

An evidence review of research on health interventions in humanitarian crises



LONDON
SCHOOL *of*
HYGIENE
& TROPICAL
MEDICINE

NOVEMBER 2013

Principal Investigators

Karl Blanchet and
Bayard Roberts

Authors

Karl Blanchet, Vera Sistenich,
Anita Ramesh, Severine Frison,
Emily Warren, Mazeda Hossain,
Abigail Knight, Chris Lewis,
James Smith, Aniek Woodward,
Maysoon Dahab, Sara Pantuliano,
Bayard Roberts

Partners

The Harvard School of Public
Health and the Overseas
Development Institute

Funders

Department for International
Development (DFID) and the
Wellcome Trust

Commissioning Agency

Enhancing Learning and
Research for Humanitarian
Assistance (ELRHA)



HARVARD
SCHOOL OF PUBLIC HEALTH



Acknowledgements

We would like to thank the Wellcome Trust and the Department for International Development (DFID) for funding this project and Enhancing Learning and Research in Humanitarian Assistance (ELRHA) for managing it. We would also like to thank the project advisory committee members (listed in Annex 1) and the expert interviewees (listed in Annex 2).

Disclaimer

This is a collaborative report from the London School of Hygiene and Tropical Medicine, the Harvard School of Public Health and the Overseas Development Institute (ODI). Any opinions and recommendations contained therein are those of the report authors, not of ELRHA, DFID or the Wellcome Trust.

Executive Summary

Background

The need for a stronger scientific evidence base for responses to humanitarian crises has been identified by various public health actors. To this end, the UK Department for International Development (DFID) and the Wellcome Trust commissioned a project to review the evidence base of public health interventions in humanitarian crises. The overall aim of the project is to provide a rigorous assessment of the current quality and depth of the evidence-base that informs humanitarian public health programming globally. The project therefore assesses the quantity and quality of intervention studies, rather than measuring the actual effectiveness of the intervention itself.

The project addresses evidence on interventions in humanitarian crises (including early recovery and forced displacement) for health topics of: communicable disease control; water, sanitation and hygiene (WASH); nutrition; sexual and reproductive health (SRH), including gender-based violence (GBV); mental health and psychosocial support; non-communicable disease (NCD); injury and physical rehabilitation, health services, and health systems. In addition, contextual factors influencing the delivery of health-related interventions are included in the project, consisting of: access to health services, health assessment methods, coordination, accountability, health worker security, and urbanisation.

Methods

The research project uses the following two main methods:

- (i) A series of systematic literature reviews on evidence of humanitarian interventions related to the health topics and on the influence of contextual factors on the interventions. The systematic review on evidence of interventions for the different health topics included quantitative evidence from published and grey literature. The systematic review on the contextual factors included quantitative and qualitative evidence from the published literature. Standard systematic review methodologies were used.
- (ii) Qualitative individual interviews with expert practitioners, policy makers and academics to identify critical weaknesses and gaps in the evidence base for humanitarian public health actions (including related to the contextual factors) and to recommend priority areas for further research. A series of more general consultations with humanitarian health experts through meetings in London, Geneva, Paris, and New York.

Results

An overview of the main results is firstly presented, followed by the results of the individual health topics and contextual factors.

Overview

- Research on the effectiveness of health interventions in humanitarian crises has significantly increased during the last decade, with 76% of the 706 studies selected in the systematic review published between 2000 and 2012. However, considering the diversity of humanitarian crises, contexts and health care needs, the volume of evidence available remains too limited – particularly for health topics of gender-based violence (GBV) and water, sanitation and hygiene (WASH).
 - 60% of the studies reviewed in-depth were rated moderate to high quality, but the quality of research has improved during the last decade.
-

- Interventions for some health topics require further evidence on their actual effectiveness (e.g. GBV and mental and psychosocial health) whereas other topics require evidence on the most effective way of delivering the health intervention (e.g. injury & rehabilitation, WASH, NCD, SRH), while nutrition and communicable disease control tend to require evidence on the effectiveness of some interventions and also evidence on the most effective way of delivering others types of interventions.
- Common themes identified in all the health topics and contextual factors include:
 - Systems and delivery: more evidence on the effectiveness and feasibility of inter-sectoral interventions, scaling-up, task-shifting, and supporting health system resilience.
 - Research methods: development and validation of robust assessment methods; greater use of certain research designs (particularly for cost-effectiveness) and baseline and routine data; and high quality mixed methods studies.
 - Context: Greater evidence is required on dispersed, urban and rural populations; on ensuring continuity of care – particularly for chronic conditions and NCDs; and measuring and addressing health care needs in middle-income settings (particularly NCDs).

Communicable disease control

Seventy two studies on communicable disease control interventions met the inclusion criteria and were reviewed in depth. Thirty four were graded as high quality. The following highlights the research needs identified from the systematic review and expert interviews:

- Research should be conducted to help standardise medical protocols and quality standards to direct interventions, and indicators to measure their impact.
- Specific evidence gaps exist around many issues related to communicable diseases: disease themselves (e.g. pertussis, hepatitis A and E, and measles), methods to measure them (e.g. Quality Assurance Sampling (LQAS)), and standard measurements such as mortality (e.g. age and gender specific).
- Increasing urbanisation, and movement of people to coastal areas, means that more research is needed on populations living in these areas.
- More attention needs to be given to regional analysis amongst these populations, especially due to issues related to migration and importation of disease.
- More anthropological/sociological research is needed for communicable disease interventions (e.g. acceptability).
- Research could help validate syndromic diagnoses (e.g. diarrhoea) with laboratory confirmed (e.g. shigella) outcomes for communicable disease interventions.

Water, Sanitation and Hygiene (WASH)

Only eight studies on WASH interventions met the inclusion criteria, and three were of high quality. The following highlights the research needs identified from the systematic review and expert interviews:

- More research expertise is needed to guide operational organisations on how WASH interventions can be linked to health outcomes, including on the use of different study designs.
 - A review of Sphere indicators for the WASH sector is needed.
 - More research is needed on behaviour change (e.g. acceptability of interventions, barriers to uptake).
 - The evidence base on specific WASH interventions for health outcomes (e.g. hepatitis E, cholera) needs to be strengthened.
 - Economic and anthropological research is needed. What level of success is acceptable to communities, governments, etc in relation to health effects seen as well as money spent?
-

Nutrition

Seventy-seven studies on nutrition interventions met the inclusion criteria, and 18 were of high quality. The following highlights the research needs identified from the systematic review and expert interviews:

- A better understanding of the aetiology of malnutrition and famines in different contexts is required.
- Evidence on the impact of contextual factors on famine and malnutrition (e.g. anthropological studies on the power of women in society).
- Evidence on how best to intervene in low Global Acute Malnutrition (GAM) prevalence settings and/or in middle income countries.
- Need to test different monitoring tools, techniques and new technologies to measure progress and impact of nutrition programmes, including better use of routine data and monitoring and evaluation data.
- More evidence on cost-effectiveness of nutrition interventions.
- More evidence required on the impact of Infant and Young Child Feeding interventions (IYCF).
- Research focus needed on infants, people with disabilities and elderly.
- Search alternatives to Blanket Supplementary Feeding programmes (BSFP) (i.e. Cash transfer vs. Ready to Use Food (RUF) distribution; food security intervention vs. RUF).
- More research required on long term effects of interventions (i.e. long-term effects of blanket distribution of lipid based supplement).
- Further research required on stunting.
- Evidence required on the most effective way of delivering nutritional programmes? Community health workers or health facilities?
- Long-term effect of RUF on anthropometric status, cognitive development, risk of relapse etc.

Sexual and reproductive health (SRH), including gender-based violence (GBV)

Thirty-one studies on SRH (including GBV) interventions met the inclusion criteria, and only four were of high quality. Of the 31 studies, only three related to GBV interventions. The following highlights the research needs identified from the systematic review and expert interviews:

- More evidence on SRH interventions with particular populations groups (e.g. people with disabilities, men, adolescents)
 - More evidence on different models of scaling up services (e.g. facility- or community-based care, task-shifting, greater involvement of community members).
 - Evidence on effectiveness and feasibility of new technologies.
 - Evidence on availability and use of SRH commodities in emergencies.
 - Evidence on behaviour, knowledge, attitude and barriers to long acting reversible contraception; and implications regarding availability of long-term care.
 - More evidence on the provision of safe abortion services, and delivery services (particularly caesarean sections).
 - There is extremely limited evidence on GBV. More information is needed on the spectrum and context of GBV.
 - Evidence is required on effectiveness and operational constraints of targeted interventions (e.g. safe spaces, cash-transfers, livelihoods programmes).
 - Evidence is required on the appropriateness and use of GBV guidelines.
 - Development of new methodological approaches to overcome contextual and logistical constraints to research.
-

Mental health and psychosocial support

Sixty-nine studies of mental health and psychosocial support interventions met the inclusion criteria, and 15 were of high quality. The following highlights the research needs identified from the systematic review and expert interviews:

- Evidence required on effectiveness and feasibility of scaling-up low intensity and low cost psychological interventions.
- Substantially more evidence is required on the effectiveness of psychosocial interventions.
- Evidence required on the effectiveness of group-based interventions as well as interventions for individuals.
- Evidence required on the effectiveness of interventions using parents, natural support systems, and schools.
- Evidence required on the use of inter-sectoral approaches (e.g. nutrition, protection, education).
- Evidence required on using a modular transdiagnostic approach to treating mental disorders, including multiple disorders.
- Evidence on the effectiveness and feasibility of e-mental health interventions.
- Evidence on the effectiveness and feasibility of training interventions.
- Evidence required on the effectiveness of treating severe mental disorders, drug and harmful alcohol use, and functioning.
- Evidence from randomised control trials (RCTs) is required, but also other study designs (including quasi-experimental) and the use of routine clinical outcome data. Studies should include mixed methods to improve acceptability and appropriateness of interventions and research.
- Substantially more evidence is required on the feasibility of interventions, particularly economic feasibility and cost-effectiveness of interventions.
- Evidence is particularly required for children, adolescents, older populations and survivors of sexual and intimate partner violence.
- Greater evidence is required on the harmful effects of mental health and psychosocial support interventions.
- The quality of research needs to improve in order to ensure valid and reliable results.

Non-Communicable Diseases (NCDs)

Twenty-six studies on NCD interventions met the inclusion criteria, with four of a high quality. The following highlights the research needs identified from the systematic review and expert interviews:

- Strong need for the development and testing of standards and guidelines for the delivery of NCD care in crisis settings.
- There is a need for much more evidence on interventions for a range of leading NCDs, particularly addressing longer-term outcomes.
- There is a need for much more evidence on NCD interventions from a range of different country settings.
- Studies are needed on the feasibility and cost of NCD interventions, particularly over the longer-term.
- Evidence on experiences of collaborations and benefits with other sectors (e.g. nutrition) is required.

Injury and Rehabilitation

Seventy-six studies on injury and rehabilitation interventions met the inclusion criteria and were reviewed in-depth, and only two were of a high quality. The following highlights the research needs identified from the systematic review and expert interviews:

- Greater quantity and quality of evidence is required on the effectiveness and cost-effectiveness of rehabilitative interventions, particularly rehabilitative interventions and over the longer-term – including measuring long-term health outcomes, functionality, and quality of life.
-

- More research is needed to better understand the mechanisms that enable a continuum of care as programmes transition from the crisis to the development phase.
- Research is needed to develop appropriate quality standards and measurements of service performance.
- More evidence must be collected following natural disasters, as illustrated by the response to the 2010 Haitian Earthquake.
- More evidence should be collected related to rehabilitation interventions in camp contexts.
- More studies are needed that evaluate rehabilitation interventions in the preparedness phase, and the subsequent impact they have on health outcomes.

Health Service Delivery

Thirty-two studies on health service delivery met the inclusion criteria but only four papers measured health outcomes and these were of a low quality. The following highlights the research needs identified from the systematic review and expert interviews:

- There is a strong need to improve the quantity and quality of the evidence base on health service interventions, particularly longitudinal studies of longer-term health service interventions and related health outcomes.
- More research is required on different service delivery models of health care.
- More research is required on the content, delivery and health outcomes of different service delivery packages of care.
- Longitudinal study designs are needed to help capture this information.
- There was a lack of consensus over the guidelines to be used, or even evaluated, for health service delivery. Further studies looking specifically at this issue would enable practical suggestions for service delivery in crisis situations.

Health Systems

Fifty-six studies on health systems met the inclusion criteria. The following highlights the research needs identified from the systematic review and expert interviews:

- There is a need for further research to measure the impact crises can have on local health systems.
- Evidence is required on the effectiveness of different models of delivering health interventions during humanitarian crises: vertical versus integrated humanitarian interventions, facility-based versus community-based interventions, comprehensive package versus single interventions.
- Evidence is required on the resilience of health systems to absorb crises and on their capacities to continue the delivery of services (e.g. non communicable diseases) after the departure of humanitarian actors.
- Evidence is required on the impact of preparedness on a humanitarian crisis, and whether stronger and better prepared health systems have improved health outcomes following a humanitarian crisis.
- There is a need for much more research into some of the specific areas of the health system, particularly the influence of health financing and access to essential medicines in a humanitarian crisis.
- Research on how interventions for sub-sectors health could take the opportunities that humanitarian crises offer to strengthen the systems.

Access to healthcare

Sixty-four studies on access to healthcare met the inclusion criteria. The following highlights the research needs identified from the systematic review and expert interviews:

- There is a particular paucity of evidence on the impact of physical, economic and political accessibility of health workers on public health interventions during crises.
-

- More research is required on the influence of access on the impact of public health interventions.
- Research into the development of standardised methods or indicators to measure the different aspects of both end-user and health worker access to healthcare (which are currently lacking) is required.
- Greater research attention should be given to the impact of access to healthcare on health interventions during natural disasters and in the acute phase of crises.
- Greater research attention should be given to real-time mapping of access to healthcare of end-users.
- Greater research attention should be given to optimising healthcare access in crisis areas outside government control for both end-users and healthcare workers.
- Greater research attention should be given to health disparities arising from access inequities between resident and transiting populations within a crisis location.
- More research is needed on the role of mobile phones and other digital technologies in improving health access for end-users.
- More research is needed into mechanisms and policies which safeguard or improve access to healthcare during humanitarian crises.

Accountability to end-users

Thirty studies on accountability to end-users and health met the inclusion criteria. The following highlights the research needs identified from the systematic review and expert interviews:

- Research on the influence of accountability on the impact of public health interventions is needed.
- Research on the development of standardised methods or indicators to measure the different aspects of accountability in health interventions is required.
- High quality comparative studies are needed to inform how accountability influences health interventions and outcomes.
- More evidence is needed on the role and methods of informed consent of end-users in crisis settings, to the perception of end-users regarding humanitarian healthcare delivery, and to the validation of assumptions concerning end-users.
- More research is required on the impact of the asymmetry of power between end-users and humanitarian agencies on public health interventions.
- Populations needing increased research focus include IDP and refugee populations; adolescents; the disabled; the elderly; those with chronic disease; and the LGBT community.
- More research is needed into mechanisms and policies which safeguard or improve accountability to end-users during humanitarian crises.
- Research into the development of ethical guidelines for humanitarian research and programmatic development should be intensified.

Health Assessment Methods

Eighty-three studies on health assessment methods met the inclusion criteria. The following highlights the research needs identified from the systematic review and expert interviews:

- More quality research is needed on the development, comparison, testing and validation of health assessment methods.
 - There is a pressing need for evidence-based consensus-building on the standardised health assessment methods that agencies will agree to use for recognised health topics.
 - Greater research attention should be given to the impact of different health assessment methodologies on the effectiveness of public health interventions during humanitarian crises.
-

- Research is needed on the humanitarian system's 'fitness-for-purpose' for addressing health needs within any crisis situation.
- Research is needed on the identification of appropriate indicators with which to measure humanitarian contextual factors in relation to health outcomes.
- Greater research attention could be given to long-term impact assessment methodologies of the contextual factors in relation to health outcomes (e.g. coordination of communicable diseases and WASH in relation to cholera).
- More research is needed into mechanisms and policies that safeguard or improve health assessment methods during humanitarian crises.

Coordination

Twenty-five studies on coordination and health met the inclusion criteria. The following highlights the research needs identified from the systematic review and expert interviews:

- More research is needed on the influence of coordination on public health interventions during humanitarian crises, including cost-benefit analysis.
- Research is also needed on non UN/OHCA-centric mechanisms of coordination, including those of local/domestic and non-cluster agencies.
- High quality comparative studies are needed to inform how coordination influences public health interventions, including the role of different levels and aspects of coordination.
- Greater research attention should be given to investigate the health impact of clusters as a coordination mechanism.
- Greater research attention should be given to impact of integrated UN missions on healthcare delivery.
- Greater research attention should be given to how international actors coordinate with local government.
- Research is needed to evaluate the advantages and disadvantages for health of pooled funding within the UN structure.
- Greater research attention should be given to the role of generating competitive market forces between agencies in improving coordination and healthcare delivery efficiency.
- More research is needed into mechanisms and policies which safeguard or improve coordination during humanitarian crises.

Security of healthcare workers

Only 16 studies on healthcare worker and health security met the inclusion criteria. The following highlights the research needs identified from the systematic review and expert interviews:

- The issue of security of healthcare workers in the humanitarian sector is disproportionate to the very limited available evidence in both terms of quantity and quality.
 - There is a need for more research on how healthcare worker security influences the effectiveness of public health interventions in humanitarian crises.
 - High quality comparative studies are needed to inform how security influences health interventions and outcomes, in particular comparing crises of varying security levels, crises in urban vs. rural settings, and crises with international vs. purely local or domestic health assistance.
 - Greater research attention should be given to the increased risks posed by integrated UN missions.
 - Research is needed to measure the impact of using foreign over local healthcare workers.
 - Greater research attention should be given to identification of risk factors associated with security threats to healthcare workers.
-

- Greater research attention should be given to the impact of asymmetry of power on the effectiveness of health interventions within a conflict setting on security.
- Research is needed to assess the impact of patients' perception on security.
- Greater research attention should be given to the impact of healthcare worker security on public health interventions during natural disasters and in the acute phase and early recovery phases of crises.

Urbanisation

Twenty-seven studies on urbanisation and healthcare met the inclusion criteria. The following highlights the research needs identified from the systematic review and expert interviews:

- More comparative studies between rural, camp and urbanised environments would be very helpful to adjust health interventions to be more effective for urban environments.
 - More research is needed on the influence of the following aspects on public health interventions: Opportunities for disaster preparedness and coordination; role of civil engineering and urban planning in disaster prevention and mitigation; use of social media and other forms of mass communication; control of infectious disease outbreaks, public health interventions.
 - Greater research attention should be given to efficient methods of identification and targeted health interventions of IDP and refugee populations within non-camp urban settings.
 - Greater research attention should be given to the management of chronic disease in crisis-affected urban populations.
-

Table of contents

List of acronyms	14
1. Introduction	15
1.1 Background	15
1.2 Conceptual framework	15
2. Methods	16
2.1 Systematic literature review on health topics	16
2.2 Systematic literature review on contextual factors	20
2.3 Expert interviews	23
3. Overview of Results	25
3.1 Quantity	25
3.2 Quality	26
3.3 Ranges of effectiveness	26
3.4 Common themes	27
4. Results for Health Topics	29
4.1 Communicable disease control	29
4.2 Water, sanitation and hygiene	37
4.3 Nutrition	42
4.4 Sexual and reproductive health (including gender-based violence)	50
4.5 Mental health and psychosocial support	56
4.6 Non-communicable disease	66
4.7 Injury and physical rehabilitation	71
4.8 Health service delivery	79
4.9 Health systems	86
5. Results for Contextual Factors	92
5.1 Access to healthcare	92
5.2 Accountability to end-users	97
5.3 Health assessment methods	101
5.4 Coordination	107
5.5 Security of healthcare workers	111
5.6 Urbanisation	114

Annex 1: List of key contributors to the project	118
Annex 2: List of expert interviewees	120
Annex 3: Search terms used for key bibliographic databases	124
Annex 4: Details for systematic review on communicable disease control	126
Annex 5: Details for systematic review on water, sanitation and hygiene	132
Annex 6: Details for systematic review on nutrition	134
Annex 7: Details for systematic review on sexual and reproductive health (including GBV)	140
Annex 8: Details for systematic review on mental health and psychosocial support	144
Annex 9: Details for systematic review on non-communicable disease	148
Annex 10: Details for systematic review on injury and physical rehabilitation	151
Annex 11: Details for systematic review on health service delivery	157
Annex 12: Details for systematic review on health systems	161
Annex 13: Details for systematic review on access to health care	163
Annex 14: Details for systematic review on accountability to end-users	169
Annex 15: Details for systematic review on health assessment methods	172
Annex 16: Details for systematic review on coordination	179
Annex 17: Details for systematic review on security of healthcare workers	182
Annex 18: Details for systematic review on urbanisation	184

List of Figures

Figure 1: Project conceptual framework	15
Figure 2: Total number of papers, by decade	25
Figure 3: Total number of papers, by health and contextual topic	25
Figure 4: Range of effectiveness among health topics	26
Figure 5: Common themes identified across health and contextual topics	27
Figure 6: Quantity and quality of communicable disease publications over time	29
Figure 7: Communicable disease research, by geographic region	30
Figure 8: Communicable disease research, by crisis type	30
Figure 9: Communicable disease, by disease	31
Figure 10: Communicable disease, by intervention	31
Figure 11: Communicable disease studies by stage of crisis	37
Figure 12: Quantity and quality of WASH publications over time	38
Figure 13: WASH research by crisis type	38
Figure 14: WASH research by geographic region	38
Figure 15: WASH disease outcomes	38
Figure 16: WASH interventions	38
Figure 17: WASH studies by stage of crisis	39
Figure 18: Quantity and quality of nutrition publications over time	42
Figure 19: Geographic regions of nutrition	43
Figure 20: Nutrition studies by emergency type	43
Figure 21: Nutrition interventions	43
Figure 22: Nutrition outcomes	43
Figure 23: Nutrition intervention types of over time	44

Figure 24: SRH and GBV outcomes described in studies	50
Figure 25: SRH or GBV interventions	50
Figure 26: Quantity and quality of SRH/GBV publications over time	51
Figure 27: SRH/GBV studies by quality of evidence and health outcomes	51
Figure 28: SRH/GBV studies by geographic region	52
Figure 29: SRH/GBV studies by crisis type	52
Figure 30: SRH/GBV studies by crisis stage	52
Figure 31: Quantity and quality of mental health and psychosocial support publications over time	57
Figure 32: Mental health and psychosocial support outcomes measured over time	58
Figure 33: Mental health and psychosocial support intervention types	59
Figure 34: Quantity and quality of NCD publications over time	66
Figure 35: NCD studies by crisis stage	67
Figure 36: NCD studies by disaster type	67
Figure 37: Geographic regions of NCD studies	67
Figure 38: NCD types	68
Figure 39: NCD interventions	68
Figure 40: Quantity and quality of injury rehabilitation publications over time	71
Figure 41: Geographic regions for injury rehabilitation studies	72
Figure 42: Injury rehabilitation studies by crisis stage	72
Figure 43: Health outcomes measured by injury rehabilitation studies	73
Figure 44: Injury rehabilitation intervention types	73
Figure 45: Quantity and quality of health service delivery studies over time	79
Figure 46: Geographic regions of health service delivery studies	80
Figure 47: Health service delivery research by crisis type	80
Figure 48: Number of health service delivery studies by crisis stage	81
Figure 49: Number of studies examining each service delivery level	81
Figure 50: Measures of health service effectiveness	82
Figure 51: Types of health service delivery	82
Figure 52: Quantity of health systems studies over time, by crisis type	86
Figure 53: Health systems studies by target group	86
Figure 54: Studies by health system building block	87
Figure 55: Project Structure	119

List of Tables

Table 1: Categorisation of selected literature	19
Table 2: Quality review criteria (adapted from STROBE and CONSORT)	19
Table 3: Quality assessment corresponding to adapted STROBE and CONSORT criteria	20
Table 4: Quality review criteria (adapted from RATS)	23
Table 5: Study categories and their relative correspondence to quality criteria	23

LIST OF ACRONYMS

ALNAP	Active Learning Network for Accountability and Performance
BCG	Bacillus Calmette–Guérin
CBT	Cognitive Behavioural Therapy
CD	Communicable Disease
CDC	US Centers for Disease Control and Prevention
CMAM	Community-based Management of Acute Malnutrition
CONSORT	Consolidated Standards of Reporting Trials
CRED	Centre for Research on the Epidemiology of Disasters
DAC	Development Assistance Committee
DARE	Database of Abstracts of Reviews of Effectiveness
DFID	Department for International Development
DOTS	Directly Observed Therapy Short course
GAM	Global Acute Malnutrition
GBV	Gender-Based Violence
GWA	Gender and Water Alliance
HSPH	Harvard School of Public Health
HERR	Humanitarian Emergency Response Review
IBSS	International Bibliography of the Social Sciences
ICRC	International Committee of the Red Cross
IDP	Internally Displaced Persons
IYCF	Infant and Young Child Feeding
IGRAC	International Groundwater Resources Assessment Centre

IMC	International Medical Corps
IWA	International Water Association
IWRA	International Water Resources Association
LSHTM	London School of Hygiene & Tropical Medicine
MAM	Moderate Acute Malnutrition
MCH	Maternal and child health
MSF	Médecins Sans Frontières
NCD	Non-communicable Disease
OCHA	Office for the Coordination of Humanitarian Affairs
ODI	Overseas Development Institute
OECD	Office for Economic Co-operation and Development
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomised Controlled Trial
RHRC	Rural Health Research Center
RUSF	Ready to Use Supplementary Food
RUTF	Ready to Use Therapeutic Food
SHARE	Sanitation and Hygiene Applied Research for Equity
SRH	Sexual and Reproductive Health
STROBE	Strengthening the Reporting of Observational studies in Epidemiology
UNHCR	United Nations High Commission for Refugees
UNISDR	United Nations International Strategy for Disaster Reduction
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

1. Introduction

1.1 Background

The need for a stronger scientific evidence base for responses to humanitarian crises has been identified by various public health actors, and was a key recommendation of the United Kingdom Humanitarian Emergency Response Review.¹ To this end, the UK Department for International Development (DFID) and the Wellcome Trust commissioned a review of the evidence base of public health interventions in humanitarian crises.²

The overall aim of the project is to provide a rigorous assessment of the current quality and depth of the evidence-base that informs humanitarian public health programming globally. The specific objectives are:

- To present a thorough assessment of the current quality and depth of the available evidence-base for humanitarian public health actions.
- To present a clear and authoritative overview of the frameworks and assumptions which underpin key thematic areas within the humanitarian public health field.
- To identify critical weaknesses in the evidence base, where further research is required.
- Identify, through consultation with practitioners and policy makers, priority areas where further investment in the research and evidence base is most needed.

1.2 Conceptual framework

The conceptual framework used for this project is shown in Figure 1. The framework contains health interventions related to core health topics, and key contextual factors which influence the delivery of the core health interventions in humanitarian crises. The conceptual framework was adapted from Hoffman et al.³ and the selection of health topics, contextual factors and cross-cutting issues informed by Sphere Standards and discussions with key experts.⁴

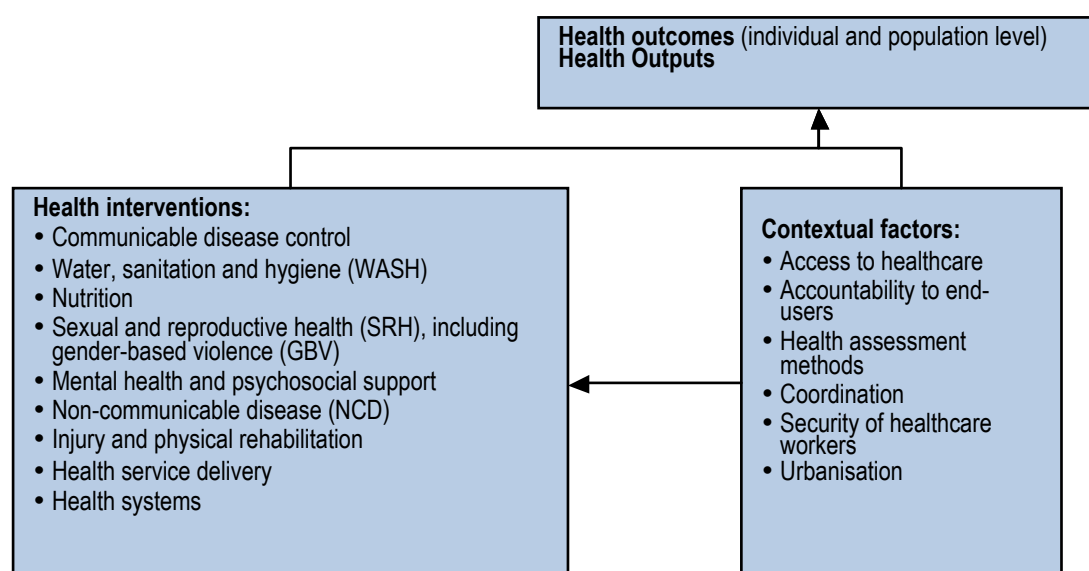


Figure 1: Project conceptual framework

¹HERR, Humanitarian Emergency Response Review, L.P. Ashdown, Editor 2011, Humanitarian Emergency Response Review.

²For the purposes of this project, humanitarian public health is defined as interventions that contribute collectively, in combination or singularly to saving lives, building resilience and promoting better health outcomes in humanitarian emergencies. In this approach public health interventions should be considered in their broadest scope including all relevant practice areas such as water and sanitation and nutrition.

³Hofmann C, et al., Measuring the impact of humanitarian aid: A review of current practice. Overseas Development Institute, 2004.

⁴Sphere Project, Sphere Handbook: Humanitarian Charter and Minimum Standards in Disaster Response, 2004.

2. Methods

The project consists of two main research methods. First, a systematic literature review on evidence on interventions of the health topics and contextual factors. Second, qualitative expert interviews with practitioners, policy makers and academics addressing the core health topics and contextual factors. The research for the health topics was conducted by staff at LSHTM, while the research on the contextual factors was led by staff at Harvard (see Annex 1 for further details on project structure and staffing).

2.1 Systematic literature review on health topics

This series of systematic reviews aims to provide a situational analysis of the existing evidence from humanitarian crises on public health interventions for the following health topics: communicable disease control; water, sanitation and hygiene (WASH); nutrition; sexual and reproductive health (SRH), including gender-based violence (GBV); mental health and psychosocial support; injury and physical rehabilitation; non-communicable disease (NCD); health services; and health systems⁵. The systematic review methodology adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.⁶

2.1.1 Key terms:

The following key terms and concepts relate to this systematic literature review, their definitions having been adapted from the World Health Organization (WHO) Humanitarian Health Action Dictionary.⁷

Public Health Intervention: Public health actions that seek to improve health outcomes.

Humanitarian crisis: A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources, necessitating a request to national or international level for external assistance. The disaster situation may either be manmade (e.g. armed conflict) or a natural phenomenon (e.g. drought).

Man-made humanitarian disasters: These include international armed conflicts; non-international armed conflicts; and other situations of violence.⁸

Natural disasters: These include hazardous natural phenomena leading to humanitarian crises such as earthquakes, volcanic activity, landslides, tsunamis, tropical cyclones and other severe storms, tornadoes and high winds, floods, and droughts.

Early Recovery: Early Recovery is defined as recovery that begins early in a humanitarian setting. It is a multi-dimensional process, guided by development principles. It aims to generate self-sustaining nationally owned and resilient processes for post-crisis recovery.

⁵The health systems literature review also included qualitative studies given the multi-faceted nature of health systems. The methodology for reviewing the qualitative studies is described in section 2.2.5.

⁶Moher, D., et al., Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ*, 2009. 339: p. b2535.

⁷World Health Organization (WHO). Humanitarian Health Action Dictionary. 2013 [cited August 29, 2013]; Available from: <http://www.who.int/hac/about/definitions/en/index.html>

⁸International Committee of the Red Cross (ICRC), 31st International Conference of the Red Cross and Red Crescent Report: International humanitarian law and the challenges of contemporary armed conflict, 2011

2.1.2 Search strategy and search terms

This literature review uses peer-reviewed literature, non-peer reviewed ('grey') literature, and expert consultation/ review of selected references to ensure all key publications have been taken into account.

Peer reviewed literature was located using electronic bibliographic databases such as Medline, Embase, and Global Health (depending on the health topic). The search structure consisted of the following:

- terms related to humanitarian crises
- AND terms related to public health interventions
- AND terms related to lower and middle income economies
- AND terms related to each of the nine health topics above

The search terms used for the main bibliographic databases are given in Annex 3. The additional health topic specific search terms were then added on (see Annexes).

Grey literature was sought using databases, humanitarian agency websites and search engines such as Google, R4D, ReliefWeb, Desastres, Eldis, ALNAP, CRED, RHRC, MSF Field Research, WHO, UNICEF, UNFPA, UNHCR, and ICRC.

Searches were supplemented by reviewing the reference lists ('references of references') of selected articles to find any other relevant papers.

The databases and search terms used for each health topic are given in the Annexes.

2.1.3 Inclusion/exclusion criteria

The following seven key inclusion criteria were used in this review:

- **Types of studies:** Primary quantitative research studies. Study designs including randomised controlled trials (RCTs), non-randomised controlled trials, controlled before-after studies, controlled interrupted time series studies, economic studies (cost-effectiveness analysis, cost-utility analysis, cost-benefit analysis, economic modelling) of public health which the outcome is measured before and after the intervention or an intervention is studied against another intervention with baseline or control group.
 - **Populations of interest:** Populations affected by humanitarian crises and receiving humanitarian assistance in low and middle-income countries (based upon World Bank country classification).
 - **Health outcomes and outputs of interest:** Primary outcomes (e.g. morbidity, mortality, vaccination status), secondary outcomes (e.g. contraceptive prevalence rate), and primary outputs (e.g. malaria bed nets distributed, nutrition supplements provided etc).
 - **Crisis Phase:** Studies that occur in humanitarian crises including those that evaluate: i) the impact of preparedness and resilience on public health outcomes during a humanitarian crises and/or ii) studies that evaluate the impact of public health interventions during the acute, chronic, or early recovery phases of humanitarian crises.
 - **Data type(s):** Must include primary data.
 - **Date of intervention and publication:** January 1, 1980 – April 30, 2013.
 - **Publication language:** English, French.
-

The following criteria were used to exclude studies from this review:

- Studies with no specific health intervention and no outcomes or outputs (i.e., excluding studies that examine only health needs, prevalence, health risk-factors, co-ordination).
- Studies that examine preparedness and resilience not linked to health outcomes in humanitarian crises (e.g. studies on housing fortification before flooding).
- Review papers; only references listed in review papers were screened to find more primary data sources.

2.1.4 Study screening and data extraction

The systematic literature review for each health topic was conducted by one topic leader (see Annex 1 for further details). For quality assurance, a secondary peer reviewer corroborated study selection and data extraction at Stage Four.

Data were screened with the following five stages:

Stage One: electronic database search using terms; with results imported into reference management software, and duplicates removed.

Stage Two: title and abstract reviewed to remove studies not meeting the inclusion criteria (see above).

Stage Three: manuscript review to remove studies that did not meet inclusion criteria; paper selection.

Stage Four: review of references of selected papers (from Stage Three).

Stage Five: final paper selection, data extraction, and quality assessment.

Data was extracted based on the specific points noted below and input into a standardised Excel database:

- study authors or agency, year
 - study country
 - setting: urban or rural
 - population type (refugee, internally displaced, entrapped population, host population)
 - humanitarian crises type (armed conflict or natural disaster)
 - health outcome(s) addressed by the public health intervention
 - type(s) of public health intervention
 - study design
 - measurement outcomes (e.g. prevalence, odds, ratios etc)
 - target age group: i) infants: under 6 months, ii) infants and young children: under two years, iii) children under five: 6 months - 59 months, iv) school age children: 6 years - 15 years, v) adolescents: 10 years - 19 years,* vi) adults: 20 years - 49 years, vii) elderly: 50+ years.
 - quality of the evidence on specific interventions
 - change in quantity of evidence over time
 - change in quality of evidence over time
 - research strengths from the literature
 - research gaps from the literature
-

2.1.5 Data categorisation and analysis

Data analysis was conducted for each health topic separately, with findings organised in relation to the key issues of quantity and quality of the evidence base. To increase clarity of the final results, the studies selected at Stage Five were arranged into three main categories of evidence (Table 1):

Table 1: Categorisation of selected literature

Category A: Studies that measure statistical associations between intervention and health-related outcome
Category B: Studies that measure changes in health-related outcome, but do not report statistical associations.
Category C: Outcomes not measured (e.g. outputs, processes, perceptions)

As indicated in Table 1, Categories A and B roughly correspond to evidence that is expected to be of high to moderate quality. Given the generally much weaker value of evidence in Category C, data extracted from studies classified as Category C was limited to the existence of the study alone.

The quality assessment of studies (Categories A and B) included in the systematic literature review were reviewed based upon criteria adapted from the STROBE and CONSORT standards for observational studies and clinical trials, respectively. The adaptations are outlined in Table 2 and scoring levels given in Table 3.

Table 2: Quality review criteria (adapted from STROBE and CONSORT)

STROBE Criteria for Observational Studies*	CONSORT Criteria for Clinical Trials*
<p>Intervention:</p> <ol style="list-style-type: none"> 1. Is the intervention clearly described? <p>Selection of participants:</p> <ol style="list-style-type: none"> 2. Is the target population defined? 3. Is there a comparison group (e.g. baseline, control)? 4. Are the inclusion and exclusion criteria defined? <p>Statistical methods:</p> <ol style="list-style-type: none"> 5. Is the sample size / method justified with statistical basis? 6. Is there a statistical test (p-value or confidence interval)? 7. Is there adjustment for confounding? <p>Limitations:</p> <ol style="list-style-type: none"> 8. Are study limitations explained (e.g. biases)? 	<p>Eligibility</p> <ol style="list-style-type: none"> 1. Did study state # not meeting inclusion criteria? 2. Did study state # declined to participate? <p>Once Randomised:</p> <p>Allocation:</p> <ol style="list-style-type: none"> 3. Did study state # receiving intervention? 4. Did study state # not receiving intervention? <p>Follow-Up:</p> <ol style="list-style-type: none"> 5. Did study state # lost to follow-up? 6. Did study provide reasons for loss to follow-up? <p>Analysis:</p> <ol style="list-style-type: none"> 7. Did study state reasons participants were excluded from analysis? 8. Are limitations of the study explained (e.g. biases)

Table 3: Quality assessment corresponding to adapted STROBE and CONSORT

Level of Quality	Rating of Evidence per STROBE / CONSORT
HIGH	7-8 criteria met = high quality evidence
MODERATE	4-6 criteria met = moderate quality evidence
LOW	1-3 criteria met = low quality evidence

2.2 Systematic literature review on contextual factors

The aim of this review was to conduct a systematic evidence review of the quantity and quality of evidence on the influence of contextual factors on public health interventions in humanitarian crises. Again, the methodology and reporting adheres to the PRISMA statement.

Contextual factors are taken here to mean the physical, political and social characteristics of the environment that are related to the effectiveness of humanitarian intervention. The six contextual factors are given below:

Access to healthcare: This encompasses both the access that end-users have to healthcare as well as the access that healthcare workers have to end-users. Accessibility of healthcare to end-users will specifically include the four overlapping dimensions of (i) Physical accessibility, (ii) Economic accessibility, (iii) Informational accessibility, and (iv) Non-discrimination. Accessibility for workers to provide healthcare to end-users will include the dimensions of (i) Physical accessibility, (ii) Economic accessibility, and (iii) Political accessibility.

Health assessment methods: This will look for studies specifically seeking to test, develop or validate measurement methods (e.g. mortality estimation, population estimation, nutritional assessment etc.).

Coordination: The quality of coordination and leadership in the implementation of public health interventions during humanitarian crises at the local, regional or international level via local or OCHA-led mechanisms influences their impact. In addition to the logistical aspects of coordination, the effects of competition among local and international agencies for funding and recognition, and the lack of consensus on which public health actions are considered humanitarian and which are considered developmental will also be included.

Accountability to end-users: The Humanitarian Charter emphasises the importance of accountability of agencies to crisis-affected populations. Accountability will include the following dimensions based on a human rights-based approach to health: (i) Availability of functioning public healthcare facilities, goods and services in sufficient quantity, with sufficient capabilities, and in a timely manner; (ii) Acceptability of public healthcare facilities, goods and services in terms of medical ethics and cultural appropriateness; and (iii) Quality of public healthcare facilities, goods and services that are scientifically and medically appropriate and of good quality, and using trained and skilled personnel adhering to accepted professional standards.

Security of healthcare workers: Closely related to contextual factor 1 above (in particular the political dimension influencing the access of healthcare providers to end-users), both the interest in and the corpus of literature available on the specific issue of security of healthcare workers in humanitarian crises call for the study of this as a distinct contextual factor in this review. It will include influences which secure the respect of healthcare interventions as off-limits to deliberate attack and disruption, and those which make it conducive to hold humanitarian health action hostage (e.g. attacks on polio workers in Pakistan and Nigeria). It will also include strategies used in humanitarian health diplomacy relevant to the security of healthcare workers.

Urbanisation: Rapid global urbanisation, particularly in low- and middle-income countries, means that humanitarian crises are increasing likely to affect populations in urbanised settings. At present, the similarities and differences between the strategies and processes leading to effective public health interventions in humanitarian crises occurring in rural and urbanised environments is grossly understudied. These will be included in the analysis of this contextual factor as well as the identification of characteristics that are particular to the urban environment in terms of the physical, mental and social health challenges this setting poses to crisis-affected populations.

2.2.1 Key terms

The key terms are as given above in Section 2.1.1.

2.2.2 Search strategy and search terms:

This literature review focuses solely upon peer-reviewed literature. Relevant studies have been located using electronic bibliographic databases such as Medline, Embase, Global Health, International Bibliography of the Social Sciences (IBSS), PsychINFO, and Web of Science. The exact search terms depend on individual database but include:

- terms related to humanitarian crises
- AND terms related to lower and middle income economies
- AND terms related to each of the six contextual factors above

Peer reviewed literature research reports produced by the UN agencies were also included. These were sought from the relevant agency websites. In addition, expert consultation and a review of the reference lists ('references of references') of selected articles were used to locate other relevant papers.

2.2.3 Inclusion/exclusion criteria

The following seven inclusion criteria were used for this review:

- **Types of studies:** Primary quantitative and qualitative research published studies will be considered .
- **Populations of interest:** Populations affected by humanitarian crises in low and middle-income receiving humanitarian assistance, as defined by The World Bank.
- **Health outcomes of interest:** Primary outcomes (e.g. morbidity, mortality, vaccination status), secondary outcomes (e.g. contraceptive prevalence rate), and primary outputs (e.g. malaria bed nets distributed, nutrition supplements provided etc).
- **Crisis Phase:** Studies that cover the acute or chronic humanitarian crises, or early recovery phases of humanitarian crises.
- **Data type(s):** Must include primary data collection.
- **Date of intervention / publication:** January 1, 1980 – December 31, 2012.
- **Publication language:** English, French.

The following four exclusion criteria were used for this review:

- Studies that do not directly link the specific contextual factor with health outcomes or outputs.
 - Studies that examine preparedness and resilience not linked to health outcomes in humanitarian crises (e.g. studies on housing fortification before flooding).
 - Studies that focus on post conflict and post disaster reconstruction.
 - Review papers; only the references of review papers were screened to find more primary data sources.
-

2.2.4 Study screening and data extraction:

The evidence review of contextual factors was led by Vera Sistench and colleagues at Harvard University. For quality assurance, a secondary peer reviewer corroborated paper screening and data extraction.

Data was screened per the following five stages:

Stage One: electronic database search using terms provided above and in Appendices 1-7; number of results to be recorded and downloaded into an Endnote file (one per contextual factor), and duplicates removed.

Stage Two: title and abstract review to remove studies not meeting the inclusion criteria (see above).

Stage Three: manuscript/report review to remove studies that do not meet inclusion criteria.

Stage Four: review of references of references (taken from papers reviewed in Stage Three)

Stage Five: final paper selection, data extraction, and quality assessment.

Data was extracted based on specific research points noted below and input into a standardised Excel data extraction form:

- study authors/agency, year
- study country
- study population type (refugee, internally displaced, entrapped population, host population)
- humanitarian crises type (armed conflict or natural disaster)
- humanitarian crises stage (i.e., preparedness, acute crises, stabilised, early recovery)
- type of public health interventions
- main aspect(s) of contextual factor influencing impact of health intervention
- interventions influenced by contextual factor
- character of contextual factor influence
- study design
- stratification (by age and/or gender)
- use of recognised guidelines for public health intervention
- quality of the evidence on specific interventions
- change in quantity of evidence over time
- change in quality of evidence over time
- research strengths from the literature
- research gaps from the literature

2.2.5 Data categorisation and analysis:

Data analysis was conducted for each contextual factor separately, with findings organised in relation to the key issues of quantity and quality of the evidence base.

As noted above, the quantitative studies selected at Stage Five were arranged into the three main categories of strength of evidence (A, B, C). The quality of the quantitative evidence on contextual factors was also assessed using the STROBE standards for observational studies (see Table 2) (as no clinical trials will have been conducted on these contextual factors). The quality assessment of qualitative studies on contextual factors was conducted using an adapted version of the RATS guidelines for qualitative research review. The key quality criteria of RATS are shown in Table 4.

Table 4: Quality review criteria (adapted from RATS)

<p>Relevance of study question:</p> <p>1. Is the research question explicitly stated?</p> <p>Appropriateness of qualitative method</p> <p>2. Is the study designed described and justified by the authors?</p> <p>Transparency of procedures:</p> <p>3. Are the characteristics of the study group and setting clearly described?</p> <p>4. Was ethics approval cited?</p> <p>Soundness of interpretative approach:</p> <p>5. Was method of reliability check described and justified? For example, development of research of research instruments, translation, data analysis.</p> <p>6. Are the strengths and limitations explicitly described and discussed?</p>
--

The quality review of the qualitative studies was also graded studies based upon their overall quality. This grading is shown in Table 5.

Table 5: Study categories and their relative correspondence to quality criteria

Level of Quality	Rating of Evidence per RATS
<p>Category A:</p> <p>Studies that address 5-6/6 of all RATS guidelines</p>	High
<p>Category B:</p> <p>Studies that address 3-4/6 of all RATS guidelines</p>	Moderate
<p>Category C:</p> <p>Studies that address 0-2/6 of all RATS guidelines</p>	Low

2.3 Expert interviews

The aim of the expert interviews was to utilise expert opinion to identify critical weaknesses and gaps in the evidence base for humanitarian public health actions (including on contextual factors) in order to recommend priority areas for further research.

2.3.1 Design and implementation

The expert interviews were semi-structured in design. Participants were approached by email or telephone, with an information sheet and consent form provided in advance of the interview. The individual interviews were led by the individual project staff member leading the research on that particular health topic or contextual factor. They were conducted by telephone/Skype and were held in English or French. The interviews lasted between 30 and 60 minutes. In addition, a series of face-to-face individual or group expert interviews were held in London, Geneva, and Paris (with meetings in Washington and New York taking place in late May/early June). Written notes were taken during the interviews. The topic guide used for the interviews focused upon: (i) the use research in their organisation, (ii) the main guidelines and frameworks that guide interventions and associated research, (iii) the main evidence gaps and research needs, and (iv) recommendations for future research questions.

In addition, to help validate and prioritise the study findings, the preliminary findings and recommendations from the expert interviews and systematic review were then shared by email with the experts, and they were asked to give their additional perspectives on the findings and their prioritisation of the recommendations.

2.3.2 Participant sampling

Participants for the semi-structured interviews were experts and practitioners in the field of humanitarian health. They were purposively selected based upon their expertise using a mapping exercise of key personnel and agencies in the humanitarian health field, based upon their own knowledge, contacts and also through the literature. Additional participants were selected based upon suggestions from participants.

The participants were practitioners, policy makers or researchers working in the field of humanitarian public health with humanitarian NGOs, United Nations agencies, donor agencies, government agencies, and research institutes and universities. Please see Annex 11 for details of the participants.

2.3.3 Data analysis

Data analysis was conducted for contextual factor separately, with the findings organised in relation to the structure of the topic guide. Thematic analysis was then used to identify the key themes emerging from the data. The analysis was then adjusted after feedback from the experts on the preliminary findings.

2.3.4 Ethical issues

All interviews were fully confidential and anonymous. All data are securely stored and password protected. Ethics approval for the project was provided by the Ethics Committee of the London School of Hygiene and Tropical Medicine.

3. Overview of results

3.1 Quantity

Research on the effectiveness of health interventions in humanitarian crises has significantly increased during the last decade, with 76% of the 706 studies selected in the systematic review published between 2000 and 2012 (Figure 2). However, considering the diversity of crises, contexts and health care needs where humanitarian actors intervene, the volume of evidence available remains globally too limited. Health topics of gender-based violence (GBV) and water, sanitation and hygiene (WASH) had a particularly limited evidence base with only 3 and 8 studies respectively (Figure 3).

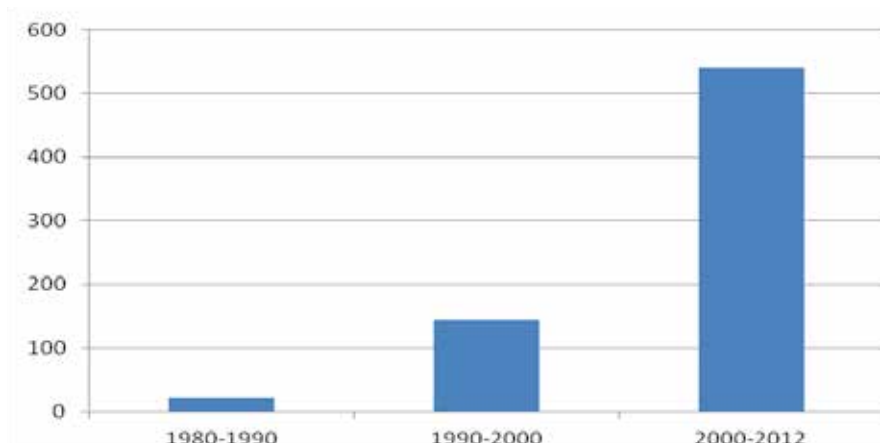


Figure 2: Total number of papers, by decade

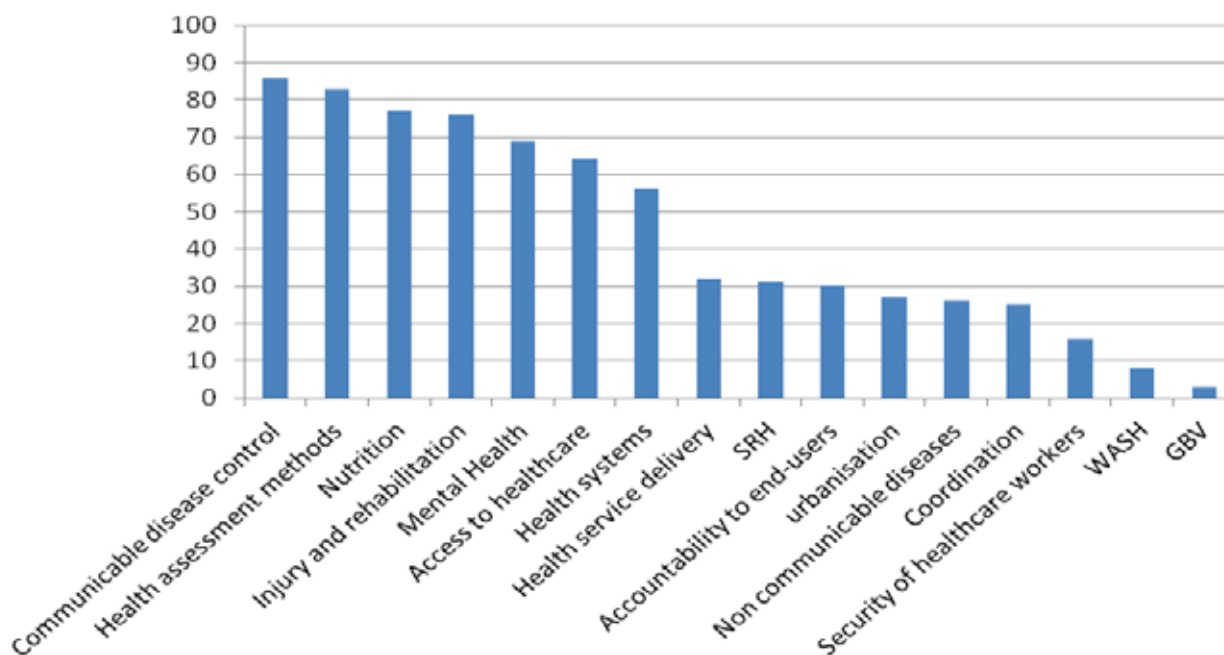


Figure 3: Total number of papers, by health and contextual topic

3.2 Quality

The quality of studies on the effectiveness of health interventions in humanitarian crises remain generally low to moderate with a very limited number of high quality studies in every field. Only 60% of the studies were rated moderate to high. However, the quality of research has significantly improved during the last decade with 80% of the studies were of being of moderate to high quality. However, the quality of studies have remained relatively low between 2000 and 2012 for research on sexual and reproductive health, health service delivery, and health systems.

3.3 Ranges of effectiveness

The research gaps identified in every health topic can be classified in three different groups (Figure 4). In areas such as GBV and mental health and particularly psychosocial support, more evidence is needed to understand the effectiveness of interventions (i.e. whether the intervention actually works). In a second group (injury and rehabilitation, WASH, NCD, SRH), evidence exists on what intervention work but research is needed on the most effective way of delivering the health intervention. In a third group composed of nutrition and communicable disease control, research needs to focus on both the effectiveness of some interventions and also the most effective way of delivering other types of interventions.

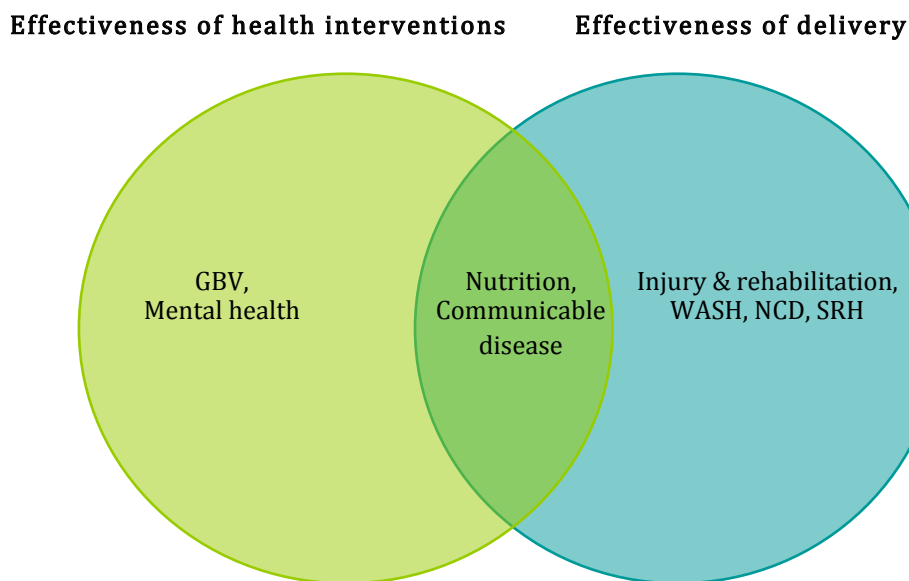


Figure 4: Range of effectiveness among health topics

3.4 Common themes

Cross-cutting issues were identified of: systems and delivery, research methods, and contexts for research (Figure 5).

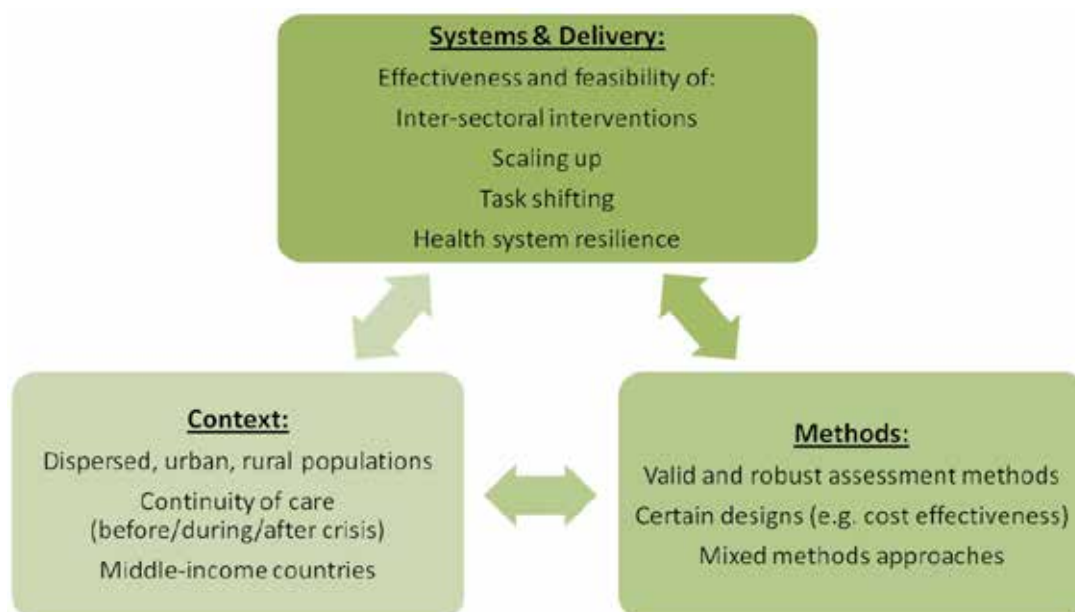


Figure 5: Common themes identified across health and contextual topics

3.4.1 Systems and delivery

- The model of delivering health interventions has been highlighted by most experts. Research is needed to test, measure and compare different models of health service delivery such as task shifting, community-based versus facility-based services.
- The fragmentation of humanitarian aid has created silos in the health sector and also with other sectors (e.g. education and protection). There is a need for interventions to create synergies between different health topics and with other sectors, and for researchers to then evaluate the health impacts of such interventions. Researchers should also initiate research that explores cross-cutting issues.
- More research is needed on understanding the most effectiveness way of building the capacities of local health services during humanitarian crises.
- Health systems resilience has increasingly emerged as a new topic of investigation. Research needs to explore how humanitarian crises affect local health systems and how local health systems adapt to or absorb crises.

3.4.2 Context

- The effectiveness of health interventions in humanitarian crises relies on the appropriateness of health interventions to local contexts. More evidence is needed on the impact of contexts (e.g. country income levels, capacity within health systems, epidemiology, security, societal organisation, cultural values etc) on the effectiveness of health interventions.

- Continuity of care is a pressing issue that needs to be addressed by humanitarian organisations to ensure that patients who need long term treatment can get access to quality healthcare after the departure of humanitarian actors. This is increasingly prescient given the growing burden of chronic diseases and NCDs, particularly in middle-income settings.

3.4.3 Methods

- In most health topics, there is a lack of harmonisation of standards and medical protocols. Researchers could help test different protocols and standards. This in turn could contribute to improve coordination amongst humanitarian actors.
 - More research is needed to develop, test and validate existing and new assessment methods (e.g. mortality estimation, population estimation, needs assessments, health service coverage and access).
 - Greater research is required on cost-effectiveness of humanitarian public health interventions, including gaining a better understanding of the burden of disease within and between health topics.
 - Greater use of baseline, and routine data to inform healthcare providers on the needs of populations and specific groups (e.g. children, elderly people or people with disabilities).
 - There is also a need for greater use of high quality mixed methods research. For example, to help guide quantitative research, to help interpret quantitative findings, and to gain better insight on issues such as access, acceptability, and appropriateness of health interventions and research.
-

4. Results for Health Topics

4.1 Communicable disease control

4.1.1 Systematic review

- A total of 16,239 peer-reviewed articles related to communicable diseases (CD), of which the vast majority (16,153) either did not address humanitarian crises or the impact of an intervention. A total of 86 peer reviewed articles covering 124 interventions met the inclusion criteria.
- There was little available grey literature, of which none met the inclusion criteria.
- Slightly over half of the selected papers (47/86) included a test of statistical significance between CD interventions and health outcomes (category A). An additional 25 (25/86) papers measured CD interventions and health outcomes without a test of statistical significance (category B). A final 14 (14/86) papers simply reported interventions and only anecdotal relationships to outcomes (category C).
- The analysis presented below relates to the 72 category A and B papers.
- There has been increasing interest in CD interventions in humanitarian crises over the past two decades; 38 (53%) papers have been published since 2000. However, increased number of publications is not correlated with increased quality (Figure 6). Of the 72 category A and B papers, 34 out of 47 (72%) category A papers were deemed high quality and 13 (28%) were deemed moderate quality; no category A papers were deemed of low quality. Nineteen out of 25 (76%) category B papers were deemed to be of moderate quality, while six out of 25 (24%) papers were deemed to be of low quality; no category B papers were deemed high quality.
- Before and after (31/72, 43%) and cohort (24/72, 33%) designs were most common, followed by randomized controlled trials (9/72, 13%). Cross sectional (3/72, 4%), non random trials (3/73, 4%), and economic studies (2/73, 3%) were relatively uncommon in this sector. The majority of the study designs employed allowed for higher quality evidence, and for the ascertainment of outcomes over time (including response to the interventions under study).

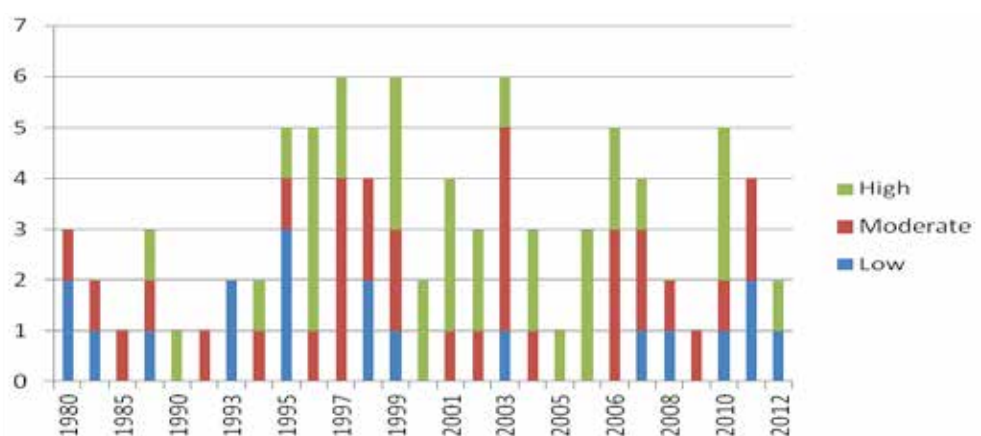


Figure 6: Quantity and quality of communicable disease publications over time

- Most studies occurred in Africa (40/72, 56%), 16 (22%) were in South Asia, 10 (14%) in Southeast Asia, and 3 (4%) each in Latin America and the Middle East (Figure 7).
- Most studies occurred in armed conflicts (63/72, 88%); only 9 (9/72, 12%) occurred in natural disasters (Figure 8). Of those in conflict zones, 59% (37/63) were with refugees, 8% (5/63) with IDPs and 33% (21/63) with

the general population. Similarly, most (7/9, 78%) natural disaster studies were conducted with the general population, and 2 (2/9, 22%) were with refugees.

- Most (38/63, 60%) studies in conflict settings were conducted in camps, 19% (12/63) were in mixed urban/rural settings, 14% (9/63) in urban settings, and 6% (4/63) in rural settings. Of the 9 studies in natural disasters, 3 (33%) were in mixed urban/rural settings, 3 (33%) in rural settings, 2 (23%) in camps, and 1 (11%) in a rural setting.

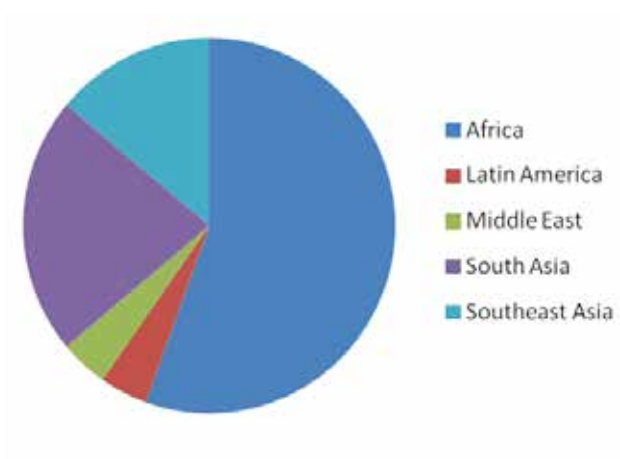


Figure 7: Communicable disease research, by geographic region

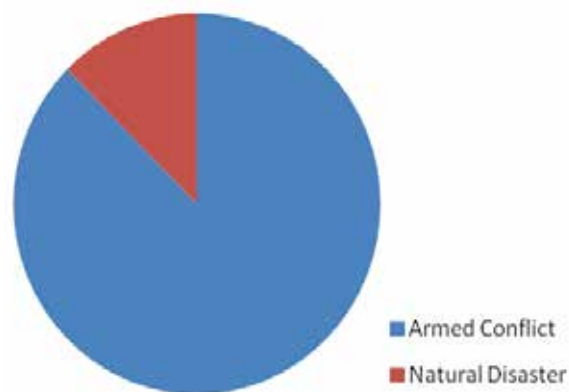


Figure 8: Communicable disease research, by crisis type

- 18 different diseases were addressed (Figure 9). Tuberculosis (25/108, 23%) and malaria (22/108, 20%) each accounted for over 20% of the diseases addressed, followed by measles (17/108, 16%), cholera (7/108, 6%), diphtheria/tetanus/pertussis (6/108, 6%), polio (6/108, 6%), and diarrhoea (6/108, 6%), shigella (5/108, 5%), and meningitis (4/108, 4%). Dengue, dracunculiasis, leishmaniasis, leptospirosis, mumps, onchocerciasis, schistosomiasis, yellow fever were each researched only once. Pneumonia is considered one of the most important contributors to morbidity and mortality in these settings and populations, but no paper explicitly addressed interventions against pneumonia.
- The 72 studies in categories A and B covered 108 interventions (Figure 10). Of these, the most popular intervention type was on vaccination (39/108, 36%). Directly observed therapy short course (DOTS) was employed in 15% (16/108) of the studies, with 5% of tuberculosis studies conducted in the pre-DOTS era (5/108). Other interventions included antimalarials (8/108, 7%), oral rehydration (7/108, 6%), insecticide-treated nets (5/108, 5%), antihelminths (3/108, 3%), indoor residual spraying (3/108, 3%), and insecticide treated sheets (3/108, 3%). Environmental spraying of insecticide, BCG vaccination, and sodium stibogluconate were researched in two studies each and, cloth filters, DEET, and zinc were used in one study each.

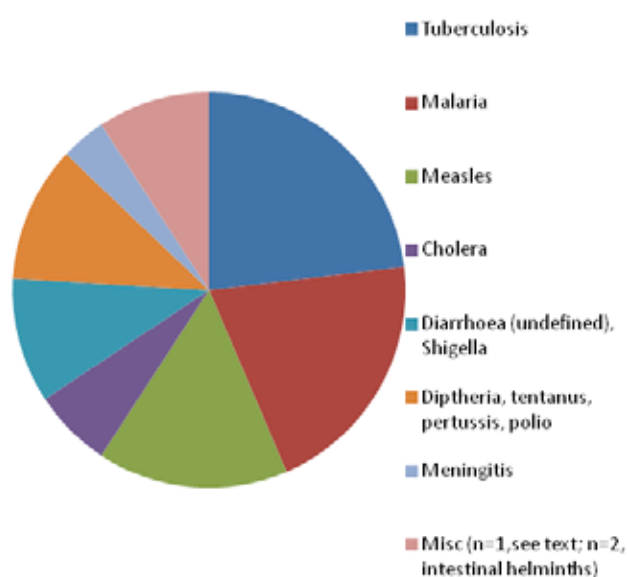


Figure 9: Communicable disease, by disease

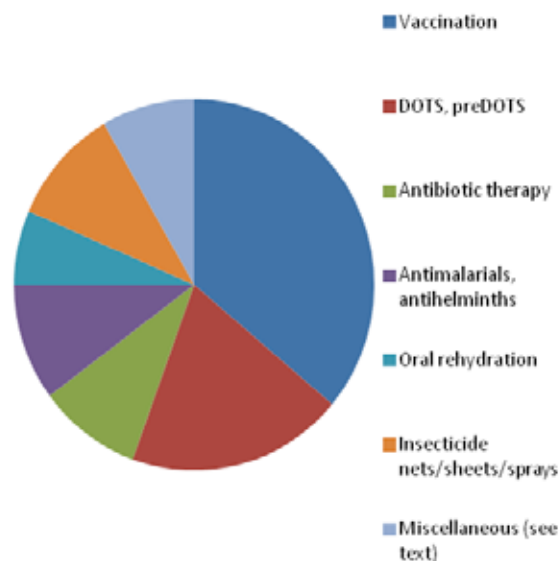


Figure 10: Communicable disease, by intervention

Most (57/72, 79%) of the studies were in the acute crisis stage, 9 (13%) were in the stabilised stage, and 6 (8%) in the early recovery stage (Figure 11). No studies were conducted during the preparedness stage.

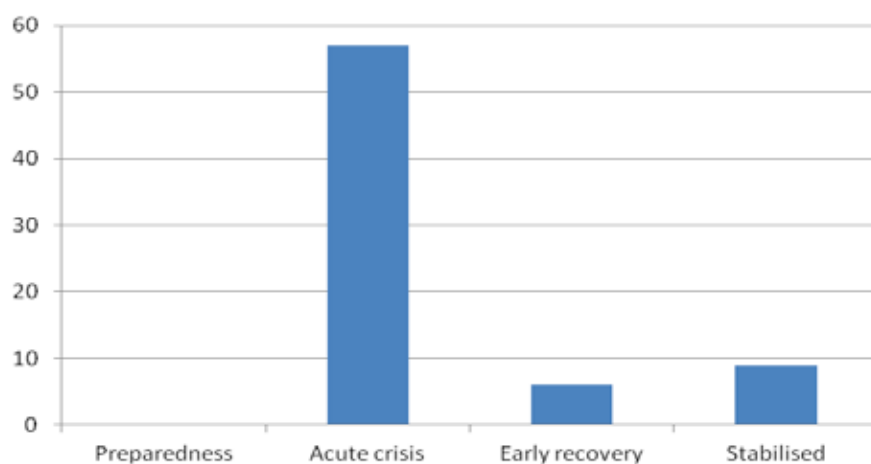


Figure 11: Communicable disease studies by stage of crisis

4.1.2 Expert interviews

Key findings from the expert interviews were as follows:

- Compared to other sectors (e.g. WASH, nutrition), the CD sector is more diverse, leading to problems when CD practitioners try to coordinate interventions and research – particularly with other sectors.
- The two largest problems facing CD research in these settings are: i) lack of coordination in response, ii) lack of consensus on standards to employ for each situation.
- Context is very important and further research is needed, for example, on how vaccinations schedules should be reconsidered per each population and crisis type (by situation, partners on the ground).
- As a sector, CD follows norms and guidelines – most notably Sphere, but individual agencies have their own guidelines and protocols, causing problems, e.g. the NATO response in Afghanistan had joined forces from different countries, meaning over 10 different malaria protocols were being used at the same time, in the same region.
- Sphere's CD indicators are not easy to measure for those practicing in the field. This has also led to a divergence of indicators, with several organisations developing their own (e.g. CDC, NGOs).
- WHO agencies need to take more leadership in this sector, as there is currently no single authoritative body to which CD practitioners defer. Experts agree this was, in theory, supposed to be the WHO but there is little guidance, which leads to each agency working more in isolation.

Evidence gaps identified by key informants included:

- The evidence base for CD interventions in crisis settings needs to be strengthened, starting with development of protocols and indicators on which everyone has consensus, e.g., Sphere indicators must be reframed into something context-specific.
- Specific evidence gaps exist around many issues related to communicable disease, including: the diseases themselves (e.g. pertussis, hepatitis A and E, and measles), methods to measure them (e.g. Lot Quality Assurance Sampling (LQAS)), and standard measurements such as mortality (e.g. age and gender specific).
- Designs to conduct and assess immunisations are problematic, with LQAS being employed by many but debated by a few experts who question its appropriateness.
- CD is context, disease and crisis specific – e.g. currently there is almost no evidence on CD control in Syrian populations; age/gender specific information is needed, even on mortality.
- Surveillance must be enhanced across all settings, once indicators are agreed upon; current surveillance focuses on measles but target ages are changing and schedules being revised.
- There is no evidence on whether a coordinated humanitarian approach will improve targets; research could be done on current versus coordinated approaches.
- Huge gap in understanding of human side of CD control; more anthropological/sociological research is needed for CD intervention success (e.g. acceptability).
- Research could validate clinical versus laboratory confirmed outcomes for CD interventions.

4.1.3 Recommendations for future research

Disease-specific gaps

- Specific evidence gaps exist around many communicable diseases such as pertussis, hepatitis A and E, or measles.

Indicators, standards, and guidelines

- The CD sector has felt a lack of uniform agreement in the area of using protocols to direct interventions, and indicators to measure their impact; research should be conducted on how to best standardise both for the CD community in crisis settings.
-

- The evidence base for CD interventions in crisis settings needs to be strengthened, starting with development of protocols and indicators on which everyone has consensus, e.g. Sphere indicators must be reframed into something context-specific.
- Better standard measurements are needed for mortality (e.g. age and gender specific) data.

Study design

- Research could help validate syndromic diagnoses versus laboratory confirmed outcomes for CD interventions.
- New measurement methods should be considered, e.g. for assessing immunization coverage.
- More anthropological/sociological research is needed for CD intervention success (e.g. acceptability, accessibility).

Contextual factors

- Increasing urbanisation and movement to coastal areas means that more attention should be given to CD research in humanitarian contexts in these settings, including disease movement to and from these population areas.

References (A and B categories): Communicable disease control

1. Aaby, P., et al., Survival of previously measles-vaccinated and measles-unvaccinated children in an emergency situation: an unplanned study. *Pediatric Infectious Disease Journal*, 2003. 22(9): p. 798-805.
 2. Aaby, P., et al., Childhood mortality after oral polio immunisation campaign in Guinea-Bissau. *Vaccine*, 2005. 23(14): p. 1746-51.
 3. Aaby, P., et al., Routine vaccinations and child survival in a war situation with high mortality: effect of gender. *Vaccine*, 2002. 21(1-2): p. 15-20.
 4. Ahmadzai, H., et al., Scaling up TB DOTS in a fragile state: post-conflict Afghanistan. *International Journal of Tuberculosis & Lung Disease*, 2008. 12(2): p. 180-5.
 5. Arumugam, M., et al., Measles transmission following the tsunami in a population with a high one-dose vaccination coverage, Tamil Nadu, India 2004-2005. *BMC Infectious Diseases*, 2006. 6(143).
 6. Bam, T.S., et al., High success rate of TB treatment among Bhutanese refugees in Nepal. *International Journal of Tuberculosis & Lung Disease*, 2007. 11(1): p. 54-8.
 7. Bohler, M., S.A. Mustafaa, and O. Morkve, Tuberculosis treatment outcome and health services: a comparison of displaced and settled population groups in Khartoum, Sudan. *International Journal of Tuberculosis & Lung Disease*, 2005. 9(1): p. 32-6.
 8. Bouma, M.J., et al., Malaria control using permethrin applied to tents of nomadic Afghan refugees in northern Pakistan. *Bulletin of the World Health Organization*, 1996. 74(4): p. 413-21.
 9. Burns, M., et al., Insecticide-treated plastic sheeting for emergency malaria prevention and shelter among displaced populations: an observational cohort study in a refugee setting in Sierra Leone. *American Journal of Tropical Medicine & Hygiene*, 2012. 87(2): p. 242-50.
 10. Centers for Disease, C. and Prevention, Implementation of health initiatives during a cease-fire-Sudan, 1995. *Morbidity and Mortality Weekly Report*, 1995. 44(23): p. 433-436.
 11. Centers for Disease, C. and Prevention, Nationwide measles vaccination campaign for children aged 6 months-12 years--Afghanistan, 2002. *MMWR - Morbidity & Mortality Weekly Report*, 2003. 52(16): p. 363-6.
 12. Depoortere, E., et al., Efficacy and effectiveness of the combination of sulfadoxine/pyrimethamine and a 3-day course of artesunate for the treatment of uncomplicated falciparum malaria in a refugee settlement in Zambia. *Tropical Medicine and International Health*, 2005. 10(2): p. 139-145.
 13. Djeddah, C., et al., An outbreak of cholera in a refugee camp in Africa. *European Journal of Epidemiology*, 1988. 4(2): p. 227-30.
-

14. Dorlencourt, F., et al., Effectiveness of mass vaccination with WC/rBS cholera vaccine during an epidemic in Adjumani district, Uganda. *Bulletin of the World Health Organization*, 1999. 77(11): p. 949-950.
 15. Elsayed, E.A., et al., Emergency measles control activities - Darfur, Sudan, 2004. *Morbidity and Mortality Weekly Report*, 2004. 53(38): p. 897-899.
 16. Garenne, M.L., R. Coninx, and C. Dupuy, Effects of the civil war in central Mozambique and evaluation of the intervention of the International Committee of the Red Cross. *Journal of Tropical Pediatrics*, 1997. 43(6): p. 318-23.
 17. Garly, M.L., et al., Prophylactic antibiotics to prevent pneumonia and other complications after measles: community based randomised double blind placebo controlled trial in Guinea-Bissau. *BMJ*, 2006. 333(7581): p. 1245.
 18. Goma Epidemiology Group, Public health impact of Rwandan refugee crisis: what happened in Goma, Zaire, in July, 1994? *Goma Epidemiology Group. Lancet*, 1995. 345(8946): p. 339-44.
 19. Gonzaga, S., et al., Enhanced medical assessment strategy for Barawan Somali refugees - Kenya, 1997. *Morbidity and Mortality Weekly Report*, 1998. 46(52): p. 1250-1254.
 20. Gustafson, P., et al., Tuberculosis mortality during a civil war in Guinea-Bissau. *JAMA*, 2001. 286(5): p. 599-603.
 21. Habib, M.A., S.B. Soofi, and Z.A. Bhutta, Effect of zinc in tablet and suspension formulations in the treatment of acute diarrhoea among young children in an emergency setting of earthquake affected region of Pakistan. *Jcpsp, Journal of the College of Physicians & Surgeons - Pakistan*, 2010. 20(12): p. 837-8.
 22. Haelterman, E., et al., Impact of a mass vaccination campaign against a meningitis epidemic in a refugee camp. *Tropical Medicine and International Health*, 1996. 1(3): p. 385-392.
 23. Heldal, E., et al., Successful management of a national tuberculosis programme under conditions of war. *International Journal of Tuberculosis & Lung Disease*, 1997. 1(1): p. 16-24.
 24. Heyman, S.N., et al., Diarrheal epidemics among Rwandan refugees in 1994. Management and outcome in a field hospital. *Journal of Clinical Gastroenterology*, 1997. 25(4): p. 595-601.
 25. Hindiyyeh, M.Y., et al., Characterization of large mumps outbreak among vaccinated Palestinian refugees. *Journal of Clinical Microbiology*, 2009. 47(3): p. 560-5.
 26. Homeida, M., et al., Resistant malaria and the Sudan floods. *Lancet*, 1988. 15: p. 912.
 27. Huhn, G.D., et al., Vaccination coverage survey versus administrative data in the assessment of mass yellow fever immunization in internally displaced persons - Liberia, 2004. *Vaccine*, 2006. 24(6): p. 730-737.
 28. Isaza, P., et al., A diarrheal diseases control program among Nicaraguan refugee children in Campo Luna, Honduras. *Bulletin of the Pan American Health Organization*, 1980. 14(4): p. 337-342.
 29. Jacquet, V., et al., Impact of DOTS expansion on tuberculosis related outcomes and costs in Haiti. *BMC Public Health*, 2006. 6(209).
 30. Kamugisha, C., K.L. Cairns, and C. Akim, An outbreak of measles in Tanzanian refugee camps. (Special issue: Global measles mortality reduction and regional elimination: a status report.). *Journal of Infectious Diseases*, 2003. 187(1): p. S58-S62.
 31. Keittivuti, B., et al., Treatment of *Schistosoma mekongi* with praziquantel in Cambodian refugees in holding centres in Prachinburi Province, Thailand. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1984. 78(4): p. 477-479.
 32. Keus, K., et al., Treatment of a cohort of tuberculosis patients using the Manyatta regimen in a conflict zone in South Sudan. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 2003. 97(6): p. 614-618.
 33. Legros, D., et al., Mass vaccination with a two-dose oral cholera vaccine in a refugee camp. *Bulletin of the World Health Organization*, 1999. 77(10): p. 837-842.
 34. Majambere, S., et al., Is mosquito larval source management appropriate for reducing malaria in areas of extensive flooding in the Gambia? A cross-over intervention trial. *American Journal of Tropical Medicine and Hygiene*, 2010. 82(2): p. 176-184.
-

35. Marfin, A.A., et al., Infectious disease surveillance during emergency relief to Bhutanese refugees in Nepal. *JAMA*, 1994. 272(5): p. 377-81.
 36. Martins, N., et al., Tuberculosis control in conflict-affected East Timor, 1996-2004. *International Journal of Tuberculosis & Lung Disease*, 2006. 10(9): p. 975-81.
 37. Mastro, T.D. and R. Coninx, The management of tuberculosis in refugees along the Thai-Kampuchean border. *Tubercle*, 1988. 69(2): p. 95-103.
 38. Mauch, V., et al., Structure and management of tuberculosis control programs in fragile states--Afghanistan, DR Congo, Haiti, Somalia. *Health Policy*, 2010. 96(2): p. 118-27.
 39. M'Boussa, J., et al., A flare-up of tuberculosis due to war in Congo Brazzaville. *International Journal of Tuberculosis & Lung Disease*, 2002. 6(6): p. 475-8.
 40. Miles, S.H. and R.B. Maat, A successful supervised outpatient short-course tuberculosis treatment program in an open refugee camp on the Thai-Cambodian border. *American Review of Respiratory Disease*, 1984. 130(5): p. 827-30.
 41. Minetti, A., et al., Tuberculosis treatment in a refugee and migrant population: 20 years of experience on the Thai-Burmese border. *International Journal of Tuberculosis & Lung Disease*, 2010. 14(12): p. 1589-95.
 42. Moll, D.M., et al., Health impact of water and sanitation infrastructure reconstruction programmes in eight Central American communities affected by Hurricane Mitch. *Journal of Water & Health*, 2007. 5(1): p. 51-65.
 43. Mupere, E., P. Onyek, and H.M. Babikako, Impact of emergency mass immunisations on measles control in displaced populations in Gulu district, northern Uganda. *East African Medical Journal*, 2005. 82(8): p. 403-8.
 44. Myint, N.W., et al., Are there any changes in burden and management of communicable diseases in areas affected by Cyclone Nargis? *Conflict and Health*, 2011. 5(9).
 45. Ndongosieme, A., et al., Collaboration between a TB control programme and NGOs during humanitarian crisis: Democratic Republic of the Congo. *Bulletin of the World Health Organization*, 2007. 85(8): p. 642-3.
 46. Norval, P.Y., et al., DOTS in Cambodia. Directly observed treatment with short-course chemotherapy. *International Journal of Tuberculosis & Lung Disease*, 1998. 2(1): p. 44-51.
 47. Nosten, F., et al., Randomised double-blind placebo-controlled trial of SPf66 malaria vaccine in children in northwestern Thailand. *Lancet*, 1996. 348(9029): p. 701-707.
 48. Paquet, C., et al., An outbreak of dysentery due to *Shigella dysenteriae* type 1 in a refugee camp in Rwanda. *Cahiers d'Etudes et de Recherches Francophones/Sante*, 1995. 5(3): p. 181-184.
 49. Porter, J.D., et al., Measles outbreaks in the Mozambican refugee camps in Malawi: the continued need for an effective vaccine. *International Journal of Epidemiology*, 1990. 19(4): p. 1072-7.
 50. Rieder, H.L., Tuberculosis in an Indochinese refugee camp: epidemiology, management and therapeutic results. *Tubercle*, 1985. 66(3): p. 179-86.
 51. Roca, M.G., et al., A new malaria protocol in a Congolese refugee camp in West Tanzania. *Global Public Health*, 2011. 6(4): p. 398-406.
 52. Rowland, M., Malaria control: bednets or spraying? Malaria control in the Afghan refugee camps of western Pakistan. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1999. 93(5): p. 458-459.
 53. Rowland, M., et al., Pyrethroid-impregnated bed nets for personal protection against malaria for Afghan refugees. *Transactions of the Royal Society of Tropical Medicine & Hygiene*, 1996. 90(4): p. 357-61.
 54. Rowland, M., et al., DEET mosquito repellent provides personal protection against malaria: a household randomized trial in an Afghan refugee camp in Pakistan. *Tropical Medicine and International Health*, 2004. 9(3): p. 335-342.
 55. Rowland, M. and N. Durrani, Randomized controlled trials of 5- and 14-days primaquine therapy against relapses of vivax malaria in an Afghan refugee settlement in Pakistan. *Transactions of the Royal Society of Tropical Medicine & Hygiene*, 1999. 93(6): p. 641-3.
-

56. Rowland, M., et al., Permethrin-treated chaddars and top-sheets: appropriate technology for protection against malaria in Afghanistan and other complex emergencies. *Transactions of the Royal Society of Tropical Medicine & Hygiene*, 1999. 93(5): p. 465-72.
 57. Rowland, M., S. Hewitt, and N. Durrani, Prevalence of malaria in Afghan refugee villages in Pakistan sprayed with lambdacyhalothrin or malathion. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1994. 88(4): p. 378-379.
 58. Rowland, M., et al., Transmission and control of vivax malaria in Afghan refugee settlements in Pakistan. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1997. 91(3): p. 252-255.
 59. Rowland, M., et al., Sustainability of pyrethroid-impregnated bednets for malaria control in Afghan communities. *Bulletin of the World Health Organization*, 1997. 75(1): p. 23-9.
 60. Rowland, M., et al., Control of malaria in Pakistan by applying deltamethrin insecticide to cattle: a community-randomised trial. *Lancet*, 2001. 357(9271): p. 1837-1841.
 61. Rowland, M., et al., Prevention of malaria in Afghanistan through social marketing of insecticide-treated nets: evaluation of coverage and effectiveness by cross-sectional surveys and passive surveillance. *Tropical Medicine & International Health*, 2002. 7(10): p. 813-22.
 62. Rutta, E., et al., Treatment outcome among Rwandan and Burundian refugees with sputum smear-positive tuberculosis in Ngara, Tanzania. *International Journal of Tuberculosis and Lung Disease*, 2001. 5(7): p. 628-632.
 63. Santaniello-Newton, A. and P.R. Hunter, Management of an outbreak of meningococcal meningitis in a Sudanese refugee camp in Northern Uganda. *Epidemiology & Infection*, 2000. 124(1): p. 75-81.
 64. Seaman, J., et al., Epidemic visceral leishmaniasis in southern Sudan: treatment of severely debilitated patients under wartime conditions and with limited resources. *Annals of Internal Medicine*, 1996. 124(7): p. 664-72.
 65. Senessie, C., G.N. Gage, and E.v. Elm, Delays in childhood immunization in a conflict area: a study from Sierra Leone during civil war. *Conflict and Health*, 2007. 1(14).
 66. Siddique, A.K., et al., Why treatment centres failed to prevent cholera deaths among Rwandan refugees in Goma, Zaire. *Lancet*, 1995. 345(8946): p. 359-61.
 67. Spencer, S., et al., Malaria in camps for internally-displaced persons in Uganda: Evaluation of an insecticide-treated bednet distribution programme. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 2004. 98(12): p. 719-727.
 68. Sukrakanchana-Trikham, P., et al., 10-year assessment of treatment outcome among Cambodian refugees with sputum smear-positive tuberculosis in Khao-I-Dang, Thailand. *Tubercle & Lung Disease*, 1992. 73(6): p. 384-7.
 69. Talley, L. and P. Salama, Assessing field vaccine efficacy for measles in famine-affected rural Ethiopia. *American Journal of Tropical Medicine and Hygiene*, 2003. 68(5): p. 545-546.
 70. Tomashek, K.M., et al., Randomized intervention study comparing several regimens for the treatment of moderate anemia among refugee children in Kigoma Region, Tanzania. *American Journal of Tropical Medicine & Hygiene*, 2001. 64(3-4): p. 164-71.
 71. Wares, D.F., et al., Control of tuberculosis amongst the Tibetan refugee community in northern India. *Indian Journal of Tuberculosis*, 2000. 47(1): p. 35-41.
 72. Wolday, D., et al., Sensitivity of *Plasmodium falciparum* in vivo to chloroquine and pyrimethamine-sulfadoxine in Rwandan patients in a refugee camp in Zaire. *Transactions of the Royal Society of Tropical Medicine & Hygiene*, 1995. 89(6): p. 654-6.
-

4.2 Water, sanitation and hygiene

4.2.1 Systematic review

- Of available peer-reviewed articles related to Water, sanitation and hygiene (WASH) (3963), the vast majority (3955) either did not occur in humanitarian crises or did not measure the impact of WASH interventions. Studies that measured the impacts of WASH interventions on water quality/purity (e.g. faecal coliform or residual chlorine levels) rather than health related outcomes (e.g. diarrhoea) were excluded.
- Only eight peer reviewed papers met the inclusion criteria. The majority of selected papers (6/8) conducted a test of statistical significance between WASH interventions and health outcomes (category A). One reported WASH interventions and health outcomes without a test of significance (category B), while another (1/8) simply reported the number of water treatment packets sold but only anecdotally mentioned in relation to cholera seasonal peaks (category C).
- The analysis presented below relates to the seven category A and B papers.
- Of these seven category A and B papers, three out of six category A papers were deemed high quality and three out of six category A papers were deemed moderate quality. The only category B paper selected was deemed to be of moderate quality.
- There has been increasing interest in WASH interventions in humanitarian crises over the past two decades, with 6/7 papers published since 2000; however, increased number of publications is not correlated with increased quality (Figure 12).
- Controlled before and after designs were most common (3/7), followed by randomised controlled trials (RCTs) (2/7), case-control (1/7), and non-random trial (1/7) designs. Of the few WASH interventions selected, the majority of designs yielded higher quality evidence.

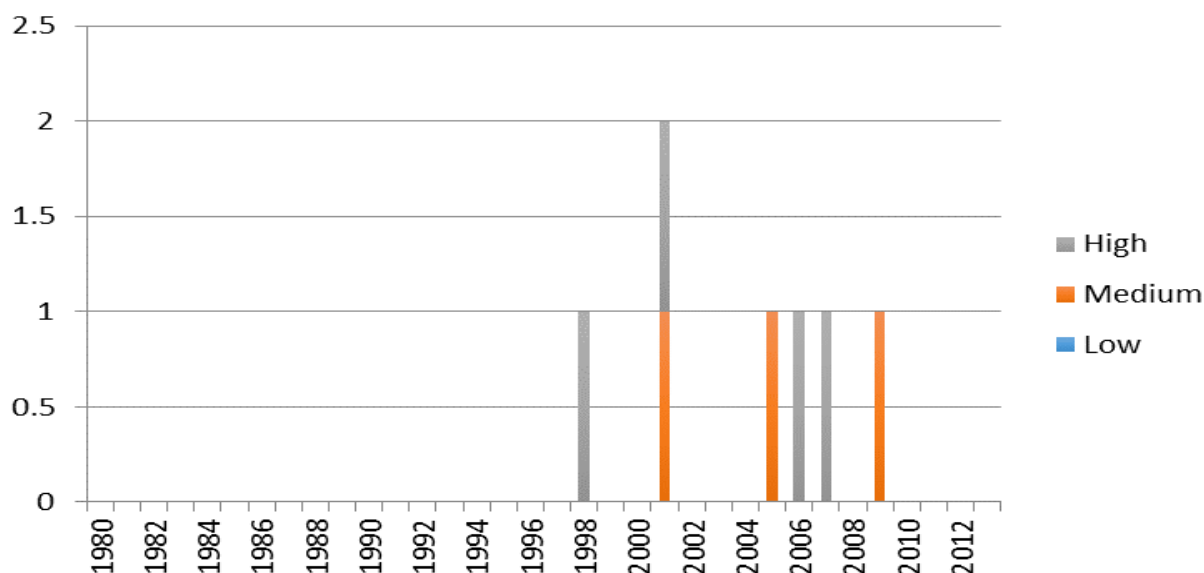


Figure 12: Quantity and quality of WASH publications over time

- Five of the seven studies occurred in armed conflicts and two in natural disasters (Figure 13). Of those in conflict zones, three were with IDPs and two with refugees. Both natural disaster studies were conducted in the general population.
- Six of the seven studies were in Africa and one in Latin America (Figure 14)

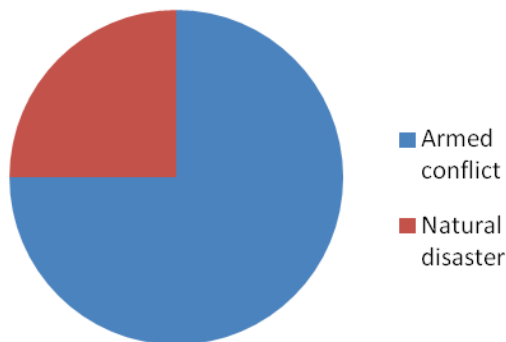


Figure 13: WASH research by crisis type

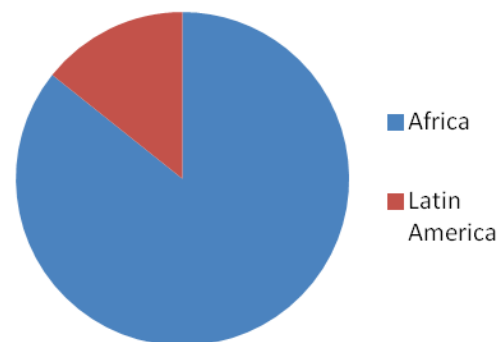


Figure 14: WASH research by geographic region

- All seven studies assessed the impact of WASH interventions on diarrhoeal diseases (Figure 15), with five on general diarrhoea, one on a cholera outbreak, and one on in a suspected – although not laboratory confirmed – Shigella outbreak.
- The seven WASH studies covered 14 different types of interventions (Figure 16). The two most popular intervention types were safe water storage (N=4) and point of use treatment (N=4), of which the majority of the latter used some sort of disinfection (e.g. flocculent). Other interventions included WASH education (N=2), hand washing (including soap distribution) (N=2), latrine provision (N=1), and point of source disinfection (N=1).

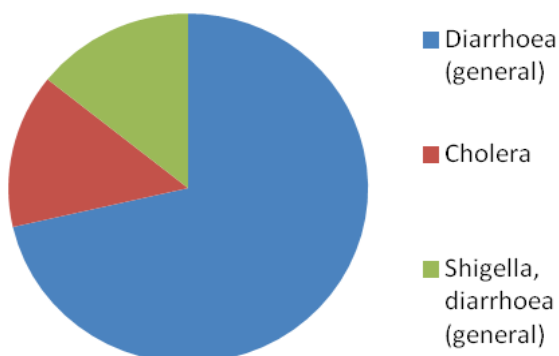


Figure 15: WASH disease outcomes

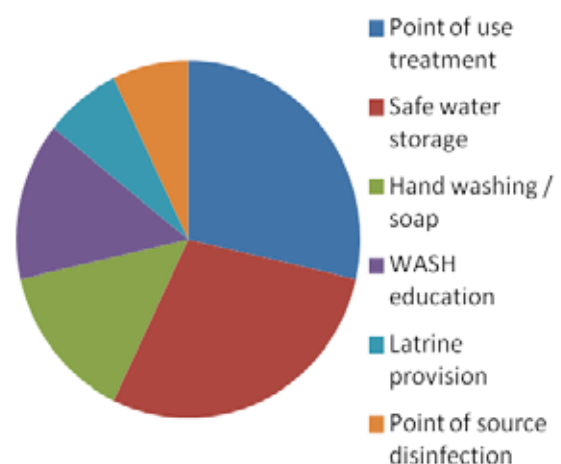


Figure 16: WASH interventions

- Most of the studies occurred in the crisis stage (4/7), followed by early recovery (2/7), and with one study conducted during both the acute crisis and early recovery stages. Preparedness was not in any of the papers reviewed (Figure 17)

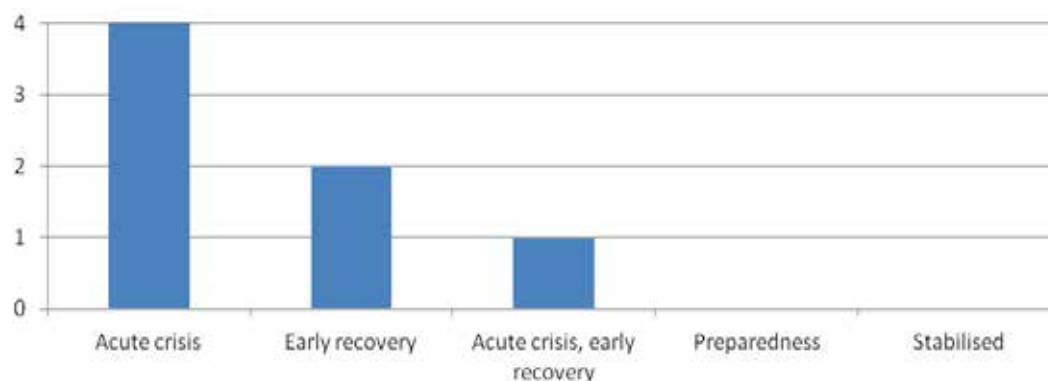


Figure 17: WASH studies by stage of crisis

4.2.2 Expert interviews

General comments

- Compared to other humanitarian sectors, WASH is fairly well organised within its sector and there seems to be good cooperation and coordination across the various actors (NGOs, extra-governmental, and governmental agencies).
- However, the WASH sector has a concentration of engineers and non-health professionals; therefore, the link with health outcomes is currently weak and there is a lack of guidance in how WASH can link with other sectors (notably infectious diseases and nutrition).

Study design

- Thus, the majority of current WASH interventions have been weak in terms of design and evaluation – future interventions should be reproducible, rigorous, and have clear objectives.
- WASH as a sector does not tend to do RCTs, with some questioning whether RCTs are necessary given that many WASH activities (e.g. hand washing) are considered good practice and common sense via years of programmatic experience.
- WASH is typically first or second line response in a disaster, leaving little time to plan how to design good studies (and there is little guidance to do so).
- Economic studies are also needed as there is a great difference in cost (and benefit) between various WASH interventions (e.g. latrine construction vs. soap provision).

Indicators, standards, and guidelines

- As a sector, WASH follows norms and guidelines – most notably Sphere. However, Sphere's WASH indicators are not easy to measure for those practising in the field, which has led to a divergence of indicators, with several organisations developing their own.
- Furthermore, as WASH professionals generally have engineering backgrounds, WASH interventions (if evaluated) are judged by water quality/treatment indicators (e.g. residual chlorine) due to the consensus and acceptability of their standards.

- There is a belief amongst some WASH professionals that water quality variables (with their agreed-upon standards) are more reliable and therefore a better measure of success than many health outcomes, especially those health outcomes that are not laboratory confirmed (e.g. self-reported diarrhoea).

Importance of intersectoral and multidisciplinary research

- Certain types of WASH responses (e.g. latrine provision) are costly and require massive planning. Given the unstable nature of many crisis-affected environments, designing studies was considered challenging, but there is a definite desire to quantify how well such interventions work – alone and with the interventions of other sectors.
- In the early 2000s, WASH as a sector realised it could not simply focus on distributing and installing goods (e.g. latrines) without considering cultural, behavioural, and contextual factors and there was recognition that research is needed to better understand issues such as acceptability and to create context-specific approaches. Behavioural (anthropological, sociological) research is crucial for the success of interventions as WASH practices (and their acceptability) are so culturally specific.
- There may be great potential to draw lessons from stable settings where longer-term approaches have been implemented and tested.

Evidence gaps identified by key informants included:

Specific research gaps

- The evidence base for WASH interventions needs to be strengthened; for instance, the evidence on interventions for some health outcomes is extremely limited (e.g. hepatitis E) or lacking in evidence compared to that of other sectors (e.g. cholera). This is not to say there is not value in these interventions, but their benefits have not been quantified.
- In addition to further research on transmission, risk factors, and intervention effectiveness; cost studies could help establish what interventions to prioritise, depending on concurrent factors (e.g. rate of migration) across settings.
- More evidence is needed on how WASH, infectious diseases, and nutrition relate; it is difficult for WASH interventions to show impact without linking to health outcomes.
- Behaviour change research is crucial, especially among previously understudied populations (e.g. in Syria and Middle-East more broadly).

Operationalising research

- It is unclear who should be charged with evaluating WASH interventions – e.g. the UN, a consortium, or an independent research body? There is a lack of leadership in this area, making impact evaluation very difficult – especially when multiple interventions across many sectors are targeting the same populations.
 - While WASH interventions are often first or second line responses, little has been established about their added benefit alongside other types of interventions (e.g. vaccination).
 - WASH experts also expressed consensus on the need for coordination (within and across sectors, and within organisations) on impact evaluation.
-

4.2.3 Recommendations for future research

General comments

- The WASH sector has felt a lack of guidance in the area of measuring the impact of interventions. More assistance (e.g. epidemiological) and coordination must occur, particularly to support WASH interventions being linked to health outcomes. Research should be conducted on how to best foster such collaboration so that future interventions can be assessed in a meaningful way.

Study design

- More research is needed on WASH behaviour change interventions, particularly with less studied populations (e.g. those from new crises in Syria and Middle-East more broadly).
- Research is needed on what study designs (other than RCTs) may provide useful results for WASH and health professionals; RCTs may not be feasible given the sector and certain settings, so in some cases other designs – including economic studies – may be more appropriate.
- The design of studies in WASH needs to be improved.
- Economic and anthropological research is needed; what level of success is acceptable to communities, governments and other actors in relation to health effects seen as well as money spent?
- Priority should be given to the lack of coordination in humanitarian response.

Indicators, standards, guidelines

- Sphere indicators are important but difficult to measure in practice. A review of Sphere indicators in the WASH sector is needed. Without good indicators it is impossible to know how well the interventions have been working in relation to acceptable levels (e.g. diarrhoea) given a setting, population, and specific disease (e.g. Shigella vs. cholera).

References (A and B categories): Water, sanitation, and hygiene (WASH)

73. Doocy, S. and G. Burnham, Point-of-use water treatment and diarrhoea reduction in the emergency context: An effectiveness trial in Liberia. *Tropical Medicine and International Health*, 2006. 11(10): p. 1542-1552.
 74. Elsanousi, S., et al., A study of the use and impacts of LifeStraw in a settlement camp in southern Gezira, Sudan. *Journal of Water & Health*, 2009. 7(3): p. 478-83.
 75. Moll, D.M., et al., Health impact of water and sanitation infrastructure reconstruction programmes in eight Central American communities affected by Hurricane Mitch. *Journal of Water and Health*, 2007. 5(1): p. 51-65.
 76. Peterson, E.A., et al., The effect of soap distribution on diarrhoea: Nyamithuthu Refugee Camp. *International Journal of Epidemiology*, 1998. 27(3): p. 520-524.
 77. Reller, M.E., et al., Cholera prevention with traditional and novel water treatment methods: an outbreak investigation in Fort-Dauphin, Madagascar. *Am J Public Health*, 2001. 91(10): p. 1608-10.
 78. Roberts, L., et al., Keeping clean water clean in a Malawi refugee camp: a randomized intervention trial. *Bulletin of the World Health Organization*, 2001. 79(4): p. 280-287.
 79. Walden, V.M., E.A. Lamond, and S.A. Field, Container contamination as a possible source of a diarrhoea outbreak in Abou Shouk camp, Darfur province, Sudan. *Disasters*, 2005. 29(3): p. 213-221.
-

4.3 Nutrition

4.3.1 Systematic review

- Seventy-seven papers were selected out of 2535 published papers searched; Twenty-two papers were included from grey literature .
- Nearly half (35 papers) of papers were from the 'A' category of evidence, 24 papers were category B, 18 papers were category C.
- There is increasing interest in evidence based-intervention in humanitarian crises, with 70% of all studies conducted since 1980 being published in the last decade. Furthermore, the proportion of high quality papers increases over time (Figure 18). Most papers were of moderate quality (34/77), a quarter were of high quality (18/77) and a third of low quality (25/77). In category A, 18 papers were of high quality, 27 were moderate and 1 out of 46 was of low quality whereas no paper was of high quality in category B, eight were moderate and 23 out of 31 were of low quality.

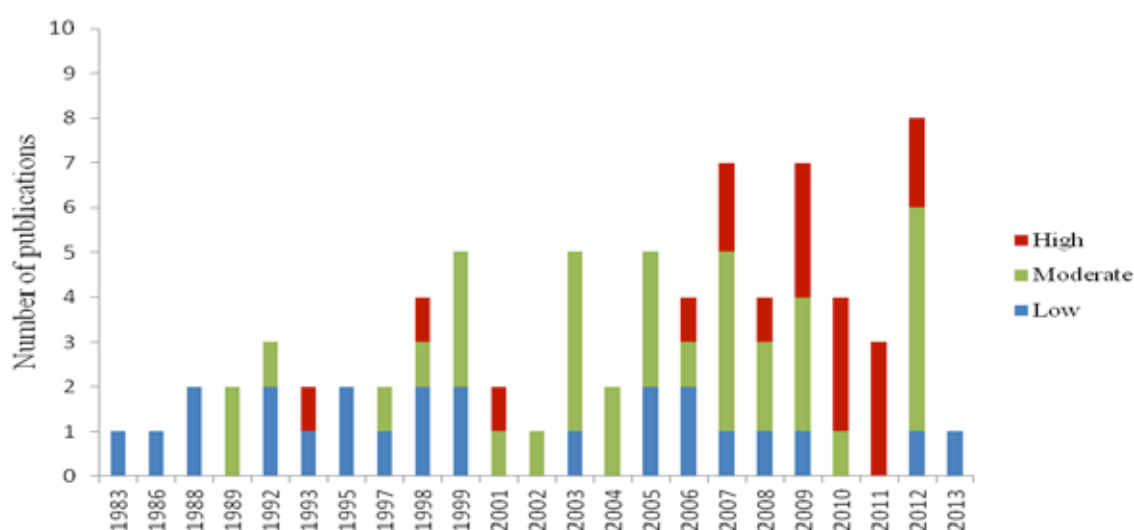


Figure 18: Quantity and quality of nutrition publications over time

- The majority of studies employed a cross-sectional design (29 papers), a third used follow-up/monitoring data of beneficiaries enrolled in programmes (27 papers), several studies were of cohort and RCT design (nine and six papers respectively), and the rest were cost-effectiveness, mix-method and case control studies (3%, 4% and 1% respectively).
- The majority of studies were conducted in Africa (72%), a fifth in Asia (18%) and few in Europe, Middle-East and Caribbean (4%, 3% and 1% respectively) (Figure 19).
- Half (37 papers) of the studies assessed were during an armed conflict, a third (26 papers) responded to a natural disaster and a fifth (15 papers) were in zones affected by both type of emergencies (Figure 20).
- Half (40 papers) of the studies were conducted during acute humanitarian crises, more than a third (30 papers) in stabilised context, 5 (6.5%) where in place before emergency (preparedness) and 2 (2.6%) were including different stages of emergencies.

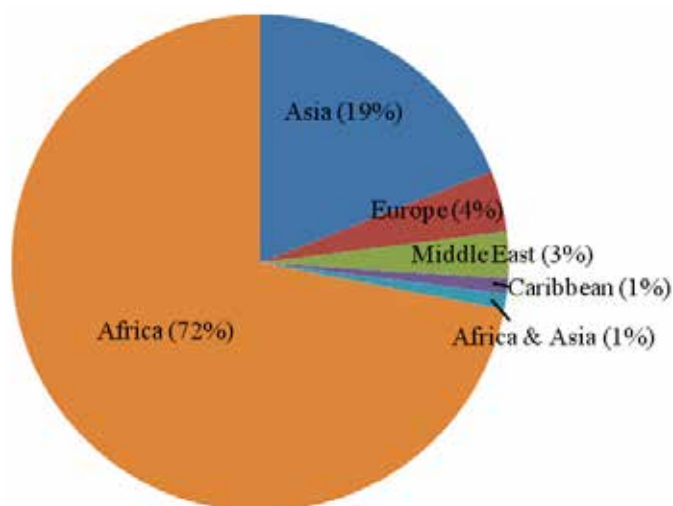


Figure 19: Geographic regions of nutrition

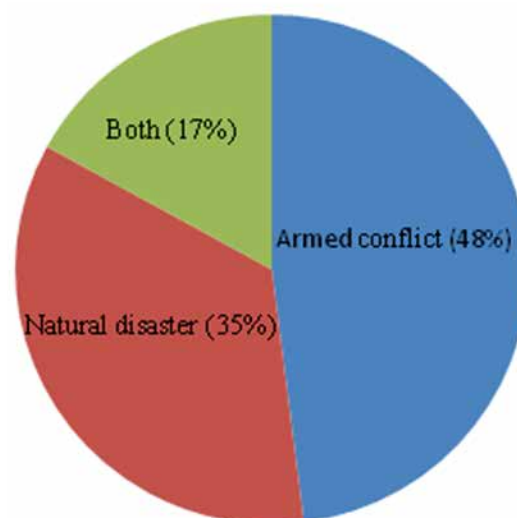


Figure 20: Nutrition studies by emergency type

- Intervention assessed were mainly addressing micro-nutrient deficiencies and the treatment of Severe Acute Malnutrition (SAM) (18 and 16 papers respectively). Several were Targeted Supplementary Feeding Programmes (TSFP), Blanket Supplementary Feeding Programmes (BSFP) and General Food Distributions (GFD) interventions (11, 8 and 8 papers respectively). Only four studies examined Infant and Young Child Feeding (IYCF) practices (Figure 21Error! Reference source not found.).
- The health outcome of more than half the studies (41 papers) was acute malnutrition followed by micro-nutrient deficiencies (24.7%), of which anaemia was mainly examined (76.5%). Several studies examined chronic malnutrition (15.6%) (Figure 22).

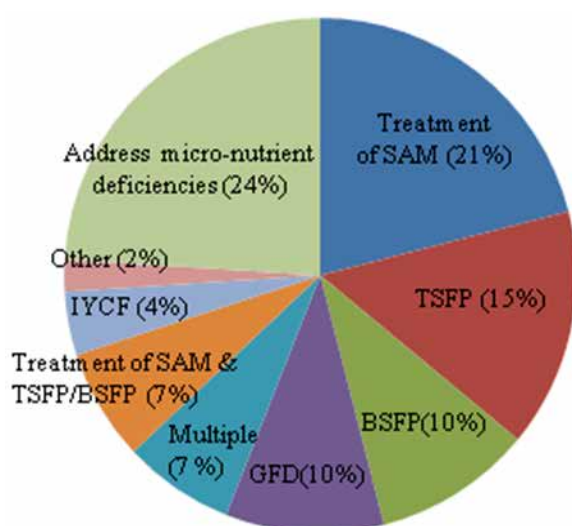


Figure 21: Nutrition interventions

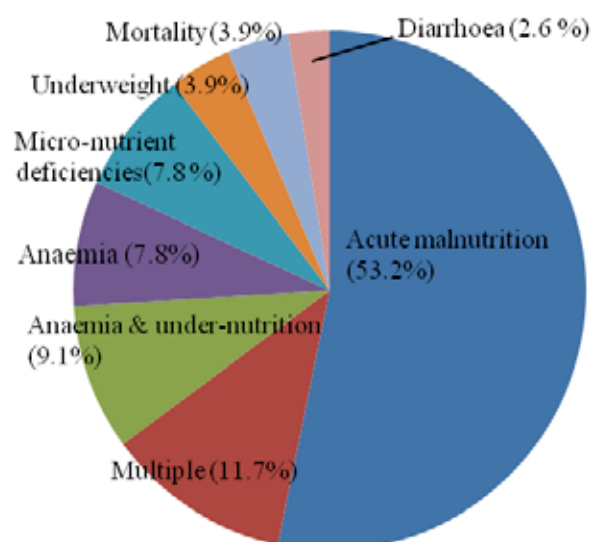


Figure 22: Nutrition outcomes

- Interventions addressing micro-nutrient deficiencies, GFD, TSFP and the treatment of SAM have been assessed since the end of the 1980s/early 1990s. The diversity of type of interventions studied increased over time. Publications on (IYCF) interventions were published only from 2003 and micro-finance and voucher (in "other" category) from 2005. All preparedness interventions were BSFP and their assessments were published after 2008 (Figure 23).

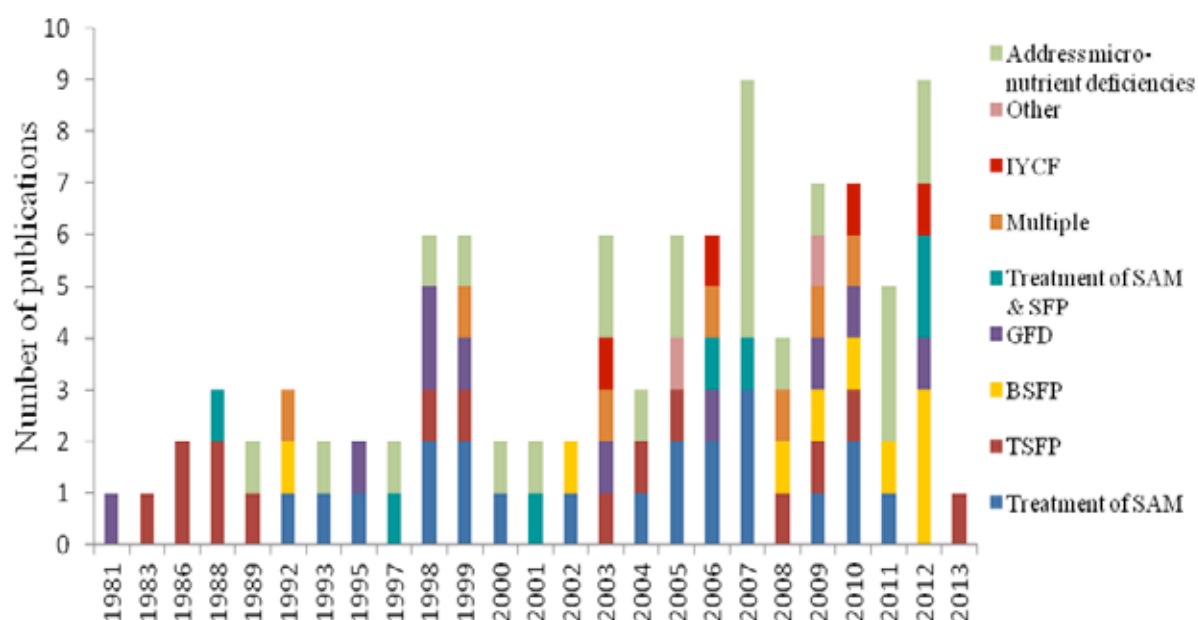


Figure 23: Nutrition intervention types of over time

4.3.2 Expert interviews

4.3.2.1 Priority gaps

Impact assessment and Monitoring and Evaluation (M&E):

- Gaps exist in how sensitive and effective assessment methods are, how well surveillance methods perform, and on the impact of interventions.
- Better monitoring and evaluation (and better use of related data) is needed for to improve the quality of nutrition programmes.
- A considerable amount of data exists but is not analysed and is poorly managed. In many organisations, data collected is not centralised or organised.

Targeting specific groups:

- Some vulnerable groups are left out: Infants-under six months, the elderly and people with disabilities. Little is done to i) identify/detect these groups, ii) design appropriate protocols/interventions, and iii) integrate within other routine programmes.

Infant and Young Child Feeding (IYCF):

- There are huge gap in IYCF although there is more emphases today with Scaling Up Nutrition (SUN) movement.

Prevention/management of Moderate Acute Malnutrition (MAM):

- Information to support the prevention and management of moderate acute malnutrition should be prioritised.
- There is too much focus on acute malnutrition and not enough on stunting.

Treatment of SAM:

- Coverage and early detection should be prioritised.
- Little is known on long-term effects of Ready to Use Foods (RUF).

4.3.2.2 Issues related to context and type of crisis

- More information is needed on nutritional needs in urban areas/slums (including support on methods given the challenges of sampling and conducting surveys).
- Aetiology of malnutrition is different in urban areas (social context, access to care).
- Emergencies in middle-income countries and/or where Global Acute Malnutrition (GAM) prevalence is low are very different and require different approaches.

4.3.2.3 Type of study needed

- All designs, including mix-methods approaches, should be used.

4.3.2.4 Use of guidelines and standards

- Sphere guidelines are used to assess nutrition programme performances and most organisations refer to best practices research method such as CONSORT or STROBE but many organisations have their own technical research policy and understanding and way of use guidelines.

4.3.2.5 Is there consensus on research gaps?

- Although most experts have their specific agenda (i.e. particular target group) there seems to be a consensus on evidence gaps on: i) IYCF interventions, ii) MAM and stunting, iii) tools for M&E and more M&E, and iv) context specific intervention.

4.3.3 Summary of recommendations for future research

Context:

- Need to better understand the aetiology of malnutrition and famines in different contexts (e.g. urban areas).
- Need more analysis of the impact of contextual factors on famine and malnutrition (e.g. anthropological studies on the power of women in society).
- Need evidence to guide how to intervene in low GAM prevalence settings and/or in middle income countries.

Impact assessment:

- Need to test different monitoring tools, techniques, and new technologies to measure progress and impact of nutrition programmes.
- Need evidence on cost-effectiveness of nutrition interventions.
- Need evidence on impact of IYCF interventions.

Targeting specific groups:

- Focus on infants, people with disabilities, and the elderly.
-

Prevention/management of Moderate Acute Malnutrition (MAM):

- Search alternatives to BSFP (i.e. Cash transfer vs. RUF distribution, food security intervention vs. RUF). Is it appropriate in all contexts?
- Research on long-term effects of interventions (i.e. long-term effects of blanket distribution of lipid based supplement); need to think about double burden of malnutrition
- Research focusing on stunting.

Treatment of SAM:

- Health service delivery: what is the most effective way of delivering nutritional programmes? For example, community health workers or health facilities (i.e. research on Community Case Management (CCM))?
- Long-term effect of RUF on anthropometric status, cognitive development, risk of relapse etc.

Note: These recommendations are also in line with some of the recommendations identified by the authors of the Lancet series on Maternal and Child Nutrition in June 2013 (although non emergency context specific) such as the need for evidence: i) on long-term benefits of breastfeeding on nutritional and developmental outcomes, ii) on the effectiveness of complementary feeding strategies, iii) for prevention and management strategies for moderate acute malnutrition in population settings, especially in infants younger than six months, iv) and on innovative delivery strategies.

References (A and B categories): Nutrition

80. Aaby, P., et al., Nutritional status and mortality of refugee and resident children in a non-camp setting during conflict: Follow up study in Guinea-Bissau. *British Medical Journal*, 1999. 319(7214): p. 878-881.
 81. Adhisivam, B., et al., Feeding of infants and young children in tsunami affected villages in Pondicherry. *Indian Pediatrics*, 2006. 43(8): p. 724-7.
 82. Amthor, R.E., S.M. Cole, and M.J. Manary, The Use of Home-Based Therapy with Ready-to-Use Therapeutic Food to Treat Malnutrition in a Rural Area during a Food Crisis. *Journal of the American Dietetic Association*, 2009. 109(3): p. 464-467.
 83. Andersson, N., et al., Breast-feeding in a complex emergency: four linked cross-sectional studies during the Bosnian conflict. *Public health nutrition*, 2010. 13(12): p. 2097-2104.
 84. Bilukha, O., et al., Effects of multimicronutrient home fortification on anemia and growth in Bhutanese refugee children. *Food and Nutrition Bulletin*, 2011. 32(3): p. 264-276.
 85. Briend, A., et al., Ready-to-use therapeutic food for treatment of marasmus. *Lancet*, 1999. 353(9166): p. 1767-1768.
 86. Bush, J., The role of food aid in drought and recovery: Oxfam's North Turkana (Kenya) drought relief programme, 1992-94. *Disasters*, 1995. 19(3): p. 247-259.
 87. Collins, S., The need for adult therapeutic care in emergency feeding programs: Lessons from Somalia. *Journal of the American Medical Association*, 1993. 270(5): p. 637-638.
 88. Collins, S., M. Myatt, and B. Golden, Dietary treatment of severe malnutrition in adults. *American Journal of Clinical Nutrition*, 1998. 68(1): p. 193-199.
 89. Collins, S. and K. Sadler, Outpatient care for severely malnourished children in emergency relief programmes: a retrospective cohort study. *Lancet*, 2002. 360(9348): p. 1824-30.
 90. Collins, S., et al., Key issues in the success of community-based management of severe malnutrition. *Food and Nutrition Bulletin*, 2006. 27(3): p. S49-S82.
 91. Colombatti, R., et al., A short-term intervention for the treatment of severe malnutrition in a post-conflict country: Results of a survey in Guinea Bissau. *Public Health Nutrition*, 2008. 11(12): p. 1357-1364.
 92. De Waal, A., A. Taffesse, and L. Carruth, Child survival during the 2002-2003 drought in Ethiopia. *Glob Public Health*, 2006. 1(2): p. 125-32.
-

93. Defourny, I., et al., A Large-Scale Distribution of Milk-Based Fortified Spreads: Evidence for a New Approach in Regions with High Burden of Acute Malnutrition. *Plos One*, 2009. 4(5).
 94. Desenclos, J.C., et al., Epidemiological patterns of scurvy among Ethiopian refugees. *Bulletin of the World Health Organization*, 1989. 67(3): p. 309-316.
 95. Desjeux, J.F., et al., Definition and evaluation of therapeutic food for severely malnourished children in situations of humanitarian emergencies. [French] Definition et evaluation d'un aliment therapeutique pour les enfants severement malnutris, en situation d'urgence humanitaire. *Bulletin de l'Academie nationale de medecine*, 1998. 182(8): p. 1679-1690; discussion 1691-1695.
 96. Donnen, P., et al., Vitamin A supplementation but not deworming improves growth of malnourished preschool children in eastern Zaire. *Journal of Nutrition*, 1998. 128(8): p. 1320-1327.
 97. Doocy, S., et al., Credit program outcomes: coping capacity and nutritional status in the food insecure context of Ethiopia. *Social Science & Medicine*, 2005. 60(10): p. 2371-2382.
 98. Dubray, C., et al., Treatment of severe malnutrition with 2-day intramuscular ceftriaxone vs 5-day amoxicillin. *Annals of Tropical Paediatrics*, 2008. 28(1): p. 13-22.
 99. Dzumhur, Z., et al., Therapeutic feeding in Sarajevo during the war. *European Journal of Clinical Nutrition*, 1995. 49 Suppl 2: p. S40-2.
 100. Fawzi, W.W., et al., The effect of vitamin A supplementation on the growth of preschool children in the Sudan. *American Journal of Public Health*, 1997. 87(8): p. 1359-1362.
 101. Gaboulaud, V., et al., Could nutritional rehabilitation at home complement or replace centre-based therapeutic feeding programmes for severe malnutrition? *Journal of Tropical Pediatrics*, 2007. 53(1): p. 49-51.
 102. Gibb, C., A review of feeding programmes in refugee reception centres in Eastern Sudan, October 1985. *Disasters*, 1986. 10(1): p. 17-24.
 103. Greco, L., et al., Effect of a low-cost food on the recovery and death rate of malnourished children. *Journal of Pediatric Gastroenterology and Nutrition*, 2006. 43(4): p. 512-517.
 104. Grellety, E., et al., Effect of Mass Supplementation with Ready-to-Use Supplementary Food during an Anticipated Nutritional Emergency. *Plos One*, 2012. 7(9).
 105. Hipgrave, D.B., et al., Donated breast milk substitutes and incidence of diarrhoea among infants and young children after the May 2006 earthquake in Yogyakarta and Central Java. *Public health nutrition*, 2012. 15(2): p. 307-315.
 106. Hossain, S.M. and P. Kolsteren, The 1998 flood in Bangladesh: is different targeting needed during emergencies and recovery to tackle malnutrition? *Disasters*, 2003. 27(2): p. 172-84.
 107. Hossain, S.M., D.M. Maggio, and K.M. Sullivan, Relationship between food aid and acute malnutrition following an earthquake. *Food & Nutrition Bulletin*, 2009. 30(4): p. 336-9.
 108. Huybregts, L., et al., The Effect of Adding Ready-to-Use Supplementary Food to a General Food Distribution on Child Nutritional Status and Morbidity: A Cluster-Randomized Controlled Trial. *Plos Medicine*, 2012. 9(9).
 109. Isanaka, S., et al., Effect of Preventive Supplementation With Ready-to-Use Therapeutic Food on the Nutritional Status, Mortality, and Morbidity of Children Aged 6 to 60 Months in Niger A Cluster Randomized Trial. *Journal of the American Medical Association*, 2009. 301(3): p. 277-285.
 110. Isanaka, S., et al., Reducing Wasting in Young Children With Preventive Supplementation: A Cohort Study in Niger. *Pediatrics*, 2010. 126(2): p. E442-E450.
 111. Jakobsen, M., et al., Breastfeeding status as a predictor of mortality among refugee children in an emergency situation in Guinea-Bissau. *Tropical Medicine and International Health*, 2003. 8(11): p. 992-996.
 112. Jayatissa, R., et al., Community-based management of severe and moderate acute malnutrition during emergencies in Sri Lanka: Challenges of implementation. *Food and Nutrition Bulletin*, 2012. 33(4): p. 251-260.
 113. Kassim, I.A., et al., Excessive iodine intake during pregnancy in Somali refugees. *Maternal and Child Nutrition*, 2012. 8(1): p. 49-56.
 114. Khatib, I.M., S.M. Samrah, and F.M. Zghol, Nutritional interventions in refugee camps on Jordan's eastern border: Assessment of status of vulnerable groups. *Eastern Mediterranean Health Journal*, 2010. 16(2): p. 187-193.
-

115. Kumar, S. and L. Bhawani, Managing child malnutrition in a drought affected district of Rajasthan--a case study. *Indian journal of public health*, 2005. 49(4): p. 198-206.
 116. Lopriore, C., et al., Spread fortified with vitamins and minerals induces catch-up growth and eradicates severe anemia in stunted refugee children aged 3-6 y. *The American journal of clinical nutrition*, 2004. 80(4): p. 973-981.
 117. Luxemburger, C., et al., Beri-beri: the major cause of infant mortality in Karen refugees. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 2003. 97(2): p. 251-255.
 118. Magoni, M., M. Jaber, and R. Piera, Fighting anaemia and malnutrition in Hebron (Palestine): Impact evaluation of a humanitarian project. *Acta Tropica*, 2008. 105(3): p. 242-248.
 119. Malfait, P., A. Moren, and J.C. Dillon, An outbreak of pellagra related to changes in dietary niacin among Mozambican refugees in Malawi. *International Journal of Epidemiology*, 1993. 22(3): p. 504-511.
 120. Mange, V., Nutrition strategies and preventive health strategies in the Cambodian refugee camp, site 2, Thailand. *Journal of Refugee Studies*, 1992. 5(3): p. 343-358.
 121. Menon, P., et al., Micronutrient sprinkles reduce anemia among 9-to 24-mo-old children when delivered through an integrated health and nutrition program in rural Haiti. *Journal of Nutrition*, 2007. 137(4): p. 1023-1030.
 122. Morikawa, M., A. Polanc, and S. Becker, Continuous weight and height gain among at-risk children discharged from a supplementary feeding center in Kabul, Afghanistan. *Infant, Child & Adolescent Nutrition* 2013. 5(2): p. 97-99.
 123. Nackers, F., et al., Effectiveness of ready-to-use therapeutic food compared to a corn/soy-blend-based pre-mix for the treatment of childhood moderate acute malnutrition in Niger. *Journal of Tropical Pediatrics*, 2010. 56(6): p. 407-413.
 124. Ndemwa, P., et al., Relationship of the availability of micronutrient powder with iron status and hemoglobin among women and children in the Kakuma Refugee Camp, Kenya. *Food and Nutrition Bulletin*, 2011. 32(3): p. 286-291.
 125. Nielsen, J., et al., Vitamin A supplementation during war-emergency in Guinea-Bissau 1998-1999. *Acta Tropica*, 2005. 93(3): p. 275-82.
 126. Nielsen, J., et al., Malnourished children and supplementary feeding during the war emergency in Guinea-Bissau in 1998-1999. *The American journal of clinical nutrition*, 2004. 80(4): p. 1036-1042.
 127. Pecoul, B., et al., Efficacy of a Therapeutic Feeding Center Evaluated during Hospitalization and a Follow-up Period, Tahoua, Niger, 1987-1988. *Annals of Tropical Paediatrics*, 1992. 12(1): p. 47-54.
 128. Rah, J.H., et al., Provision of micronutrient powder in response to the cyclone sidr emergency in Bangladesh: Crosssectional assessment at the end of the intervention. *Food and Nutrition Bulletin*, 2011. 32(3): p. 277-285.
 129. Roesel, C., From relief to development: supplementary feeding among Khmer refugees. *Health Policy and Planning*, 1988. 3(3): p. 227-236.
 130. Rossi, L., D. Verna, and S.L. Villeneuve, The humanitarian emergency in Burundi: Evaluation of the operational strategy for management of nutritional crisis. *Public Health Nutrition*, 2008. 11(7): p. 699-705.
 131. Sadler, K., et al., A comparison of the programme coverage of two therapeutic feeding interventions implemented in neighbouring districts of Malawi. *Public Health Nutrition*, 2007. 10(9): p. 907-13.
 132. Seal, A., et al., Maize meal fortification is associated with improved vitamin A and iron status in adolescents and reduced childhood anaemia in a food aid-dependent refugee population. *Public Health Nutrition*, 2008. 11(7): p. 720-8.
 133. Seal, A.J., et al., Low and deficient niacin status and pellagra are endemic in postwar Angola. *American Journal of Clinical Nutrition*, 2007. 85(1): p. 218-224.
 134. Stefanak, M.A. and D. Jarjoura, Weight-Gain in Supervised and Take-Home Feeding Programs in Chad. *Journal of Tropical Pediatrics*, 1989. 35(5): p. 214-217.
 135. Stuetz, W., et al., Micronutrient status in lactating mothers before and after introduction of fortified flour: Cross-sectional surveys in Maela refugee camp. *European Journal of Nutrition*, 2012. 51(4): p. 425-434.
-

136. Talley, L., et al., Evaluation of the effectiveness of stainless steel cooking pots in reducing iron-deficiency anaemia in food aid-dependent populations. *Public health nutrition*, 2010. 13(1): p. 107-115.
 137. Taylor, W.R., An evaluation of supplementary feeding in Somali refugee camps. *International Journal of Epidemiology*, 1983. 12(4): p. 433-6.
 138. Tekeste, A., et al., Cost effectiveness of community-based and inpatient therapeutic feeding programmes to treat SAM in Ethiopia. *Field Exchange Emergency Nutrition Network ENN*, 2011. 41: p. 21-22.
 139. Tomashek, K.M., et al., Randomized intervention study comparing several regimens for the treatment of moderate anemia among refugee children in kigoma region, Tanzania. *American Journal of Tropical Medicine and Hygiene*, 2001. 64(3-4): p. 164-171.
 140. Toole, M.J. and R. Bhatia, A case study of Somali refugees in Hartisheik A Camp, Eastern Ethiopia: health and nutrition profile, July 1988-June 1990. *Journal of Refugee Studies*, 1992. 5(3): p. 313-326.
 141. Toole, M.J., P. Nieburg, and R.J. Waldman, The association between inadequate rations, undernutrition prevalence, and mortality in refugee camps: Case studies of refugee populations in Eastern Thailand, 1970-1980, and Eastern Sudan, 1984-1985. *Journal of Tropical Pediatrics*, 1988. 34(5): p. 218-224.
 142. Vautier, F., et al., Dry supplementary feeding programmes: an effective short-term strategy in food crisis situations. *Tropical Medicine and International Health*, 1999. 4(12): p. 875-879.
 143. Vincent, J.E. and A.M. Menefee, Vitamin A supplementation including older children: a refugee population on the Thailand-Burma border. *Sight and Life Magazine*, 2007. 2(2007): p. 16-19.
-

4.4 Sexual and reproductive health (including gender-based violence)

4.4.1 Systematic review

- Total papers: Thirty-one papers were selected out of a total 7149 of papers searched. No papers were from grey literature. 27/31 (87%) studies focused on SRH interventions, 3/31 (10%) evaluated a GBV-related intervention, and 1/31 (3%) evaluated a combined SRH and GBV management intervention. Overall and disaggregated analyses of SRH and GBV interventions are presented below (Figure 24 and Figure 25).



Figure 24: SRH and GBV outcomes described in studies

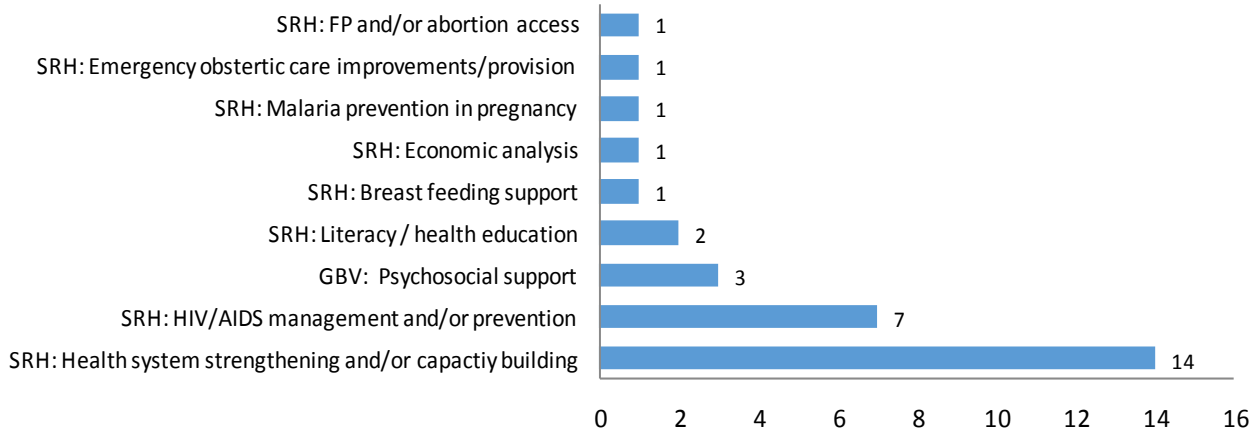


Figure 25: SRH or GBV interventions

- Quality of evidence: There was a wide range of quality of evidence. The majority of studies provided low/moderate strength evidence, with 12/31 (39%) low, 15/31 (48%) moderate, and 4/31 (13%) high quality. High quality studies were implemented between 2006-2013. See Figure 26 and Figure 27.
- Evidence categories: Among A category papers: three were scored as high, seven medium. Among B: one scored as high quality, seven medium quality, and eight low quality. Among C: zero scored as high, one medium, four low quality.
- Study types: 13 cross-sectional, nine controlled before/after, three cohort, three randomised controlled trials (RCT), one case-control, one economic analysis, and one lesson learned.

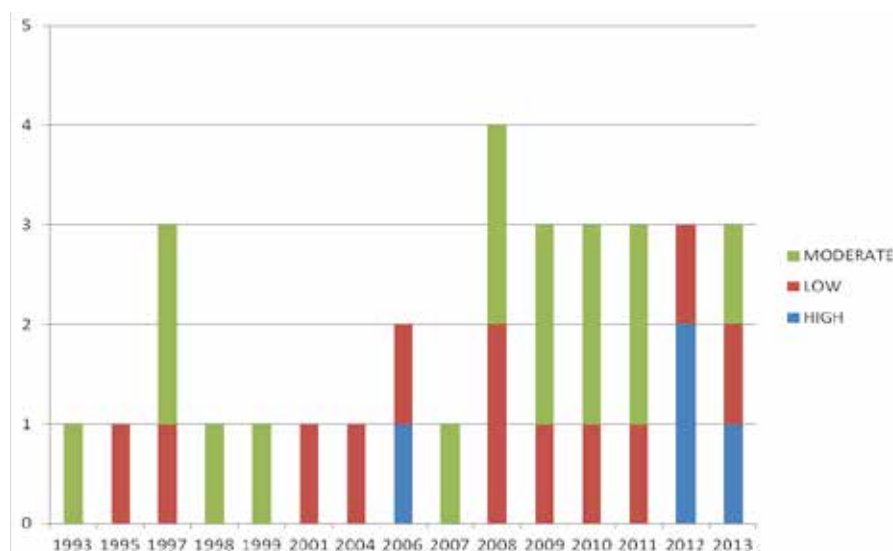


Figure 26: Quantity and quality of SRH/GBV publications over time

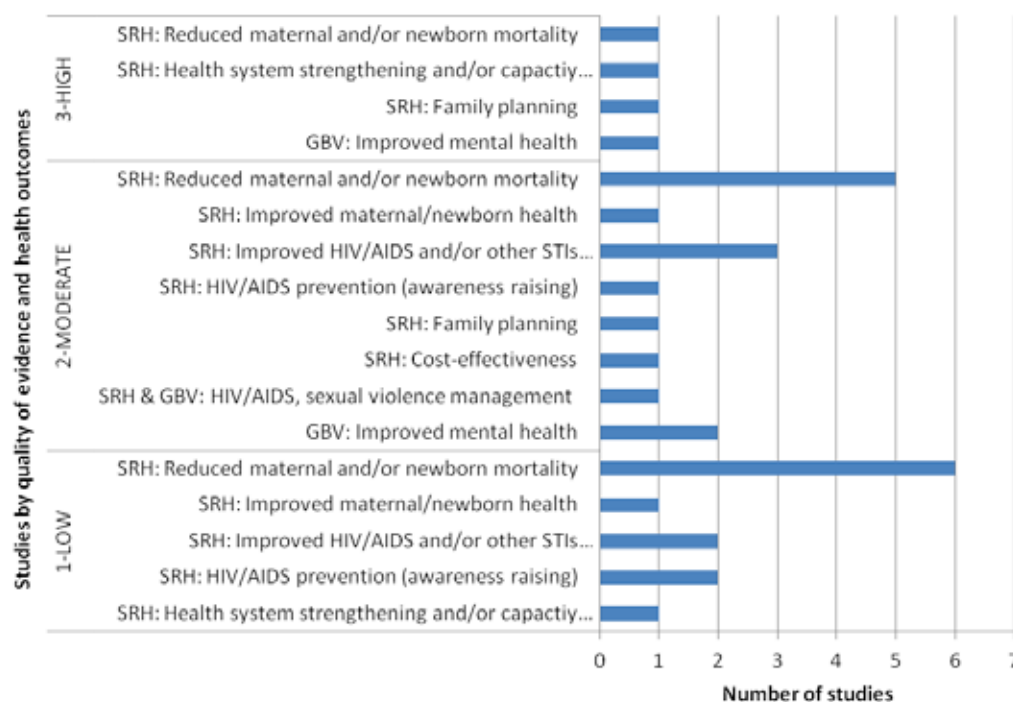


Figure 27: SRH/GBV studies by quality of evidence and health outcomes

- Regions: Twenty-two studies from armed conflict settings in Africa, eight from Asia, one from a natural disaster in the Caribbean/Latin America region (Figure 28 and Figure 29).
- Setting and stages of crisis: The majority of studies took place in armed conflict settings (80%) (Figure 29). Five studies from the acute stage of the crisis, nine from the early recovery stage, 17 from the stabilized period (Figure 30).

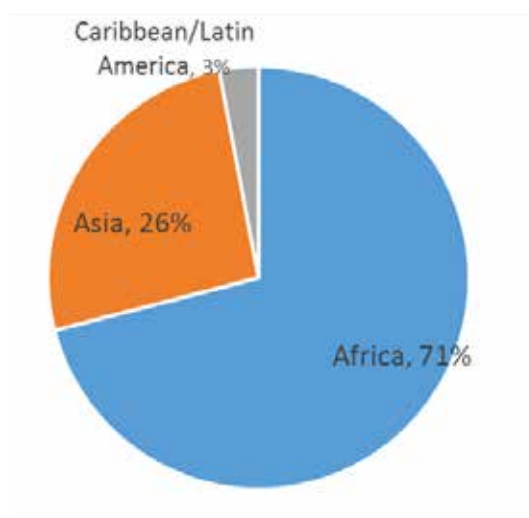


Figure 28: SRH/GBV studies by geographic region

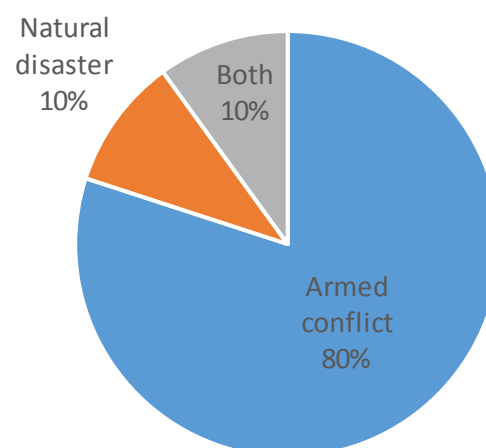


Figure 29: SRH/GBV studies by crisis type

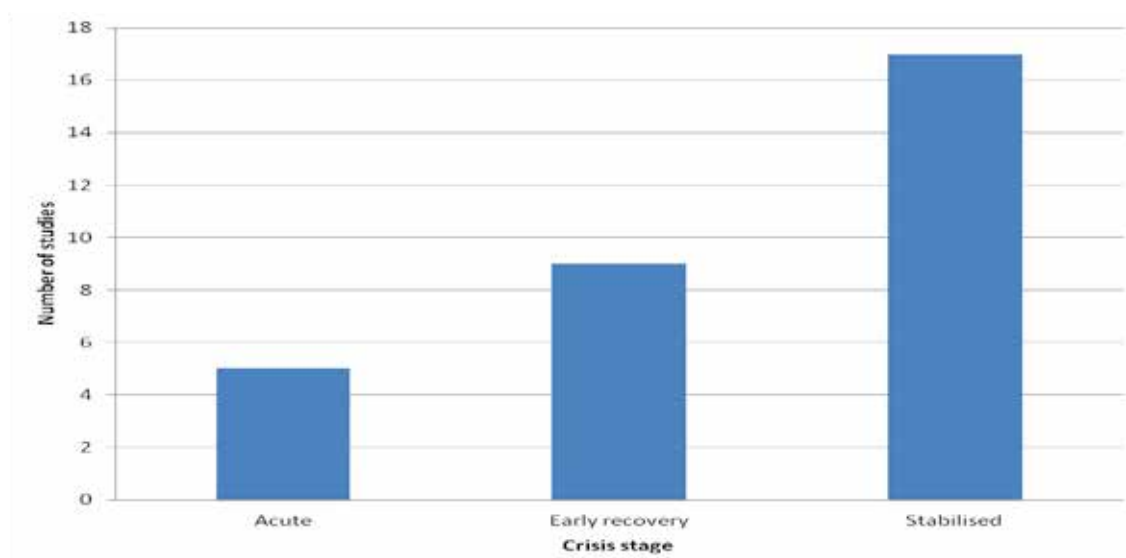


Figure 30: SRH/GBV studies by crisis stage

4.4.2 Expert interviews

Key Findings for SRH:

- Research is used to inform the design of interventions when possible but staff faced many barriers including limited access to peer-reviewed publications and prohibitively high costs for obtaining articles.
- Operational data is regularly collected which could be more effectively used.
- More research is needed during the transition phase (acute to chronic and protracted crisis).
- Given the social implications inherent in providing SRH services, context specific evidence is needed on how to make services and service delivery more responsive to people's needs, which bear in mind values, attitude, behaviours, and contextual realities.
- Research, including the use of trials, is needed which can show causation and direct impact of an intervention on a given health outcome.
- The most commonly cited guidelines in use included Sphere, the MISP, and the IAWG Field Manual. Some organisations developed their own guidance based their organisational experience, the aforementioned guidelines, and the WHO guidance.

Key Findings for GBV:

- Research on primary and secondary GBV prevention programming is needed at all phases of a crisis. There is limited research at protracted/early recovery stages but even less at the acute and chronic stages.
- Current guidelines for GBV-related interventions are based on programmatic experience and evidence from developed and stable country settings. Numerous guidelines exist but are not systematically implemented and none have been evaluated.
- Evidence on health service needs for survivors of violence exist but there is no evidence on the impact in emergencies of other prevention and response interventions (i.e. case management for survivors of violence, psychosocial interventions, or risk reduction through interventions such as cash transfers, or community based medical care). All of these interventions are based on evidence from stable country settings, not crisis settings.
- Most organisations in crisis settings do not have the research capacity or the funding to design, collect, analyse and disseminate research findings. Operational data and research from local NGOs is useful for service planning but are not designed or powered to assess impact. Rigorous research designs are needed which are implemented from an early stage.

4.4.3 Recommendations for future research

Research recommendations for SRH:

- More research was needed on the most effective means of service delivery in crisis settings rather than on the efficacy of interventions that have been proven in other settings.
- Qualitative and context specific behaviour and attitude research on people's preferences is needed.

Particular research questions include:

- Profiling people and SRH needs in emergencies: What are the SRH needs of people in emergencies? Are they the same for the host population or global profile? Do services offered match needs?
 - Specific sub-populations: What is the effectiveness of interventions that target previously excluded populations (e.g. people with disabilities, men, adolescents)?
-

- ***Service delivery and scaling-up interventions:***

- What are the mechanisms through which effective services and interventions can be scaled up?
- What are effective delivery models (e.g. facility- or community-based care) for emergency settings?
- How can task shifting being used to increase service delivery?
- How can we effectively involve community members in these interventions?

- ***Technologies: use and development:***

- How effective are new technologies (e.g. non-pneumatic anti-shock garments) at improving health and survival, how are they being used, and how should they be used (development of new guidance)?
- How and how frequently are currently available commodities being used in emergencies? (e.g. how frequently is each component of the safe birthing kits being used? And how can they be made more efficient? How and for what purpose is Misoprostol being used?

- ***Family planning:*** How is long acting reversible contraception (LARC) used in humanitarian settings? What are the behaviours, attitude and logistical barriers to family planning use? Do people receive sufficient appropriate information? What are the implications for future reproductive health (e.g. removal of IUS/IUD/implant) in the absence of availability of long-term health care?

- ***Pregnancy and management of complicating conditions:*** What is the best way to manage conditions like (pre-) eclampsia or cholera to improve maternal and/or neonatal health outcomes?

- ***Safe abortion services:***

- How do we effectively address abortion practices in emergency settings, including the provision of safe abortion and post-abortion care?
- How is Misoprostol being used in non-controlled settings and what are the associated changes in health? Is the existence of an underground/informal economy creating conditions where women are likely to take too much or too little Misoprostol, and therefore suffer ill-health?

- ***Delivery:***

- In facility settings, how common are manual deliveries, episiotomies, vacuum assisted deliveries, and C-sections?
- Are C-sections being over utilised and/or conservative methods of assisted delivery under-utilised? What are the implications for future pregnancies or deliveries?

Research recommendations for GBV:

- Overall, there is no strong evidence on what interventions (stand alone/short-term or comprehensive GBV service provision) effectively address the immediate and long-term impact of violence on physical and mental health of survivors. Importantly, evidence on successful primary and secondary prevention programming is lacking throughout all crisis phases.

Particular research questions include:

- ***Spectrum and context of violence:***

- What is the spectrum of violence against women, girls, men, and boys during a crisis? (e.g. sexual violence by a combatant, intimate partner violence, trafficking, forced marriage)
 - How can programmes be adapted to address the different forms of violence and corresponding health needs?
 - How does each phase of the crisis impact on each sub-populations' unique vulnerabilities to different types of violence?
 - Do other forms of GBV increase as a result of conflict-related violence? For example, does intimate partner violence or child abuse increase in recovery phase?
-

● **Targeted interventions and operational constraints:**

- How can we ensure that GBV services and prevention programming do not miss the most vulnerable? (i.e., disabled, elderly, young girls, urban refugees)
- Medical provision can be implemented through various humanitarian actors but most do not have the resource capacity to deliver comprehensive care for survivors. What are the best ways to deliver and strengthen GBV and medical services in crisis settings? Does the provision of GBV interventions lead to increases in other health and social services? How can safe abortion, emergency contraception, family planning and STI treatment be provided safely and effectively to survivors, especially in contexts where survivors may be blamed, hurt or even killed?
- There is no evidence base to understand the effectiveness and long-term impact of interventions for sexual violence survivors in the early crisis stage. What programming is feasible and effective? What is the optimal timing for early intervention for improved long-term physical and mental health outcomes?

● **Accountability and use of guidelines:**

- Current guidelines for emergency settings are based on programmatic experiences and development contexts. How effective (or harmful) are the guidelines at preventing cases of violence?
- How can we ensure that the revised IASC GBV guidelines are being implemented across the humanitarian clusters and they are effective?

● **Interventions to evaluate:** A number of promising interventions are being implemented but their impact on preventing GBV has not been evaluated. What is the role of safe spaces for women/children? What effect do cash transfer or livelihood interventions have at preventing GBV? What are ways to reduce unaccompanied children and provide protection? Does the placement of a GBV specialist advisor in acute crisis settings enhance the delivery of GBV services across the humanitarian clusters?

● **Methodological development:** The collection of violence prevalence data in the acute stage of a crisis is not always ethical or logistically feasible. What are alternative methodological approaches for understanding experiences of violence in the early crisis stages?

References (A and B categories): Sexual and reproductive health (SRH), including maternal health and gender-based violence

144. Ahoua, L., et al., Evaluation of a 5-year programme to prevent mother-to-child transmission of HIV infection in Northern Uganda. *Journal of tropical pediatrics*, 2010. 56(1): p. 43-52.
145. Ayoya, M.A., K. Golden, and I.N. Teta, Protecting and Improving Breastfeeding Practices during a Major Emergency: Lessons learnt from the baby tents in Haiti. document inédito.
146. Bass, J.K., et al., Controlled trial of psychotherapy for Congolese survivors of sexual violence. *N Engl J Med*, 2013. 368(23): p. 2182-91.
147. Carrara, V.I., et al., Improved pregnancy outcome in refugees and migrants despite low literacy on the Thai-Burmese border: Results of three cross-sectional surveys. *BMC Pregnancy and Childbirth*, 2011. 11(45).
148. Ciccio, L. and D. Sera, Assessing the knowledge and behavior towards HIV/AIDS among youth in Northern Uganda: A cross-sectional survey. *Giornale Italiano di Medicina Tropicale*, 2010. 15(1-4): p. 29-34.
149. Dolan, G., F.O.t. Kuile, and V. Jacoutot, Bed nets for the prevention of malaria and anaemia in pregnancy. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1993. 87(6): p. 620-626.
150. Hustache, S., et al., Evaluation of psychological support for victims of sexual violence in a conflict setting: Results from Brazzaville, Congo. *International Journal of Mental Health Systems*, 2009. 3(7).
151. Jordans, M.J., et al., Evaluation of a classroom-based psychosocial intervention in conflict-affected Nepal: a cluster randomized controlled trial. *Journal of Child Psychology & Psychiatry & Allied Disciplines*, 2010. 51(7): p. 818-26.

152. Larsen, M.M., et al., Changes in HIV/AIDS/STI knowledge, attitudes and practices among commercial sex workers and military forces in Port Loko, Sierra Leone. (Special issue: Reproductive health and conflict). *Disasters*, 2004. 28(3): p. 239-254.
153. Leigh, B., et al., Improving emergency obstetric care at a district hospital, Makeni, Sierra Leone. The Freetown/Makeni PMM Team. *International Journal of Gynaecology & Obstetrics*, 1997. 59 Suppl 2: p. S55-65.
154. Mayaud, P., The challenge of sexually transmitted infections control for HIV prevention in refugee settings: Rwandan refugees in Tanzania. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 2001. 95(2): p. 121-124.
155. McGinn, T. and K. Allen, Improving refugees' reproductive health through literacy in Guinea. *Global public health*, 2006. 1(3): p. 229-248.
156. McPherson, R.A., et al., Are birth-preparedness programmes effective? Results from a field trial in Siraha District, Nepal. (Special issue: Reproductive and newborn health.). *Journal of Health, Population and Nutrition*, 2006. 24(4): p. 479-488.
157. Miller, L.C., et al., Trained traditional birth attendants as educators of refugee mothers. *World Health Forum*, 1995. 16(2): p. 151-156.
158. Orach, C.G., D. Dubourg, and V. De Brouwere, Costs and coverage of reproductive health interventions in three rural refugee-affected districts, Uganda. *Tropical Medicine and International Health*, 2007. 12(3): p. 459-469.
159. Purdin, S., K. Tila, and R. Saucier, Reducing maternal mortality among Afghan refugees in Pakistan. *International Journal of Gynecology & Obstetrics*, 2009. 105(1): p. 82-85.
160. Raheel, H., et al., Knowledge, attitudes and practices of contraception among Afghan refugee women in Pakistan: a cross-sectional study. *PLoS ONE*, 2012. 7(11).
161. Rutta, E., et al., Prevention of mother-to-child transmission of HIV in a refugee camp setting in Tanzania. *Global Public Health*, 2008. 3(3): p. 62-76.
162. Samai, O. and P. Sengeh, Facilitating emergency obstetric care through transportation and communication, Bo, Sierra Leone. The Bo PMM Team. *International Journal of Gynaecology & Obstetrics*, 1997. 59 Suppl 2: p. S157-64.
163. Schaidt, J., et al., International maternal mortality reduction: Outcome of traditional birth attendant education and intervention in Angola. *Journal of Medical Systems*, 1999. 23(2): p. 99-105.
164. Shaikh, M.A., Nurses' use of global information systems for provision of outreach reproductive health services to internally displaced persons. *Prehospital and disaster medicine : the official journal of the National Association of EMS Physicians and the World Association for Emergency and Disaster Medicine in association with the Acute Care Foundation*, 2008. 23(3): p. s35-38.
165. Van Damme, W., et al., Effects of a refugee-assistance programme on host population in Guinea as measured by obstetric interventions. *The Lancet*, 1998. 351(9116): p. 1609-1613.
166. Viswanathan, K., et al., Can community health workers increase coverage of reproductive health services? *Journal of epidemiology and community health*, 2012. 66(10): p. 894-900.
167. Woodward, A., et al., Reproductive health for refugees by refugees in Guinea IV: peer education and HIV knowledge, attitudes, and reported practices. *Conflict and Health*, 2011. 5(10).

4.5 Mental health and psychosocial support

4.5.1 Systematic review

- The search strategy yielded 8740 results but only 69 met the inclusion criteria (all A and B categories).
 - There is an increasing evidence base. The earliest identified study that met the inclusion criteria was from 1997 and the number of studies has increased steadily since then (Figure 31).
 - Twenty-seven studies were with populations affected by natural disasters (12 earthquakes, 12 Tsunami, 3 floods).
-

Forty-two studies were with populations affected by armed conflict (6 with refugees, 8 with IDPs, and 28 with general populations). Of these 42 studies, 10 were in the acute crisis stage and the remainder in more stable and early recovery stages.

- Of the 69 studies, 10 were in urban settings, 13 in rural settings, 35 in both urban and rural, and 11 in refugee/IDP camp settings.
- Thirty-seven of the studies were with adults, and 32 with children and adolescents.
- Fifteen of the studies were scored as being of high quality (7-8/8), 37 moderate quality (4-6/8), and 17 low quality (1-3/8). There is some indication that quality levels may have improved over the past four years or so (Figure 31).
- Twenty-six of the studies were controlled before/after studies, 21 non-randomised trials, 19 randomised control trails, 2 cross-sectional and 1 a study on economic costs.

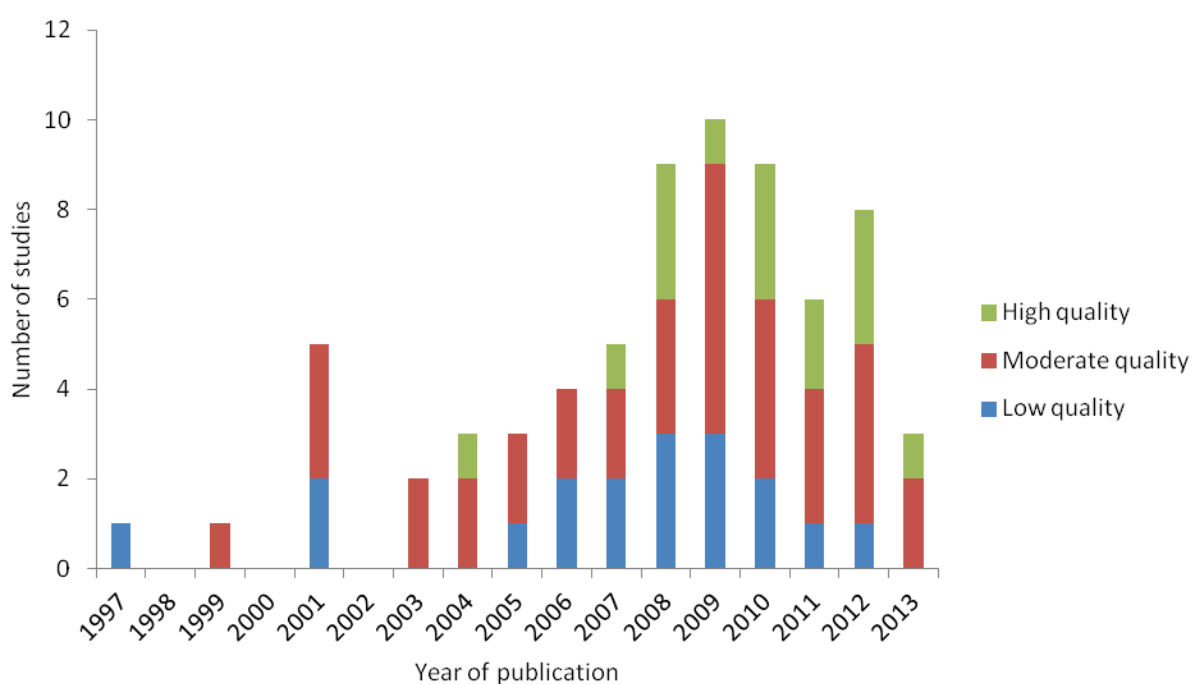


Figure 31: Quantity and quality of mental health and psychosocial support publications over time

- Post-traumatic stress disorder (PTSD) was the most common outcome measured, followed by depression, non-condition specific 'general mental health' and then functioning (Figure 32). There were no studies on more severe conditions. Thirty-three studies measured more than one outcome.
- Thirty-one types of interventions were evaluated in the studies (Figure 33). The most common were psychotherapy (N=11), cognitive behavioural therapy (CBT) (N=8), psychoeducation (N=8) and mixed psychosocial (N=7). Seventeen studies included more than one main type of intervention.

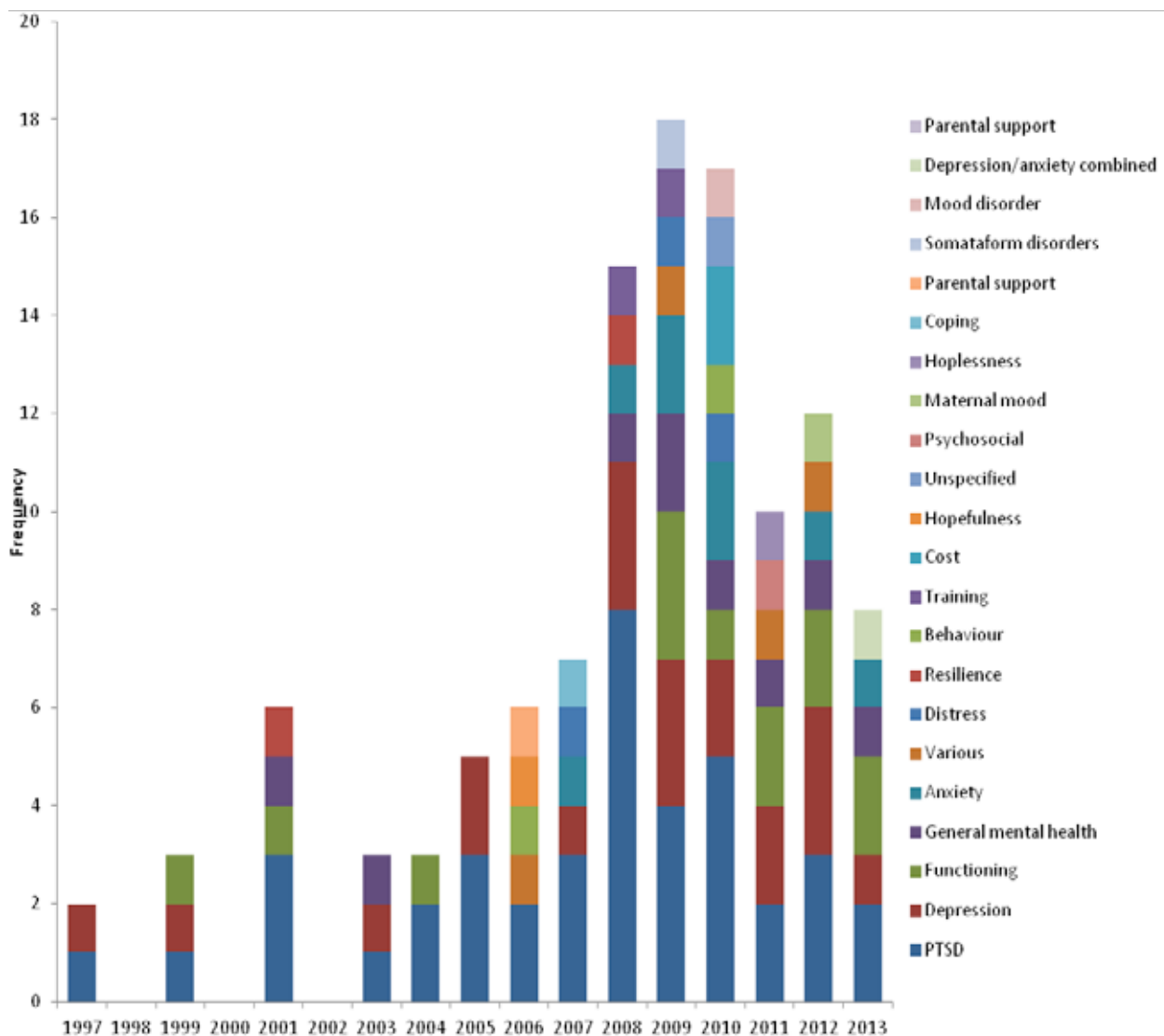


Figure 32: Mental health and psychosocial support outcomes measured over time

4.5.2 Expert interviews

4.5.2.1 Intervention approaches

Scaling up: There is a need for more evidence on the effectiveness of low intensity and low cost interventions in non-specialised health care and community settings. Research on the following was suggested:

- The effectiveness and feasibility of delivering care through different cadres of health workers, including with intermediate training (e.g. BSc level or less) and community health workers. This should include potential risks and trade-offs.
- Evidence on how services can be most effectively integrated through existing health services/systems, particularly at the primary health care level.
- Effectiveness of different training methods, particularly how much supervision is needed to achieve effective task shifting.

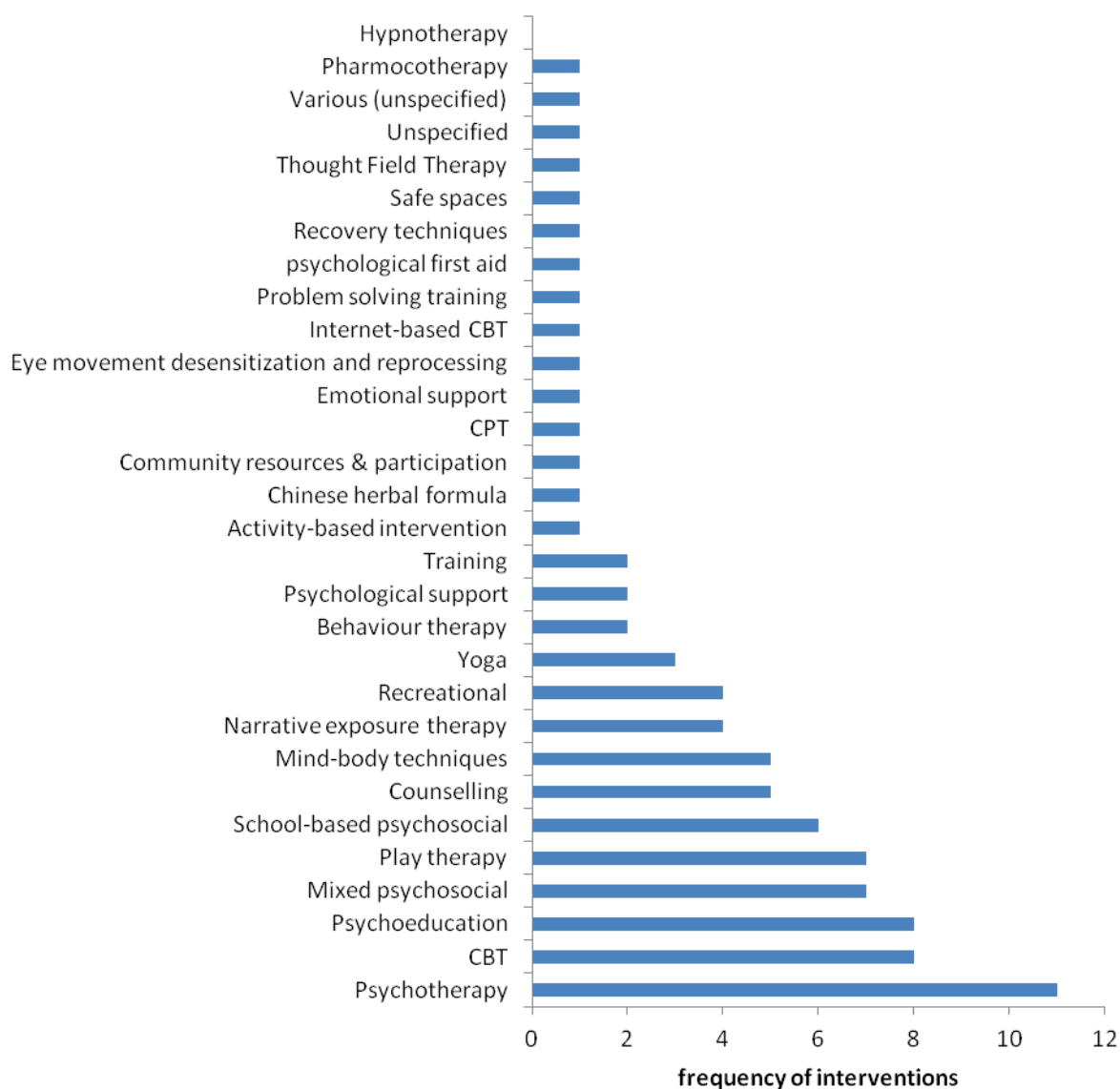


Figure 33: Mental health and psychosocial support intervention types

- Effectiveness and feasibility of interventions for groups, in addition to individuals.
- Effectiveness and feasibility of e-mental health interventions.
- Effectiveness and feasibility of interventions addressing issues underlying multiple disorders, rather than specialist interventions on a single disorder (e.g. PTSD). Such an approach could be maximised by applying components from different treatments methods to address co-morbidity (i.e. component- or module-based therapy, see below).

User and community-orientated services: Mental health users, family members and communities can be involved more in preventive and treatment interventions. Research on the effectiveness of the following interventions was suggested:

- Evidence for interventions aimed at strengthening participation of affected communities in humanitarian settings, a key principle in current guidelines.
- Where appropriate, using parents and natural support systems (rather than external counsellors), including parent management training.
- Strengthening social support and coping mechanisms at family and community levels.
- School-based interventions for improving pupil mental health outcomes, including looking at the burden on teachers (if teachers are involved).

Interventions with other sectors: There is a need for more evidence on how mental health and psychosocial support interventions can be better integrated with other sectors. Examples include evidence on the effectiveness of mental health and psychosocial support interventions with the following sectors:

- Research on preventive interventions that address major determinants of mental health in humanitarian settings, including interventions targeting ongoing violence (particularly against women), poverty, and social exclusion.
- The education sector (e.g. school-based interventions to improve pupil mental health outcomes).
- The nutrition sector (e.g. mental health interventions with mothers to also improve maternal and infant nutritional outcomes).
- Protection and welfare (e.g. to prevent punitive parental violence against children to improve child mental health and behaviour outcomes; e.g. to improve parental mental health to reduce parental violence against children; e.g. improve mental health outcomes among survivors of sexual violence).
- Communicable disease (e.g. how improved mental health (e.g. reducing harmful alcohol use) may reduce risky behaviour and communicable disease transmission).

4.5.2.2 Types of intervention to be researched

The following two complementary approaches were highlighted.

- **Psychosocial interventions:** The lack of evidence on the effectiveness of psychosocial (preventive) interventions in particular was frequently reported (although the additional complexities of evaluating such interventions were recognised). Cited examples include stronger evidence needed on psychological interventions such as psychological first aid, generic counselling, psycho-education, social interventions such as addressing violence and social exclusion, and childhood interventions.
- **Modular transdiagnostic approaches for psychological interventions:** For people with mental disorders, it was suggested that rather than providing a single treatment for a specific disorder (e.g. those with a more proven evidence base such as CBT and IPT), it could be beneficial to apply simplified individual modules from within these different treatments in order to simultaneously respond to a range of symptoms and disorders (rather than just a single disorder). Evidence would therefore be required on the effectiveness of this modular approach.

4.5.2.3 Mental health and psychosocial support outcomes to be researched

- **Multiple outcomes:** It was widely recognised that evidence on the effectiveness of interventions treating a range of different outcomes (e.g. PTSD, depression, anxiety or alcohol disorder) was required given the variety of disorders commonly observed with crisis-affected populations, the high levels of co-morbidity, and the greater cost-effectiveness of treating multiple disorders.
 - **Severe disorders:** There remains a clear need to strengthen the evidence-base of common mental disorders, but in addition there is a need for a much stronger evidence-base on treating severe mental disorders (e.g. psychosis,
-

schizophrenia, severe depression) given their increased burden and that they commonly take up the majority of clinic load (albeit context specific). It was noted that while the efficacy of some interventions for severe disorders is well proven from more stable settings (e.g. use of specific drugs), the broader effectiveness of such interventions in emergency settings has not been proven. In addition, the use of supplementary psychosocial interventions for severe disorders has not been adequately tested or proven (e.g. the use of anti-stigma campaigns in communities, community-based rehabilitation and inclusion approaches).

- **Functioning:** The need for more measurement of functioning as outcome for mental health interventions was frequently noted. The additional need to ensure functioning measures were culturally appropriate was also raised.
- **Substance misuse:** The need for further research on interventions addressing harmful alcohol use and drug taking was frequently raised, including brief interventions.
- **Determinants of mental health:** given that humanitarian settings are often chronic, it is key that interventions also address the ongoing determinants of mental health (e.g. violence against women and children, socio-economic adversity, social exclusion). These interventions are popular in practice, but have not been rigorously evaluated.

4.5.2.4 Study designs to be used

- **Randomised control trials (RCTs):** Despite the obvious challenges of conducting RCTs in humanitarian settings, the need for RCT was widely recognised, but also that RCTs (and other study designs such as quasi-experimental designs with comparison groups) should collect data over a much longer period than has previously been the case in order to be able to track longer-term intervention effects (where ethically appropriate).
- **Mixed-methods studies:** The need for combined quantitative and qualitative studies was commonly reported. For example, to better understand local explanations for mental health disorders and causes, issues of access, the cultural acceptability and appropriateness of interventions and their implementation, and study measures.
- **Greater use of routine data:** Great analysis and publication of high quality routine facility-based data on mental disorder outcomes over time, including the use of clinical audit data and also case-study approaches to observe treatment effects and review service delivery models. This includes using mental health in routine surveillance systems as soon as possible in humanitarian crises.
- **Feasibility studies:** The need for greater evidence on feasibility of interventions was frequently raised, particularly in comparing different interventions (e.g. by being linked to an RCT) and in scaling-up interventions and for task-shifting interventions. Aspects of feasibility should include economic (see below), social and cultural (e.g. how acceptable), political, technical and operational.
- **Economic studies:** There was a widely expressed need for more studies on economic aspects of interventions, in particular for cost-effectiveness analysis to be included in intervention studies. Other research related to the need to understand the overall economic costs and benefits in interventions involving scaling-up services through the health system. Gaining a better understanding of the economic costs of poor mental health (and subsequent potential gains through improved mental health) was also highlighted.

4.5.2.5 Particular study populations of interest

- **Children and adolescents:** The need for evidence on interventions for child mental health, behavioural problems and development was raised, including the use of brief family interventions, peer education, and appropriate community mechanism and resources.
 - **Older populations:** Particular evidence on interventions addressing dementia and old age problems.
 - **Survivors of sexual and other forms of gender-based violence:** For example, evidence on the effectiveness of mental health interventions for survivors of sexual and gender-based violence (e.g. intimate partner violence); evidence on interventions to reduce anger and violence among men.
-

4.5.2.6 Key ethical issues:

- **Adverse effects:** More evidence is required on the adverse effects of mental health interventions. For example, culturally insensitive interventions; lack of sustainability; poor or (unintentionally) abusive practice due to limited training, capacity, monitoring and supervision.
- **Independent RCTs:** There is a need for more independently led trials, rather than being led by proponents of the particular mental health intervention being trailed.
- **Quality:** There is a need to improve the quality of research in order to ensure its appropriateness, and the accuracy, validity and reliability of results of the interventions.

4.5.3 Recommendations for future research

- Evidence is required on effectiveness and feasibility of scaling-up low intensity and low cost psychological interventions.
- Substantially more evidence is required on the effectiveness of psychosocial interventions.
- Evidence on the effectiveness of group-based interventions as well as interventions for individuals.
- Effectiveness of interventions using parents, peers, natural support systems, and schools.
- Evidence on the use of inter-sectoral approaches (e.g. nutrition, protection, education).
- Evidence on using a modular transdiagnostic approach to treating mental disorders, including multiple disorders.
- Evidence on the effectiveness and feasibility of e-mental health interventions.
- Evidence on the effectiveness and feasibility of training interventions.
- The effectiveness of interventions that address common issues underlying multiple disorders.
- Effectiveness of different training methods.
- Evidence on the effectiveness of treating common mental disorders but also severe mental disorders, drug and harmful alcohol use, and having a focus on functioning as a key outcome.
- Evidence from RCTs and quasi experimental studies is required. However, use of other study designs is of value, including the use routine clinical outcome data. More evidence using mixed methods is required to improve acceptability and appropriateness of interventions and associated research.
- Substantially more evidence is required on the feasibility of rolling out interventions into practice settings, particularly economic feasibility and cost-effectiveness of interventions.
- Evidence is particularly required for interventions that focus on the needs of children, adolescents, older populations and survivors of sexual and other forms of gender-based violence.
- Greater evidence on potentially harmful effects of mental health interventions is required.
- The quality of research needs to improve in order to ensure valid and reliable results.

References (A and B categories): Mental health and psychosocial support

168. Ager, A., et al., The impact of the school-based Psychosocial Structured Activities (PSSA) program on conflict-affected children in Northern Uganda. *J Child Psychol Psychiatry*, 2011. 52(11): p. 1124-33.
 169. Ayoughi, S., et al., Provision of mental health services in resource-poor settings: a randomised trial comparing counselling with routine medical treatment in North Afghanistan (Mazar-e-Sharif). *BMC psychiatry*, 2012. 12: p. 14.
 170. Basoglu, M., et al., A brief behavioural treatment of chronic post-traumatic stress disorder in earthquake survivors: Results from an open clinical trial. *Psychological Medicine*, 2003. 33(4): p. 647-654.
 171. Basoglu, M., et al., Single-session behavioral treatment of earthquake-related posttraumatic stress disorder: a randomized waiting list controlled trial. *J Trauma Stress*, 2005. 18(1): p. 1-11.
-

172. Bass, J., et al., A controlled trial of problem-solving counseling for war-affected adults in Aceh, Indonesia. *Social psychiatry and psychiatric epidemiology*, 2012. 47(2): p. 279-291.
 173. Bastin, P., et al., Description and Predictive Factors of Individual Outcomes in a Refugee Camp Based Mental Health Intervention (Beirut, Lebanon). *PLoS ONE*, 2013. 8(1).
 174. Becker, S.M., Psychosocial care for women survivors of the tsunami disaster in India. *American Journal of Public Health*, 2009. 99(4): p. 654-658.
 175. Berger, R. and M. Gelkopf, School-based intervention for the treatment of tsunami-related distress in children: a quasi-randomized controlled trial. *Psychotherapy & Psychosomatics*, 2009. 78(6): p. 364-71.
 176. Betancourt, T.S., et al., Moderators of treatment effectiveness for war-affected youth with depression in northern Uganda. *J Adolesc Health*, 2012. 51(6): p. 544-50.
 177. Bolton, P., et al., Interventions for depression symptoms among adolescent survivors of war and displacement in northern Uganda: a randomized controlled trial. *JAMA : the journal of the American Medical Association*, 2007. 298(5): p. 519-527.
 178. Budosan B and Jones L, Evaluation of effectiveness of mental health training program for primary health care staff in Hambantota District, Sri Lanka post-tsunami. *The Journal of Humanitarian Assistance*, 2009. May 2009.
 179. Catani, C., et al., Treating children traumatized by war and Tsunami: a comparison between exposure therapy and meditation-relaxation in North-East Sri Lanka. *BMC psychiatry*, 2009. 9: p. 22.
 180. Constandinides D, et al., Research in ongoing conflict zones: Effects of a school-based intervention for Palestinian children. *Peace and Conflict: Journal of Peace Psychology*, 2011. 17(3): p. 270-302.
 181. Descilo, T., et al., Effects of a yoga breath intervention alone and in combination with an exposure therapy for post-traumatic stress disorder and depression in survivors of the 2004 South-East Asia tsunami. *Acta Psychiatrica Scandinavica*, 2010. 121(4): p. 289-300.
 182. Dybdahl, R., Children and mothers in war: an outcome study of a psychosocial intervention program. *Child development*, 2001. 72(4): p. 1214-1230.
 183. Ferdos, G. and S. Seyed-Hosseini, The effectiveness of problem solving skills in decreasing PTSD symptoms in survivors of bam earthquake. *Pakistan Journal of Medical Sciences*, 2007. 23(5): p. 736-740.
 184. Gabouloud V and et al, Psychological support for Palestinian children and adults: an analysis of data from people referred to the Médecins Sans Frontières programme for behavioural and emotional disorders in the occupied Palestinian territory. *Intervention*, 2010. 8(2): p. 131-142.
 185. Gelkopf, M., et al., The impact of "training the trainers" course for helping tsunami-survivor children on Sri Lankan disaster volunteer workers. *International Journal of Stress Management*, 2008. 15(2): p. 117-135..
 186. Goenjian, A.K., et al., Outcome of psychotherapy among early adolescents after trauma. *American Journal of Psychiatry*, 1997. 154(4): p. 536-542.
 187. Goenjian, A.K., et al., A prospective study of posttraumatic stress and depressive reactions among treated and untreated adolescents 5 years after a catastrophic disaster. *American Journal of Psychiatry*, 2005. 162(12): p. 2302-2308.
 188. Gordon, J.S., et al., Treatment of posttraumatic stress disorder in postwar Kosovo high school students using mind-body skills groups: a pilot study. *J Trauma Stress*, 2004. 17(2): p. 143-7.
 189. Gordon, J.S., et al., Treatment of posttraumatic stress disorder in postwar Kosovar adolescents using mind-body skills groups: a randomized controlled trial. *Journal of Clinical Psychiatry*, 2008. 69(9): p. 1469-76.
 190. Gupta, L. and C. Zimmer, Psychosocial intervention for war-affected children in Sierra Leone. *British Journal of Psychiatry*, 2008. 192(3): p. 212-216.
 191. Hasanovic, M., et al., Psychosocial assistance to students with posttraumatic stress disorder in primary and secondary schools in post-war Bosnia Herzegovina. *Psychiatria Danubina*, 2009. 21(4): p. 463-73.
 192. Jiang, R., Q. Zhang, and J. Fan, Psychological intervention to victims affected by a flash flood. *Modern Preventive Medicine*, 2010. 37(19): p. 3699-3701.
 193. Johnson, C., et al., Thought Field Therapy-soothing the bad moments of Kosovo. *J Clin Psychol*, 2001. 57(10): p. 1237-40.
-

194. Jordans, M.J., et al., Evaluation of a classroom-based psychosocial intervention in conflict-affected Nepal: a cluster randomized controlled trial. *Journal of child psychology and psychiatry, and allied disciplines*, 2010. 51(7): p. 818-826.
 195. Jordans, M.J., et al., Practice-driven evaluation of a multi-layered psychosocial care package for children in areas of armed conflict. *Community Ment Health J*, 2011. 47(3): p. 267-77.
 196. Karam, E.G., et al., Effectiveness and specificity of a classroom-based group intervention in children and adolescents exposed to war in Lebanon. *World Psychiatry*, 2008. 7(2): p. 103-109.
 197. Khamis, V. The Impact of the Classroom/Community/Camp-Based Intervention Program on Palestinian Children. 2004; Available from: http://pdf.usaid.gov/pdf_docs/PNADJ085.pdf.
 198. Konuk, E., et al., The effects of eye movement desensitization and reprocessing (EMDR) therapy on posttraumatic stress disorder in survivors of the 1999 Marmara, Turkey, earthquake. *International Journal of Stress Management*, 2006. 13(3): p. 291-308.
 199. Krishnaswamy, S., et al., The 2004 tsunami in Penang, Malaysia: early mental health intervention. *Asia-Pacific Journal of Public Health*, 2012. 24(4): p. 710-8.
 200. Layne, C.M., et al., Effectiveness of a school-based group psychotherapy program for war-exposed adolescents: A randomized controlled trial. *Journal of the American Academy of Child and Adolescent Psychiatry*, 2008. 47(9): p. 1048-1062.
 201. Layne, C.M., et al., Trauma/grief-focused group psychotherapy: School-based postwar intervention with traumatized Bosnian adolescents. *Group Dynamics*, 2001. 5(4): p. 277-290.
 202. Le Roch, K., et al., Two psychosocial assistance approaches for Iraqi urban refugees in Jordan and Lebanon: Center-based services compared to community outreach services. *Journal of Muslim Mental Health*, 2010. 5(1): p. 99-119.
 203. Loughry, M., et al., The impact of structured activities among Palestinian children in a time of conflict. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 2006. 47(12): p. 1211-1218.
 204. Madfis, J., D. Martyris, and C. Triplehorn, Emergency safe spaces in Haiti and the Solomon Islands. *Disasters*, 2010. 34(3): p. 845-864.
 205. Mahmoudi-Gharaei, J., et al., The Effects of a Short-term Cognitive Behavioral Group Intervention on Bam Earthquake Related PTSD Symptoms in Adolescents. *Iranian Journal of Psychiatry*, 2009. 4: p. 79-84.
 206. Meng, X., et al., A Chinese herbal formula to improve general psychological status in posttraumatic stress disorder: a randomized placebo-controlled trial on Sichuan earthquake survivors. *Evidence based Complementary and Alternative Medicine*, 2012. 691258(89).
 207. Mooren, T.T., et al., The efficacy of a mental health program in Bosnia-Herzegovina: impact on coping and general health. *Journal of Clinical Psychology*, 2003. 59(1): p. 57-69.
 208. Morris, J., et al., Does combining infant stimulation with emergency feeding improve psychosocial outcomes for displaced mothers and babies? A controlled evaluation from northern Uganda. *Am J Orthopsychiatry*, 2012. 82(3): p. 349-57.
 209. Mueller, Y., et al., Integrating mental health into primary care for displaced populations: the experience of Mindanao, Philippines. *Conflict and Health*, 2011. 5(3).
 210. Neuner, F., et al., Treatment of Posttraumatic Stress Disorder by Trained Lay Counselors in an African Refugee Settlement: A Randomized Controlled Trial. *Journal of Consulting and Clinical Psychology*, 2008. 76(4): p. 686-694.
 211. Neuner, F., et al., A comparison of narrative exposure therapy, supportive counseling, and psychoeducation for treating posttraumatic stress disorder in an African refugee settlement. *Journal of Consulting and Clinical Psychology*, 2004. 72(4): p. 579-587.
 212. Pityaratstian, N., et al., Cognitive-behavioral intervention for young tsunami victims. *Journal of the Medical Association of Thailand*, 2007. 90(3): p. 518-23.
-

213. Priebe, S., et al., Treatment outcomes and costs at specialized centers for the treatment of PTSD after the war in former Yugoslavia. *Psychiatric Services*, 2010. 61(6): p. 598-604.
 214. Qouta, S.R., et al., Intervention effectiveness among war-affected children: a cluster randomized controlled trial on improving mental health. *Journal of traumatic stress*, 2012. 25(3): p. 288-298.
 215. Salcioglu, E., M. Basoglu, and M. Livanou, Effects of live exposure on symptoms of posttraumatic stress disorder: The role of reduced behavioral avoidance in improvement. *Behaviour Research and Therapy*, 2007. 45(10): p. 2268-2279.
 216. Selimbasic, Z., et al., Posttraumatic stress disorder--effects of psychosocial treatment in children. *Medicinski arhiv*, 2001. 55(1 Suppl 1): p. 25-29.
 217. Shooshtary, M.H., L. Panaghi, and J.A. Moghadam, Outcome of Cognitive Behavioral Therapy in Adolescents After Natural Disaster. *Journal of Adolescent Health*, 2008. 42(5): p. 466-472.
 218. Sonderegger, R., et al., Trauma rehabilitation for war-affected persons in northern Uganda: a pilot evaluation of the EMPOWER programme. *British Journal of Clinical Psychology*, 2011. 50(3): p. 234-49.
 219. Staples JK, et al., Mind-body skills groups for posttraumatic stress disorder and depression symptoms in Palestinian children and adolescents in Gaza. *International Journal of Stress Management*, 2011. 18(3): p. 246-262.
 220. Telles, S., K.V. Naveen, and M. Dash, Yoga reduces symptoms of distress in tsunami survivors in the Andaman Islands. *Evidence based Complementary and Alternative Medicine*, 2007. 4(4): p. 503-509.
 221. Telles, S., et al., Post traumatic stress symptoms and heart rate variability in Bihar flood survivors following yoga: A randomized controlled study. *BMC Psychiatry*, 2010. 10(18).
 222. Thabet, A.A., P. Vostanis, and K. Karim, Group crisis intervention for children during ongoing war conflict. *European Child & Adolescent Psychiatry*, 2005. 14(5): p. 262-9.
 223. Tol, W.A., et al., Brief multi-disciplinary treatment for torture survivors in Nepal: a naturalistic comparative study. *International Journal of Social Psychiatry*, 2009. 55(1): p. 39-56.
 224. Tol, W.A., et al., Outcomes and moderators of a preventive school-based mental health intervention for children affected by war in Sri Lanka: A cluster randomized trial. *World Psychiatry*, 2012. 11(2): p. 114-122.
 225. Tol, W.A., et al., School-based mental health intervention for children affected by political violence in Indonesia: a cluster randomized trial. *JAMA*, 2008. 300(6): p. 655-62.
 226. Urrego Z, EVALUATION OF RESULTS FROM A SINGLE-SESSION PSYCHOTHERAPEUTIC INTERVENTION IN POPULATION AFFECTED BY THE COLOMBIAN INTERNAL ARMED CONFLICT, 2009, MSF: Bogota.
 227. Vijayakumar, L., et al., Do all children need intervention after exposure to tsunami? *International Review of Psychiatry*, 2006. 18(6): p. 515-522.
 228. Vijayakumar, L. and M.S. Kumar, Trained volunteer-delivered mental health support to those bereaved by Asian Tsunami - An evaluation. *International Journal of Social Psychiatry*, 2008. 54(4): p. 293-302.
 229. Wagner, B., W. Schulz, and C. Knaevelsrud, Efficacy of an Internet-based intervention for posttraumatic stress disorder in Iraq: A pilot study. *Psychiatry Research*, 2012. 195(1-2): p. 85-88.
 230. Wickrama, K. and T. Wickrama, Perceived community participation in tsunami recovery efforts and the mental health of tsunami-affected mothers: Findings from a study in rural Sri Lanka. *International Journal of Social Psychiatry*, 2011. 57(5): p. 518-527.
 231. Woodside, D., J. Santa Barbara, and D.G. Benner, Psychological trauma and social healing in Croatia. *Medicine, conflict, and survival*, 1999. 15(4): p. 355-367; discussion 391-393.
 232. Wu, S., L. Cao, and R. Wang, Psychological intervention for earthquake injured people in off-site areas. *Journal of Shandong University*, 2009. 47(8): p. 114-117.
 233. Yeomans, P.D., et al., A randomized trial of a reconciliation workshop with and without PTSD psychoeducation in Burundian sample. *Journal of traumatic stress*, 2010. 23(3): p. 305-312.
 234. Zang, Y., N. Hunt, and T. Cox, A randomised controlled pilot study: The effectiveness of narrative exposure therapy with adult survivors of the Sichuan earthquake. *BMC Psychiatry*, 2013. 13(41).
-

4.6 Non-communicable disease

4.6.1 Systematic review

- The search strategy captured a total of 5552 papers. The vast majority (5526) either did not discuss humanitarian crises or did not consider the impact of an intervention. Twenty-six papers met the inclusion criteria.
- The majority of papers (16/26, 62%) included a test of significance for NCD outcomes (category A). 4/26 (15%) papers examined NCD outcomes without a test of significance (category B). 6/26 (23%) papers were of category C.
- The remainder of the analysis below is restricted to the 20 papers that evaluated NCD health outcomes (i.e. categories A and B).
- Most papers (13/20, 65%) were of medium quality, as assessed against the adapted STROBE criteria. 4/20 (20%) papers were considered to be high quality and 3/20 (15%) were low quality (Figure 34)
- There has been increasing interest in public health interventions for NCDs in humanitarian crises over the past two decades, with 16/20 (80%) papers published since 2000 (Figure 34).
- The quality of evidence has improved over time also. 3/4 high quality studies have been published since 2010 (Figure 34).



Figure 34: Quantity and quality of NCD publications over time

- Cross-sectional studies were the most common design used, (11/20, 55%). There were five cohort studies, two case-control studies, one non-randomised trial and one controlled before and after study. Most studies therefore assessed a single point in time rather than following up the effectiveness of an intervention over a period of time.
- The acute crisis was the most common stage of crisis under analysis (9/20, 45%), followed by stabilised stage (6/20, 30%) and early recovery (5/20, 25%) (Figure 35). Preparedness was not considered in any of the papers reviewed.
- All 21 studies were conducted in the Middle East. 8/20 (40%) studies focussed on the earthquake in Turkey, and 5/20 (25%) studies were on the earthquake in Iran. The remaining studies (7/20, 35%) were in armed conflict settings: two in Israel, two in Jordan, one in Afghanistan, one in Kuwait and one in Jordan, Syrian Arab Republic, Lebanon, Gaza Strip and the West Bank, collectively. See Figure 36 and Figure 37.

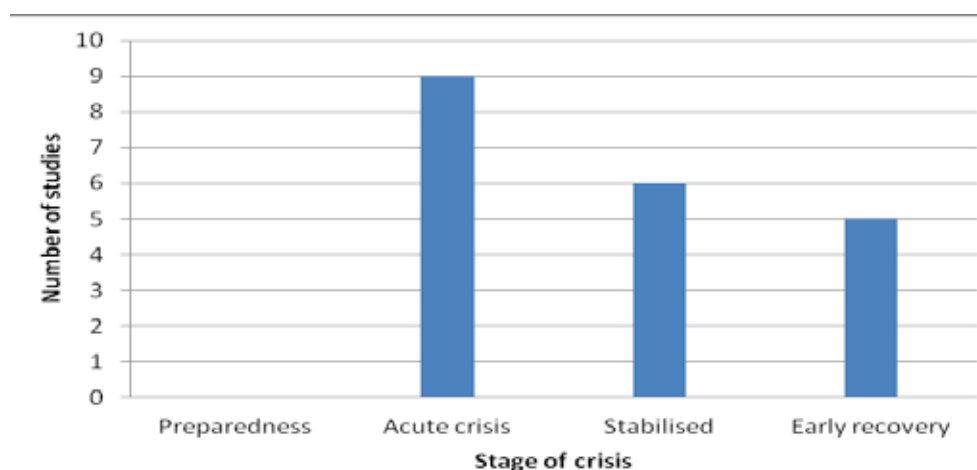


Figure 35: NCD studies by crisis stage

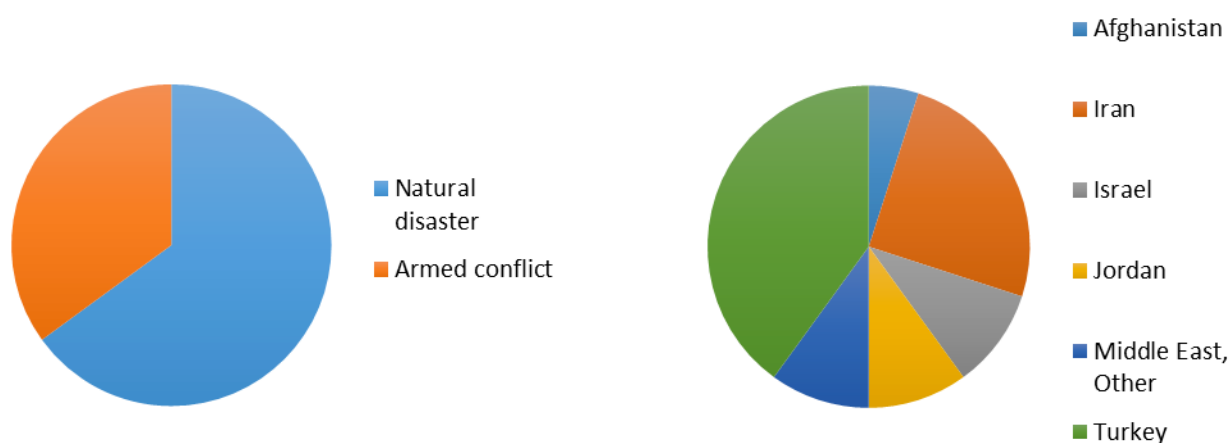


Figure 36: NCD studies by disaster type

Figure 37: Geographic regions of NCD studies

- It was common for studies to focus on regions that encompassed both urban and rural settings (10/20, 50%). 9/20 (45%) papers focused on urban settings and 1/20 (5%) paper focussed on a rural environment. Camp settings were not considered by any of the studies.
- The most common NCD examined was renal failure (13/20, 65%); 12 of these 13 studies were set in the aftermath of an earthquake. The only other paper that examined a natural disaster was on diabetes. The seven studies in conflict settings covered a greater range of NCDs: asthma, diabetes, diabetes and CVD, hypertension, MS, renal failure and thalassaemia. See Figure 38.
- The most common intervention considered was renal replacement therapy (RRT), (7/20, 35%) as a reflection of renal failure being the most common NCD. 4/20 (20%) studies examined diagnostic tools or protocols, and 3/20 (15%) were about NCD clinics. Other interventions were operations (2), anxiety relief (2), fluid therapy (1), and antibiotics, transfusions and ventilation (1). See Figure 39.

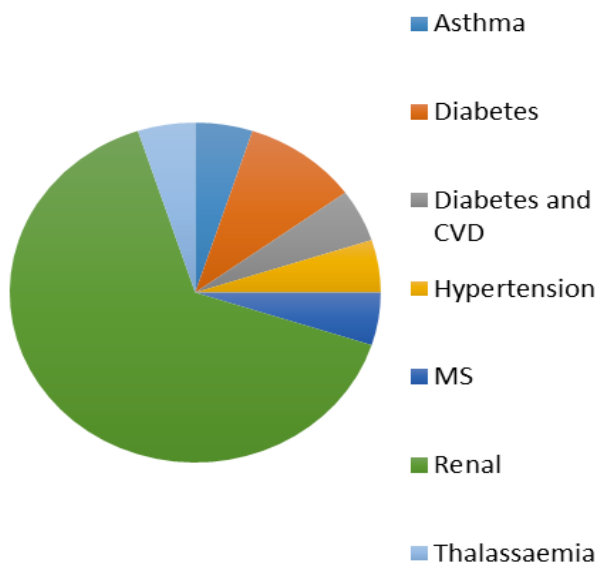


Figure 38: NCD types

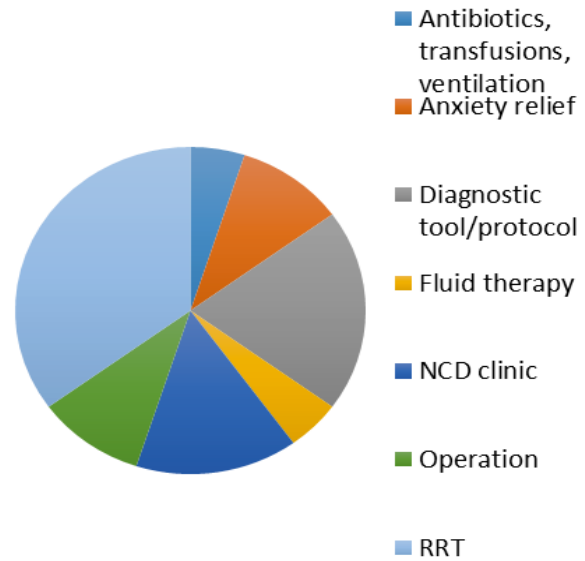


Figure 39: NCD interventions

4.6.2 Expert interviews

Key findings from the expert interviews were as follows:

- There was some consensus that NCDs in humanitarian crises were not generally seen as a priority for intervention, nor for research. It was therefore felt that one of the priorities for NCDs was to make their case as an important public health issue during humanitarian crises.
- Another priority evidence gap that emerged was around protocols, guidelines and frameworks for NCDs that could be translated to different crisis scenarios. One specific gap cited was in the inclusion of NCDs in the basic package of health care for humanitarian crises.
- There was a sense that knowledge already exists around what interventions are effective for NCDs but that there was a gap in knowledge around implementation. One expert thought that improvements had been made in effective delivery mechanisms, citing the case of Haiti. However, this review did not uncover any studies from Haiti.
- Acute conditions, such as kidney injury or complications of NCDs were seen to take precedence. NCDs, in particular hypertension and diabetes, are increasing problems pre-crisis and it was thought that evidence should expand to cover these more diverse health needs.
- Data collection was seen as a barrier to developing evidence in crisis settings. Assessments of health needs were reliant on verbal accounts of current needs. Conflict zones bore additional problems since it was difficult to continue data collection while working in dangerous condition, which called the accuracy of data into question. Also, information on resource and infrastructure are often classified in these settings.
- Ethical approval was cited as a common obstacle to research in crisis settings.
- Experts proposed that a pre-conflict understanding of NCD needs would assist the understanding of the interventions needed in an emergency. Before and after study designs were recommended, in particular to understand how best to ensure continuity of care and reduction of complications.
- There was considered to be a lack of follow up of NCD intervention, particularly for renal replacement therapy. Longitudinal study designs were recommended.

- There was felt to be a lack of consideration of older people during crises, who are disproportionately affected by NCDs. Age stratification of these older age groups was therefore recommended.
- It was also suggested that research should be conducted in collaboration between conflict and health teams to improve the quality of information generated by each.
- It was highlighted by several experts that essential drugs for NCDs were not included in emergency kits, which was seen as an oversight.
- Suggestions for the development of guidelines and standards centred on sharing learning from other topic areas. It was considered that a lot of research had been done on retaining access to HIV medication, which would be equally applicable to NCDs. Studies examining the role of nutrition in childhood could provide understanding around the impact of a crisis on the subsequent development of NCDs. Another suggestion was to research camp or slum areas, which could provide indicators of effective interventions in more acute crises.

4.6.3 Recommendations for future research

Indicators, standards, and guidelines

- The key priority for NCD research is in the development and testing of standards and guidelines for the delivery of NCD care in crisis settings.
- The evidence base would benefit from an understanding of how current practice (including in camps) vary from new recommended standards and guidelines, in order to develop recommendations for implementation.

Study design

- Attention should be paid to producing higher quality evidence. The evidence base would benefit from: before and after, or longitudinal study designs; with careful consideration of feasibility and cost, bearing in mind the movement of affected population.
- There is a need for sex and age disaggregated data of the pre-crisis situation.

Delivery of health interventions

- Improvements to the effectiveness of delivery of NCD interventions during crises could be achieved by working with specialists in other health areas. For example, addressing nutritional standards, particularly in camp situations where support is likely to be longer term, would play an important role in the prevention of NCDs.
- Of high priority is identification and inclusion of essential drugs for NCDs into emergency kits and the subsequent evaluation of the basic package of care for humanitarian crises.

Context

- There is a lack of evidence beyond the Middle East region, despite a high prevalence of NCDs in Asia and increasing prevalence in other regions.

References (A and B categories): Non-communicable diseases (NCDs)

235. Amini, M., et al., Role of dipstick in detection of haeme pigment due to rhabdomyolysis in victims of Bam earthquake. *Eastern Mediterranean Health Journal*, 2010. 16(9): p. 977-81.
 236. Atef, M.R., et al., Acute renal failure in earthquake victims in Iran: epidemiology and management. *Quarterly Journal of Medicine*, 1994. 87(1): p. 35-40.
 237. Bolt, J.D. and B.A. Schoneboom, Operative splenectomy for treatment of homozygous thalassemia major in Afghan children at a US military hospital. *AANA Journal*, 2010. 78(2): p. 129-33.
 238. Brook, U., Anxiety of asthmatic pupils in Israel during the Persian Gulf War: treatment and counseling implications. *Patient Education & Counseling*, 1995. 25(2): p. 211-4.
-

239. el-Reshaid, K., et al., The impact of Iraqi occupation on end-stage renal disease patients in Kuwait, 1990-1991. *Nephrology Dialysis Transplantation*, 1993. 8(1): p. 7-10.
 240. Kantarci, G., et al., Acute renal failure due to crush syndrome during Marmara earthquake. *American Journal of Kidney Diseases*, 2002. 40(4): p. 682-9.
 241. Kazancioglu, R., et al., The outcome of patients presenting with crush syndrome after the Marmara earthquake. *International Journal of Artificial Organs*, 2001. 24(1): p. 17-21.
 242. Khader, A., et al., Cohort monitoring of persons with hypertension: An illustrated example from a primary healthcare clinic for Palestine refugees in Jordan. *Tropical Medicine and International Health*, 2012. 17(9): p. 1163-1170.
 243. Khader, A., et al., Cohort monitoring of persons with diabetes mellitus in a primary healthcare clinic for Palestine refugees in Jordan. *Tropical Medicine and International Health*, 2012. 17(12): p. 1569-1576.
 244. Mousa, H.S., et al., Hyperglycaemia, hypertension and their risk factors among Palestine refugees served by UNRWA. *Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-ihhiyah li-sharq al-mutawassi*, 2010. 16(6): p. 609-614.
 245. Nadjafi, I., et al., Suggested guidelines for treatment of acute renal failure in earthquake victims. *Renal Failure*, 1997. 19(5): p. 655-64.
 246. Ozturk, S., et al., The effect of the type of membrane on intradialytic complications and mortality in crush syndrome. *Renal Failure*, 2009. 31(8): p. 655-61.
 247. Safari, S., et al., Outcomes of fasciotomy in patients with crush-induced acute kidney injury after Bam earthquake. *Iranian journal of Kidney Diseases*, 2011. 5(1): p. 25-8.
 248. Sagheb, M.M., et al., Effect of fluid therapy on prevention of acute renal failure in Bam earthquake crush victims. *Renal Failure*, 2008. 30(9): p. 831-5.
 249. Sengul, A., et al., Lessons learnt from influences of the Marmara earthquake on glycemic control and quality of life in people with type 1 diabetes. *Endocrine Journal*, 2004. 51(4): p. 407-14.
 250. Sever, M.S., et al., Features of chronic hemodialysis practice after the Marmara earthquake. *Journal of the American Society of Nephrology*, 2004. 15(4): p. 1071-1076.
 251. Sever, M.S., et al., Lessons learned from the catastrophic Marmara earthquake: factors influencing the final outcome of renal victims. *Clinical Nephrology*, 2004. 61(6): p. 413-21.
 252. Sever, M.S., et al., Renal replacement therapies in the aftermath of the catastrophic Marmara earthquake. *Kidney International*, 2002. 62(6): p. 2264-71.
 253. Somer, E., et al., Patients with multiple sclerosis in a war zone: coping strategies associated with reduced risk for relapse. *Multiple Sclerosis*, 2010. 16(4): p. 463-71.
 254. Yurugen, B., G. Emir, and A. Ersoy, Treatment of patients with acute renal failure during Marmara earthquake. *Edtna-Erca Journal*, 2001. 27(4): p. 174-177.
-

4.7 Injury and physical rehabilitation

4.7.1 Systematic review

- The combined search strategies captured a large number of peer-reviewed articles broadly related to injury and rehabilitation (n=4798). Following full review, a combined total of 117 articles met the inclusion criteria, and were related to injury and rehabilitation-related public health interventions in humanitarian crises.
- A small number of papers (n=24) evaluated health outcomes and quoted some form of significance test (category A). A further 42 articles described outputs in the form of surgical, medical, and rehabilitative interventions, but did not discuss associated health outcomes (category C). The remaining 52 articles discussed health outcomes, but did not draw statistical associations between the intervention and outcomes (category B).
- Each paper was quality-assessed using the adapted STROBE criteria for observational studies. Only 3% (n=2) papers were of high quality. No papers met the full STROBE criteria as sample size calculations were absent.
- Both quantity and quality of papers increased over the last 23 years. 61% (n=46) of the papers in this study were published between 2000 and 2013. 81% (n=21) of the higher quality studies were published between 2000 and 2013 (Figure 40).

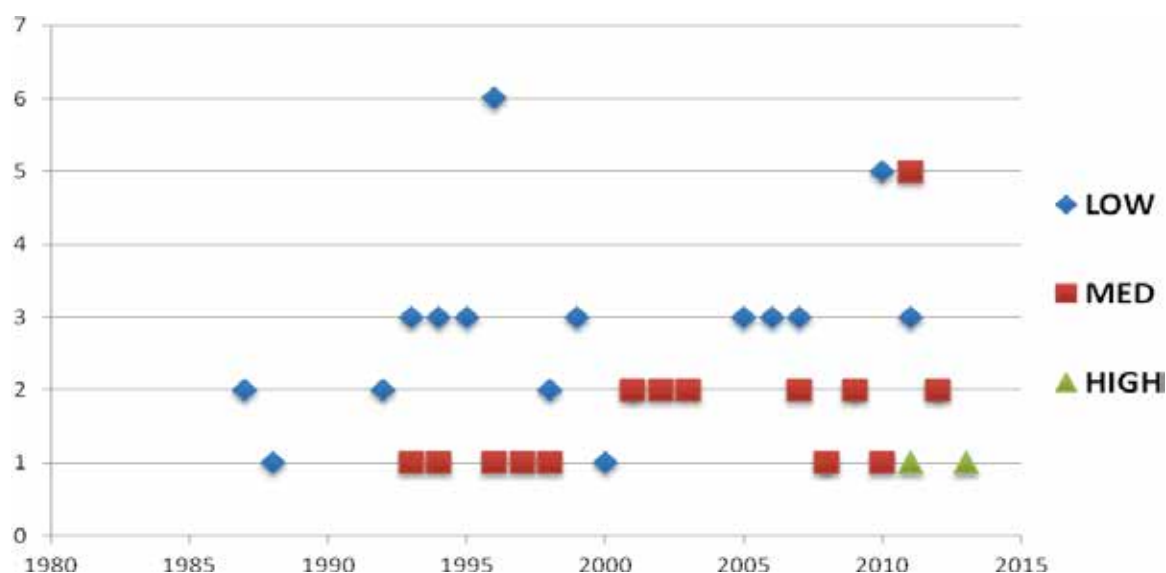


Figure 40: Quantity and quality of injury rehabilitation publications over time

- The majority of studies were cross-sectional in design (n=47; 67%), followed by cohort studies (n=21; 28%). A single economic study investigated the cost-effectiveness of short-term orthopaedic missions in relief and elective contexts. A single case-control trial investigated the rehabilitation outcome of patients with war-related amputations. Six studies were non-random trials.
- The majority of studies were based on injuries seen in Asia (n=45; 59%). Sixteen of the Asian studies (36%) were specifically related to the 2008 Wenchuan Earthquake, Central China. The second most studied continent was Europe, with 20 studies (26%). All of these studies related to conflict in the Former Yugoslavia in the 1990s. See Figure 41.

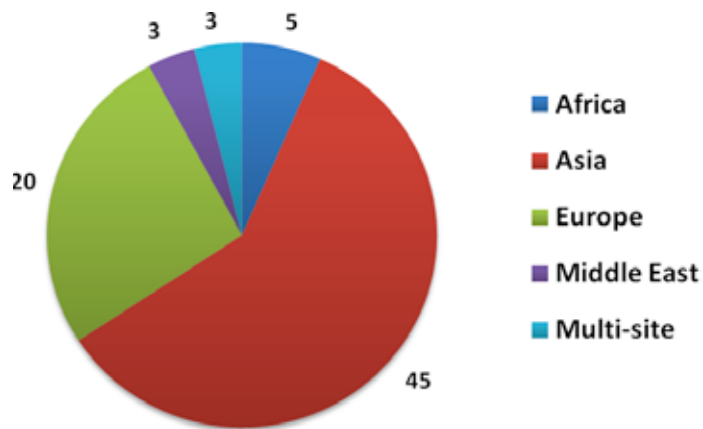


Figure 41: Geographic regions for injury rehabilitation studies

- 63% (n=48) of the studies were conducted in conflict settings, or with patients who had suffered conflict-related injuries.
- The majority of papers reviewed or collected data from the acute phase of a crisis (n=65; 86%). A small number of papers looked at health outcomes in the early recovery and stabilisation phases (n=5 and n=6 respectively). No papers were identified that examined the relationship between preparedness and health outcomes (See Figure 42).

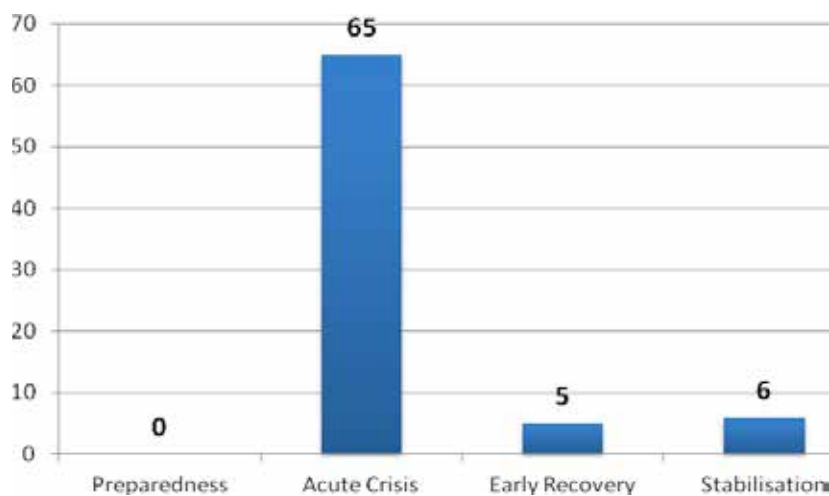


Figure 42: Injury rehabilitation studies by crisis stage

- 97% of the papers described interventions for the general population (n=74).
- The majority of the papers (54) were set in a mixed urban-rural environment, while only one paper examined injury and rehabilitation in a refugee camp setting. Fourteen studies took place both in rural and urban areas. Seven papers focused on urban areas and one in refugee camps.
- The majority of the papers examined a range of physical injuries (n=20; 26%). Limb injuries were the subject of 16 papers (21%), most of which examined the repair of fractures (Figure 43).

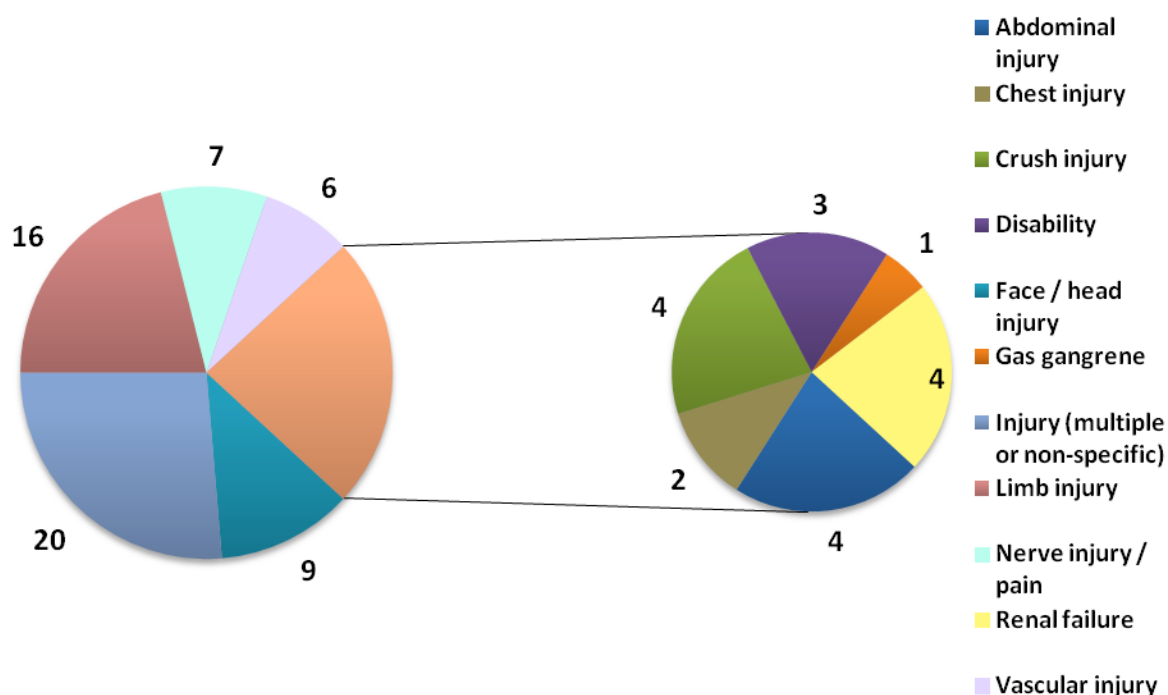


Figure 43: Health outcomes measured by injury rehabilitation studies

- Thirty of the studies described a range of surgical interventions (39%). Eight papers looked at surgical external and internal fixation techniques in particular (11%). This type of operation was the focal point of published research more frequently than any other complex surgical technique. A further five papers looked at health outcomes following limb amputation specifically (7%), while seven papers evaluated different forms of rehabilitation (9%) (Figure 44).

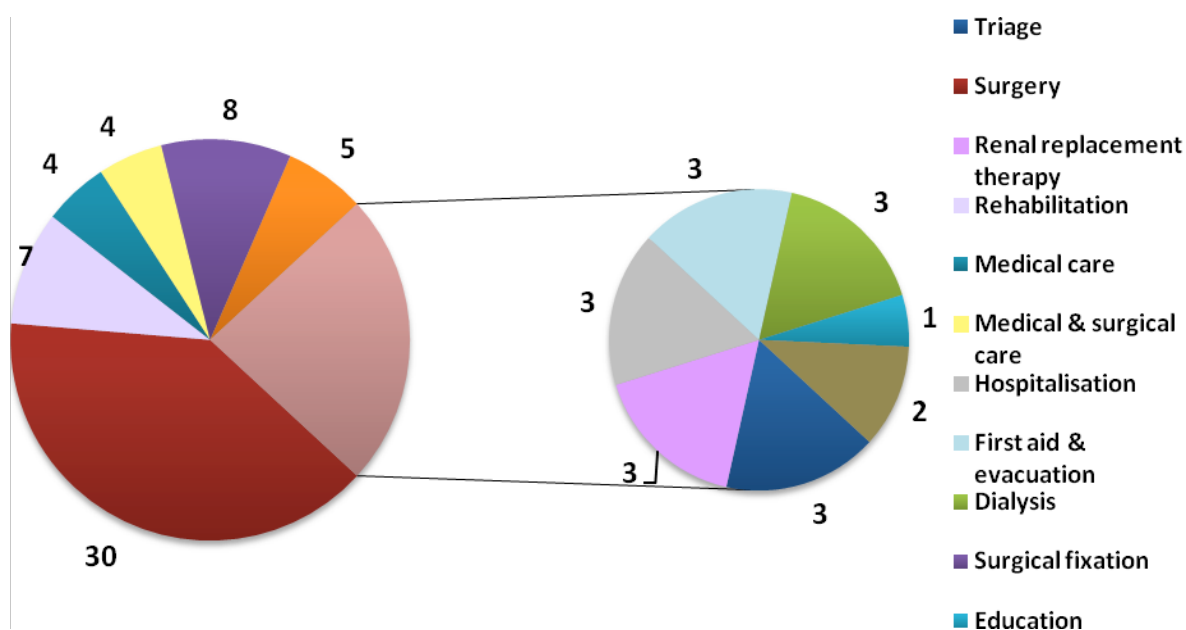


Figure 44: Injury rehabilitation intervention types

4.7.2 Evidence gaps

- Evidence for rehabilitation-related interventions is particularly limited and currently there are no major research initiatives in this field.
 - Research related to injury and rehabilitation is limited among operational NGOs and is rarely integrated into programmes.
 - Patients suffering from physical injury, and requiring rehabilitation, need continued care and follow up; in this sense management is comparable to that of non-communicable diseases. As such, it is crucial that local service providers are able to maintain the services delivered during the emergency phase. This has been challenging in a number of different contexts.
 - Experience of armed conflict – specifically civil war – in middle-income countries forced practitioners to adapt their standards and model for interventions: the technologies used were upgraded, competency within the local health system was better harnessed, and it was possible to import materials.
 - Many of the studies were conducted by surgeons, and are based on their experiences during crises.
 - Research related to injury and rehabilitation focused on the clinical and technical aspects of an intervention, as practitioners wanted to test different protocols and technologies.
 - The progress made with new technologies means that research can now focus on under-researched aspects of crisis interventions, such as service delivery and health systems. Several guidelines are available on surgery and orthopaedics. At the individual level, professionals know what services they have to deliver. The challenge remains with whom to work, how to integrate rehabilitation into the general health system, and how to integrate local services when establishing an acute intervention.
 - Research also focused on demonstrating that people with disabilities should not be excluded from mainstream services offered by humanitarian organisations. Physical and communication obstacles experienced by people with disabilities during the acute emergency phase create a barrier to access to services. However, the complexity of this situation has not been fully explored.
 - The aftermath of the 2010 Haitian earthquake required extensive surgical and rehabilitative interventions. The scale of the intervention and the difficulties met by operational actors generated new questions related to the capacity of humanitarian organisations to intervene in such contexts.
-

4.7.3 Recommendations for future research

Study design

- More evidence is needed related to the effectiveness and cost-effectiveness of rehabilitative interventions. More before and after studies are needed to assess the impact of interventions.
- There is a need for more high quality, methodologically robust, evidence and studies that assess long-term health outcomes. While there is a reasonable quantity of evidence related to injury, much of this evidence is low quality, cross-sectional in nature, and conducted by clinical practitioners.
- Follow-up studies would enable better assessment of long-term health outcomes, functionality, and quality of life (e.g. Standardised assessment forms for physical function as well as environmental factors in disaster victims to enable comparative research). In particular, there is a lack of high-quality evidence related to the effect of rehabilitative interventions on physical disabilities.
- More research is needed to better understand the mechanisms that enable a continuum of care as programmes transition from the acute to the longer term, development phase.

Indicators, standards, and guidelines

- Research is needed to develop appropriate quality standards and measurements of service performance.

Context

- More research should be conducted during crises in Africa and the Americas in order to develop and evidence base for context-specific interventions.
- More evidence must be collected following natural disasters, as illustrated by the response to the 2010 Haitian Earthquake.
- More evidence must be collected related to physical rehabilitation in refugee camp contexts.
- More studies are needed that evaluate interventions in the preparedness phase, and the subsequent impact they have on health outcomes.

Delivery of health interventions

- More research is needed on how to integrate rehabilitation into the general health system, and how to integrate local services in the delivery of humanitarian health interventions.
- More research is needed to understand the complexity of mainstreaming disability into humanitarian health interventions.

References (A and B categories): Injury and physical rehabilitation

255. Ahlberg, A., et al., The scud missile disaster in Al-Khobar, Saudi Arabia, 1991: the orthopaedic experience. *Injury*, 1994. 25(2): p. 97-8.
 256. Amirjamshidi, A., K. Abbassioun, and H. Rahmat, Minimal debridement or simple wound closure as the only surgical treatment in war victims with low-velocity penetrating head injuries. Indications and management protocol based upon more than 8 years follow-up of 99 cases from Iran-Iraq conflict. *Surgical Neurology*, 2003. 60(2): p. 105-10; discussion 110-1.
 257. Bazardzanovic, M., et al., Craniocerebral injuries in combat soldiers treated at the Sapna war hospital, Bosnia and Herzegovina. *Croatian Medical Journal*, 1998. 39(4): p. 446-9.
 258. Bowyer, G.W., Management of small fragment wounds: experience from the Afghan border. *Journal of Trauma-Injury Infection & Critical Care*, 1996. 40(3 Suppl): p. S170-2.
 259. Bumbasirevic, M., et al., War-related infected tibial nonunion with bone and soft-tissue loss treated with bone transport using the Ilizarov method. *Archives of Orthopaedic & Trauma Surgery*, 2010. 130(6): p. 739-49.
-

260. Chen, E., et al., Management of gas gangrene in Wenchuan earthquake victims. *Journal of Huazhong University of Science and Technology. Medical Sciences*, 2011. 31(1): p. 83-7.
 261. Cheng, Y., et al., Management of 7 earthquake crush syndrome victims with long-term continuous renal replacement therapy. *American Journal of Emergency Medicine*, 2013. 31(2): p. 432-5.
 262. Coupland, R.M. and P.E. Pesonen, Craniocerebral war wounds: non-specialist management. *Injury*, 1992. 23(1): p. 21-4.
 263. Cutting, P.A. and R. Agha, Surgery in a Palestinian refugee camp. *Injury*, 1992. 23(6): p. 405-9.
 264. de Wind, C.M., War injuries treated under primitive circumstances: experiences in an Ugandan mission hospital. *Annals of the Royal College of Surgeons of England*, 1987. 69(5): p. 193-5.
 265. Dedic, S.D., M. Budalica, and M. Bazardzanovic, Treatment of penetrating chest injuries during the 1992-1995 war in Bosnia and Herzegovina. *Croatian Medical Journal*, 1998. 39(4): p. 442-445.
 266. Delibegovic Dedic, S., M. Bazardzanovic, and M. Budalica, Penetrating injuries of heart and great vessels in patients wounded during the 1992-1994 war in Bosnia and Herzegovina. *Croatian Medical Journal*, 1999. 40(1): p. 85-7.
 267. Dubravko, H., et al., External fixation in war trauma management of the extremities--experience from the war in Croatia. *Journal of Trauma-Injury Infection & Critical Care*, 1994. 37(5): p. 831-4.
 268. Ebrahimzadeh, M.H. and M.T. Rajabi, Long-term outcomes of patients undergoing war-related amputations of the foot and ankle. *Journal of Foot & Ankle Surgery*, 2007. 46(6): p. 429-33.
 269. Fakri, R.M., et al., Reconstruction of nonunion tibial fractures in war-wounded Iraqi civilians, 2006-2008: better late than never. *Journal of Orthopaedic Trauma*, 2012. 26(7): p. e76-82.
 270. Gosselin, R.A., G. Gialamas, and D.M. Atkin, Comparing the cost-effectiveness of short orthopedic missions in elective and relief situations in developing countries. *World Journal of Surgery*, 2011. 35(5): p. 951-5.
 271. Gosselin, R.A., et al., Outcome of arterial repairs in 23 consecutive patients at the ICRC-Peshawar hospital for war wounded. *Journal of Trauma-Injury Infection & Critical Care*, 1993. 34(3): p. 373-6.
 272. Gousheh, J., The treatment of war injuries of the brachial plexus. *Journal of Hand Surgery - American Volume*, 1995. 20(3 Pt 2): p. S68-76.
 273. Hadzismajlovic, A. and A. Pilav, Pleural drainage and its role in management of the isolated penetrating chest injuries during the war time in Sarajevo, 1992.-1995. *Bosnian Journal of Basic Medical Sciences*, 2007. 7(2): p. 150-4.
 274. Hammer, R.R., et al., Simplified external fixation for primary management of severe musculoskeletal injuries under war and peace time conditions. *Journal of Orthopaedic Trauma*, 1996. 10(8): p. 545-54.
 275. Has, B., et al., Minimal fixation in the treatment of open hand and foot bone fractures caused by explosive devices: case series. *Croatian Medical Journal*, 2001. 42(6): p. 630-3.
 276. Hudolin, T. and I. Hudolin, The role of primary repair for colonic injuries in wartime. *British Journal of Surgery*, 2005. 92(5): p. 643-7.
 277. Hussain, S.T., et al., An observational study of 256 cases of vascular trauma in the north western province of Pakistan. *Annals of the Royal College of Surgeons of England*, 2001. 83(6): p. 388-91.
 278. Jaber, S.F., et al., The royal medical services experience in vascular injuries during the Palestinian uprising. *Jordan Medical Journal*, 2006. 40(1): p. 35-39.
 279. Jevtic, M., et al., Treatment of wounded in the combat zone. *Journal of Trauma-Injury Infection & Critical Care*, 1996. 40(3 Suppl): p. S173-6.
 280. Jiang, J., et al., Lessons learnt from the Wenchuan earthquake: Performance evaluation of treatment of critical injuries in hardest-hit areas. *Journal of Evidence-based Medicine*, 2012. 5(3): p. 114-123.
 281. Jiang, J., et al., Anaesthetic management under field conditions after the 12 May 2008 earthquake in Wenchuan, China. *Injury*, 2010. 41(6): p. e1-3.
 282. Karamouzian, S., et al., The neurological outcome of spinal cord injured victims of the Bam earthquake, Kerman, Iran. *Archives of Iranian Medicine*, 2010. 13(4): p. 351-4.
 283. Kummoona, R.K., Missile war injuries of the face. *Journal of Craniofacial Surgery*, 2011. 22(6): p. 2017-21.
-

284. Labeeu, F., et al., External fixation in war traumatology: report from the Rwandese war (October 1, 1990 to August 1, 1993). *Journal of Trauma-Injury Infection & Critical Care*, 1996. 40(3 Suppl): p. S223-7.
 285. Lacoux, P.A., et al., Field research in humanitarian medical programmes. Treatment of neuropathic pain in Sierra Leone. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 2003. 97(6): p. 619-621.
 286. Leininger, B.E., et al., Experience with wound VAC and delayed primary closure of contaminated soft tissue injuries in Iraq. *Journal of Trauma-Injury Infection & Critical Care*, 2006. 61(5): p. 1207-11.
 287. Li, C.-y., et al., Continuous renal replacement therapy and blood transfusions in treating patients with crush syndrome: 8 Case studies from the Wenchuan earthquake. *Transfusion & Apheresis Science*, 2011. 45(3): p. 257-60.
 288. Li, W., et al., Management of severe crush injury in a front-line tent ICU after 2008 Wenchuan earthquake in China: an experience with 32 cases. *Critical Care (London, England)*, 2009. 13(6): p. R178.
 289. Li, Y., et al., Evaluation of functional outcomes of physical rehabilitation and medical complications in spinal cord injury victims of the Sichuan earthquake. *Journal of Rehabilitation Medicine*, 2012. 44: p. 534-540.
 290. Liu, L., et al., The use of external fixation combined with vacuum sealing drainage to treat open comminuted fractures of tibia in the Wenchuan earthquake. *International Orthopaedics*, 2012. 36(7): p. 1441-7.
 291. Liu, L., et al., Treatment for 332 cases of lower leg fracture in "5.12" Wenchuan earthquake. *Chinese Journal of Traumatology - English Edition*, 2010. 13(1): p. 10-14.
 292. Lovric, Z., et al., War injuries of major extremity vessels. *Journal of Trauma-Injury Infection & Critical Care*, 1994. 36(2): p. 248-51.
 293. Mallick, M., et al., Large-scale physical disabilities and their management in the aftermath of the 2005 earthquake in Pakistan. (Special Issue: Subjects of strategic and programmatic importance to the health system of Pakistan.). *Eastern Mediterranean Health Journal*, 2010. 16(21).
 294. Marcikic, M., A. Melada, and R. Kovacevic, Management of war penetrating craniocerebral injuries during the war in Croatia. *Injury*, 1998. 29(8): p. 613-8.
 295. Moreels, R., et al., Wartime colon injuries: Primary repair or colostomy? *Journal of the Royal Society of Medicine*, 1994. 87(5): p. 265-267.
 296. Motamedi, M.H., et al., Rehabilitation of war-injured patients with implants: analysis of 442 implants placed during a 6-year period. *Journal of Oral & Maxillofacial Surgery*, 1999. 57(8): p. 907-13; discussion 914-5.
 297. Mujkic, A., G. Vuletic, and D. Kozaric-Kovacic, Evaluation of community based intervention for the protection of children from small arms and explosive devices during the war: Observational study. *Croatian Medical Journal*, 2002. 43(4): p. 390-395.
 298. Mulvey, J.M., A.A. Qadri, and M.A. Maqsood, Earthquake injuries and the use of ketamine for surgical procedures: The Kashmir experience. *Anaesthesia and Intensive Care*, 2006. 34(4): p. 489-494.
 299. Nikolic, D., et al., Missile injuries of the knee joint. *Injury*, 2000. 31(5): p. 317-24.
 300. Ostojic, L., et al., Intermediate rehabilitation outcome in below-knee amputations: Descriptive study comparing war-related with other causes of amputation. *Croatian Medical Journal*, 2001. 42(5): p. 535-538.
 301. Pedrini, G., et al., Management of severe open ankle-foot trauma by a simple external fixation technique: An alternative during war and in resource-poor and low-technology environments. *Journal of Orthopaedic Trauma*, 2011. 25(3): p. 180-187.
 302. Peric, M., et al., Clinical course in 52 severely wounded patients treated in the intensive care unit during the war in Croatia. *Injury*, 1995. 26(8): p. 507-13.
 303. Rashid, B.A., et al., Craniocerebral missile injuries in civilian Kashmir - India Plaies cranio-cerebrales par balles durant la guerre civile au cachemire. *African Journal of Neurological Sciences*, 2010. 29(2).
 304. Rautio, J. and P. Paavolainen, Delayed treatment of complicated fractures in war wounded. *Injury*, 1987. 18(4): p. 238-40.
 305. Rautio, J. and P. Paavolainen, Afghan war wounded: experience with 200 cases. *Journal of Trauma-Injury Infection & Critical Care*, 1988. 28(4): p. 523-5.
-

306. Roostar, L., Treatment plan used for vascular injuries in the Afghanistan war. *Cardiovascular Surgery*, 1995. 3(1): p. 42-5.
 307. Rowley, D.I., The management of war wounds involving bone. *Journal of Bone and Joint Surgery - Series B*, 1996. 78(5): p. 706-709.
 308. Roy, N., et al., Surgical and psychosocial outcomes in the rural injured--a follow-up study of the 2001 earthquake victims. *Injury*, 2005. 36(8): p. 927-34.
 309. Safari, S., et al., Outcomes of fasciotomy in patients with crush-induced acute kidney injury after bam earthquake. *Iranian journal of Kidney Diseases*, 2011. 5(1): p. 25-28.
 310. Sever, M.S., et al., Treatment modalities and outcome of the renal victims of the Marmara earthquake. *Nephron*, 2002. 92(1): p. 64-71.
 311. Splavski, B., et al., Early management of war missile spine and spinal cord injuries: experience with 21 cases. *Injury*, 1996. 27(10): p. 699-702.
 312. Sprem, N., S. Branica, and K. Dawidowsky, Tympanoplasty after war blast lesions of the eardrum: retrospective study. *Croatian Medical Journal*, 2001. 42(6): p. 642-5.
 313. Stanec, Z., et al., High-energy war wounds: flap reconstruction. *Annals of Plastic Surgery*, 1993. 31(2): p. 97-102.
 314. Stanec, Z., et al., The management of war wounds to the extremities. *Scandinavian Journal of Plastic & Reconstructive Surgery & Hand Surgery*, 1994. 28(1): p. 39-44.
 315. Strada, G., et al., Large bowel perforations in war surgery: one-stage treatment in a field hospital. *International Journal of Colorectal Disease*, 1993. 8(4): p. 213-6.
 316. Tajsic, N.B. and H. Husum, Reconstructive surgery including free flap transfers can be performed in low-resource settings: experiences from a wartime scenario. *Journal of Trauma-Injury Infection & Critical Care*, 2008. 65(6): p. 1463-7.
 317. Tauqir, S.F., et al., Complications in patients with spinal cord injuries sustained in an earthquake in Northern Pakistan. *Journal of Spinal Cord Medicine*, 2007. 30(4): p. 373-7.
 318. Vanholder, R., et al., Earthquakes and crush syndrome casualties: lessons learned from the Kashmir disaster. *Kidney International*, 2007. 71(1): p. 17-23.
 319. Xiang, B., et al., Triage of pediatric injuries after the 2008 Wen-Chuan earthquake in China. *Journal of Pediatric Surgery*, 2009. 44(12): p. 2273-7.
 320. Xiang, B., et al., Triage of pediatric injuries after the 2008 Wen-Chuan earthquake in China. *Journal of Pediatric Surgery*, 2009. 44(12): p. 2273-2277.
 321. Xiao, M., et al., Factors affecting functional outcome of Sichuan-earthquake survivors with tibial shaft fractures: a follow-up study. *Journal of Rehabilitation Medicine*, 2011. 43(6): p. 515-20.
 322. Xu, J., et al., Long-term results of patients with head injuries treated in different hospitals after the Wenchuan, China, earthquake. *World Neurosurgery*, 2011. 75(3-4): p. 390-6.
 323. Zangana, A.M., Penetrating liver war injury: a report on 676 cases, after Baghdad invasion and Iraqi civilian war April 2003. *Advances in Medical and Dental Sciences*, 2007. 1(1): p. 10-14.
 324. Zhang, X., et al., Functional outcomes and health-related quality of life in fracture victims 27 months after the Sichuan earthquake. *Journal of Rehabilitation Medicine*, 2012. 44(3): p. 206-9.
 325. Zhang, X., et al., The NHV Rehabilitation Services Program Improves Long-Term Physical Functioning in Survivors of the 2008 Sichuan Earthquake: A Longitudinal Quasi Experiment. *PLoS ONE*, 2013. 8(1).
 326. Zhao, J.N., et al., Secondary definitive surgery for multiple injuries from Wenchuan earthquake in China. *Chinese Journal of Traumatology - English Edition*, 2009. 12(1): p. 38-40.
-

4.8 Health service delivery

4.8.1 Systematic review

- The search strategy was designed to be sensitive, and as a result captured 28,199 papers. An initial filter, removing papers that did not discuss humanitarian crises, health service delivery or lower and middle income countries reduced this number to 2,534 papers. The second and final filter only included studies that discussed the acute stage of crises, the effectiveness of health service delivery and put a quantifiable figure on the effectiveness of health services. Thirty-two papers met these inclusion criteria.
- A number of websites were reviewed for grey literature but no papers met the inclusion criteria.
- The majority of papers (28/32, 87.5%) considered only outputs of health service delivery, such as the number of patient consultations performed. These papers were considered to be category C and since they did not evaluate health outcomes they were not further assessed for quality. The four papers from category B (which considered health outcomes but did not assess their statistical significance) assessed quality using the adapted STROBE quality criteria and all four papers were assessed as being low quality. See for the trends of papers over time.
- There appears to be an increasing interest in evaluating the effectiveness of health service delivery in humanitarian crises. 69% (22/32) of papers have been published since 2000, including 3 of the 4 category B papers (Figure 45).

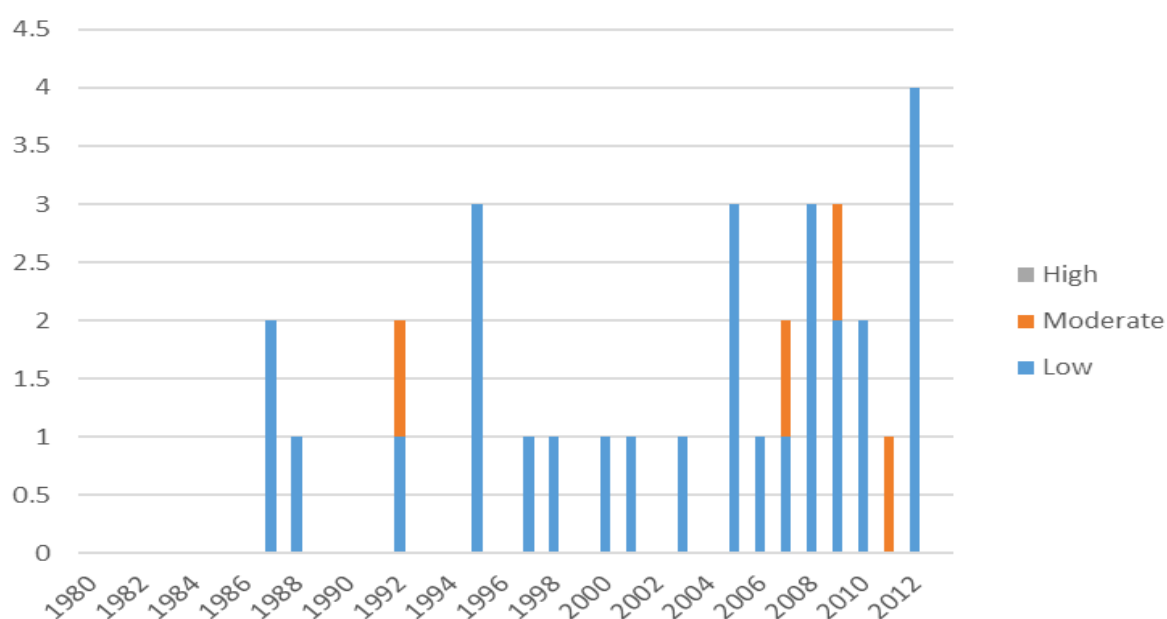


Figure 45: Quantity and quality of health service delivery studies over time

- All 32 papers were of cross sectional study design. The studies assessed a single point in time rather than following up the effectiveness of health services over a period of time, which constitutes a lower quality study design for the evaluation of effectiveness.
- 38% (12/32) of studies were conducted by multiple agencies. The most common type of research agency was academic institutions (21/32, 66%). 50% (16/32) of studies were conducted by medical facilities, 13% (4/32) were by NGOs, 9% (3/32) by the army or navy and 9% (3/32) by government agencies.
- It was not possible to identify which agency had funded the research in any of the papers reviewed.

- Research was conducted in a range of global locations (Figure 46). The most common region for study was the Middle East (11/32, 34%), followed by Asia (8/32, 25%), Eastern Europe (5/32, 16%), the Caribbean (3/32, 9%), Africa (2/32, 6%) and South America (1/32, 3%). One paper (3%) considered multiple countries and one paper (3%) did not detail the countries under analysis.
- All of the studies conducted in Eastern Europe and Africa considered armed conflict. Studies conducted in the Middle East considered equally natural disasters (5/11) and armed conflict (6/11). Studies in Asia were predominantly about natural disasters (7/8), and all studies in South America, across multiple countries and where the country was unknown, considered natural disasters.
- Papers were split as to the type of humanitarian crisis researched: 56% (18/32) were of natural disasters and 44% (14/32) of armed conflict (Figure 47).

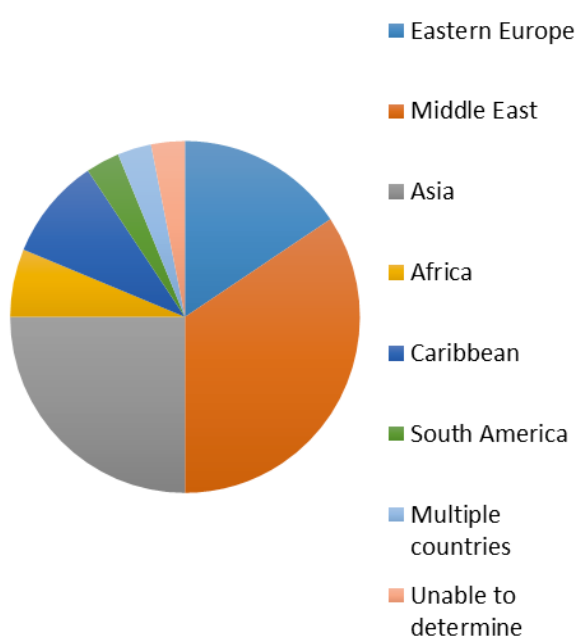


Figure 46: Geographic regions of health service delivery studies

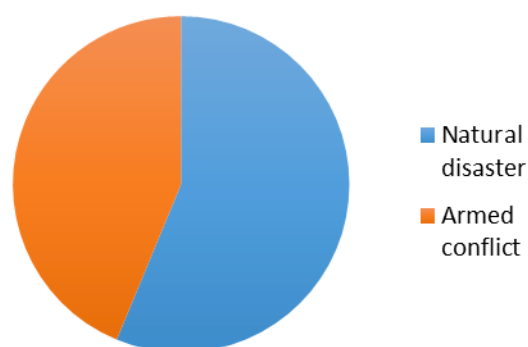


Figure 47: Health service delivery research by crisis type

- The papers reviewed spanned a range of health settings. 25% (8/32) of papers evaluated an urban location, 28% (9/32) evaluated a rural setting, 34% (11/32) spanned both urban and rural locations, 9% (3/32) evaluated a camp setting, and one paper (3%) compared a rural location and a camp setting.
- The majority of studies (72%, 23/32) evaluated the acute crisis, and a further 2 papers (6%) considered both the acute stage and early recovery (Figure 48).
- Papers were split between discussing health services that met all health needs (14/32, 44%) and services that focused specifically on casualty management (14/32). Four papers (13%) tackled more specific health needs: orthopaedic casualties and infection, paediatric services, surgery, and HIV, tuberculosis and family planning.

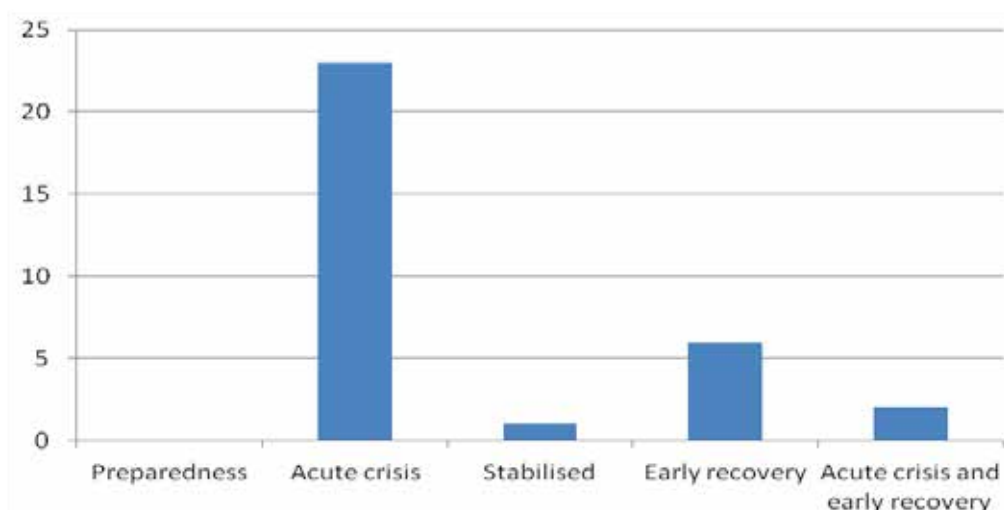


Figure 48: Number of health service delivery studies by crisis stage

- The majority of papers (17/32, 53%) focused on secondary care services. Papers also focused on primary care (6/32, 19%) or looked at the interconnection between primary and secondary care (5/32, 16%), and possibly also tertiary care (1/32, 3%). Smaller numbers of papers discussed ambulatory (2/32, 6%) and self care (1/32, 3%). See Figure 49.

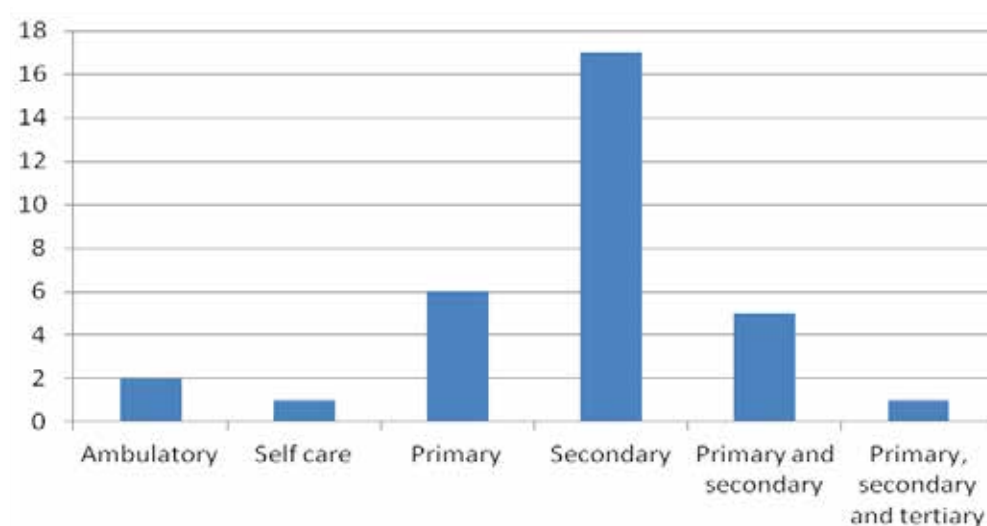


Figure 49: Number of studies examining each service delivery level

- Most papers (18/32, 56%) evaluated the effectiveness of health service delivery in terms of numbers of patients seen or procedures performed (Figure 50). A number of other health outcomes were also evaluated, albeit by smaller numbers of papers: mortality (4/32, 13%), outputs of a procedures, such as patient transfer or discharge (3/32, 9%), equity (2/32, 6%), patient satisfaction (2/32, 6%), quality (1/32, 3%), security (1/32, 3%) and the appropriateness of an assessment for locating field hospitals (1/32, 3%).
- Statistical analysis of the effectiveness of health service delivery was fairly crude. Twenty-five papers (78%) presented numbers and/or percentages as measures of health outcomes, four papers (13%) measured mean scores, two papers (6%) measured rates and one (3%) calculated the difference between means.
- Nine papers (28%) examined how existing health services within a country managed the crisis. Of these papers, six focused on rescue and casualty management and three discussed the impact on general health services. Twenty-two papers (69%) examined the implementation of temporary health services to help manage the crisis. Of these, 12 papers discussed field hospitals, seven discussed war hospitals and three examined health services in relief camps. One paper (3%) compared existing health services across a rural district and temporary health services in a camp (Figure 51).

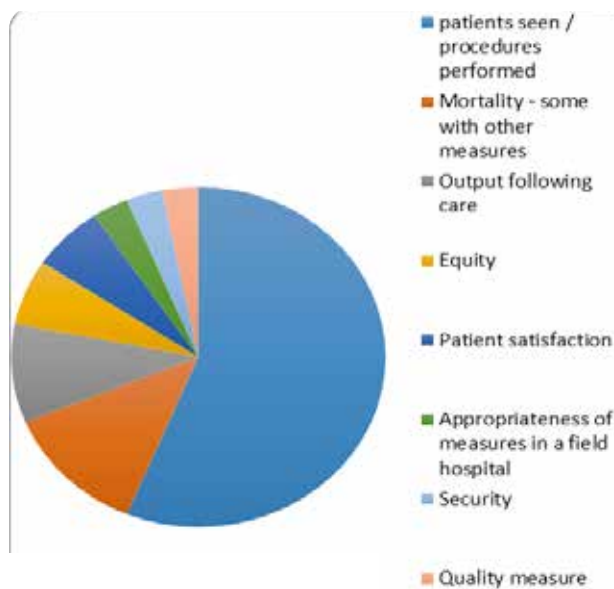


Figure 50: Measures of health service effectiveness

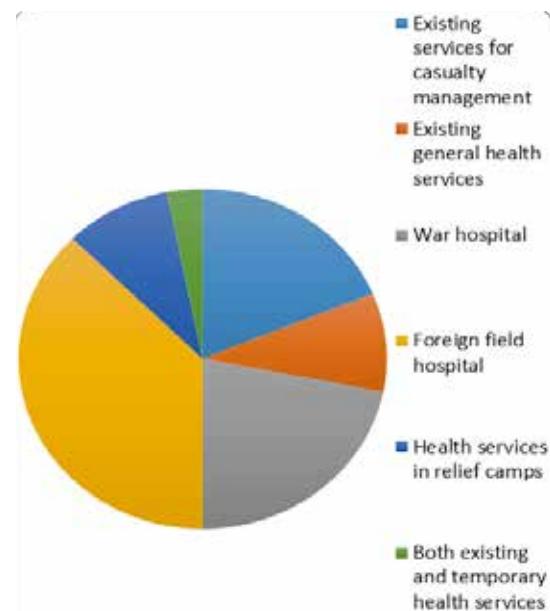


Figure 51: Types of health service delivery

- Seventeen papers (53%) included discussion of the impact of external factors on health service delivery – these factors were discussed, not evaluated. Common factors touched on included facilitation by the Ministry of Health, financial assistance and the availability, or lack of, local health personnel.
- None of the papers included discussion of the impact that health service delivery had on any external factors.
- Eight (25%) papers referenced the use of guidelines within health services. No two papers referenced the same guidelines, however. The guidelines referred to were: WHO/PAHO essential requirements; the RAND/UCLA appropriateness method for determining field hospital setting in an earthquake; NATO guidelines for mass casualties; and Zung's Self-Rating Depression Scale; as well as locally produced guidelines for patient transfer, performance appraisal and war surgery.

4.8.2 Expert interviews

Methodologies and quality of evidence:

- Health service delivery is a cross-cutting issue common to every health topic. Most research gaps in public health in humanitarian crises concern the mode of delivery of health interventions. However, the number of studies in this field remains very limited.
- There has been increasing interest in research on health service delivery in humanitarian crises during the last decade. However, the quality of many studies is questionable. There is a pressing need for introducing innovative and robust methods to study health service delivery in humanitarian crises.
- There needs to be better use of mathematical models in assessing the (cost) effectiveness of different models of delivery.

Model of delivery and integration of interventions into local health services:

- Humanitarian interventions are often in parallel to the local health services which have usually been weakened by the crisis. Many respondents mentioned the necessity of collaborating with local health services to ensure the continuity of care after the end of the humanitarian crisis. There is, however, little evidence on the most effective way of integrating humanitarian interventions into the local health services. There are additional research questions related to: which interventions should be integrated? Which one should be vertically delivered?
- The objective of universal coverage during humanitarian crises is often accompanied with free healthcare but may create unexpected effects (positive and negative) on local health services and has issues for sustainability and equity of services. These aspects have nevertheless not been explored sufficiently by researchers.
- The importance of measuring the effectiveness of different models of delivery was highlighted. Comparisons should be made between facility-based and community-based interventions as well as the delivery of comprehensive packages of interventions compared with single interventions. This field of investigation is broad as every health topic may have different models of delivery.
- Packages of care are commonly promoted but need more research evidence-base for the content of packages, costs of the package, and health benefits of packages. There is also a lack of evidence on the minimum package that could be implemented in very acute settings and what the tradeoffs may be.

Continuity of care:

- The issue of integration is also related to the continuity of care which is a necessity in a context where chronic diseases and NCDs are increasingly important. Studies should focus on examining health facility capacities to deliver and financially sustain quality services after the departure of humanitarian actors.
 - There is a need for much more evidence on how to develop longer-term strategies for delivering health care (including for the health system more broadly) to move beyond the short-term approaches common to humanitarian settings.
-

4.8.3 Recommendations for future research

- There is a strong need to improve the quantity and quality of the evidence base on health service interventions. Existing studies predominantly measure outputs of services, rather than health outcomes, and are exclusively of cross sectional study design.
- More research is required on different service delivery models of health care.
- More research is required on the content, delivery and health outcomes of different service delivery packages of care.
- There was a bias in the evidence base towards the impact of temporary health services and issues of continuity and sustainability of care need to be researched. Longitudinal study designs are needed to help capture this information.
- There was a lack of consensus over the guidelines to be used, or even evaluated, for health service delivery. Further studies looking specifically at this issue would enable practical suggestions for service delivery in crisis situations.

References: Health services delivery

327. Bar-Dayana, Y., et al., A multidisciplinary field hospital as a substitute for medical hospital care in the aftermath of an earthquake: the experience of the Israeli Defense Forces Field Hospital in Duzce, Turkey, 1999. *Prehospital & Disaster Medicine*, 2005. 20(2): p. 103-6.
328. Beckett, A., et al., Multidisciplinary trauma team care in Kandahar, Afghanistan: Current injury patterns and care practices. *Injury*, 2012. 43(12): p. 2072-2077.
329. Chan, E.Y.Y. and J.J. Kim, Remote mobile health service utilization post 2005 Kashmir-Pakistan earthquake. *European Journal of Emergency Medicine*, 2010. 17(3): p. 158-63.
330. Chapin, E., et al., Impact of the 2007 Ica earthquake on health facilities and health service provision in Southern Peru. *Prehospital and Disaster Medicine*, 2009. 24(4): p. 326-332.
331. Chen, J., et al., Administration of Nursing Services in a Newly Built Traumatic Infection Ward After an 8.0-magnitude Earthquake in Wenchuan. *Journal of Emergency Nursing*, 2009. 35(6): p. 532-535.
332. Chen, J., et al., Trans-province transfer of 10,373 patients injured in Wenchuan earthquake. *Journal of Evidence-based Medicine*, 2009. 2(4): p. 270-6.
333. Ebling, Z., et al., Osijek Health Center during the 1991-1992 war in Croatia. *Military Medicine*, 2000. 165(12): p. 929-34.
334. Fernald, J.P. and E.A. Clawson, The mobile army surgical hospital humanitarian assistance mission in Pakistan: the primary care experience. *Military Medicine*, 2007. 172(5): p. 471-477.
335. Fosse, E. and H. Husum, Surgery in Afghanistan: A light model for field surgery during war. *Injury*, 1992. 23(6): p. 401-404.
336. Fosse, E., H. Husum, and C. Giannou, The siege of Tripoli 1983: war surgery in Lebanon. *Journal of Trauma-Injury Infection & Critical Care*, 1988. 28(5): p. 660-3.
337. Giangreco, A., et al., War outside, ceasefire inside: An analysis of the performance appraisal system of a public hospital in a zone of conflict. *Evaluation & Program Planning*, 2012. 35(1): p. 161-70.
338. Halpern, P., et al., Intensive care in a field hospital in an urban disaster area: lessons from the August 1999 earthquake in Turkey. *Critical Care Medicine*, 2003. 31(5): p. 1410-4.
339. Kang, P., et al., Medical evacuation management and clinical characteristics of 3,255 inpatients after the 2010 Yushu earthquake in China. *The Journal of Trauma and Acute Care Surgery*, 2012. 72(6): p. 1626-33.
340. Kwak, Y.H., et al., Experience of a Korean disaster medical assistance team in Sri Lanka after the South Asia tsunami. *Journal of Korean Medical Science*, 2006. 21(1): p. 143-150.
341. Loghmani, A., N. Jafari, and M. Memarzadeh, Determining the field hospital setting in earthquake: using RAND/UCLA Appropriateness Method. *Iranian Red Crescent Medical Journal*, 2008. 10(3): p. 181-189.

342. Mistic, Z., et al., Delivery of medical services to different national groups during the war: an example from Bosnia and Herzegovina, 1991-2000. *Military Medicine*, 2005. 170(9): p. 810-3.
 343. Missair, A., et al., Surgery under extreme conditions in the aftermath of the 2010 Haiti earthquake: the importance of regional anesthesia. *Prehospital and Disaster Medicine*, 2010. 25(6): p. 487-493.
 344. Muawwad-Jarawan, E., A. Ashkar, and F. Saadeh, Self-care under war conditions. The case of Beirut, Lebanon. *Medical Care*, 1987. 25(9): p. 904-912.
 345. Nia, M.S., N. Nafissi, and Y. Moharamzad, Survey of Bam earthquake survivors' opinions on medical and health systems services. *Prehospital & Disaster Medicine*, 2008. 23(3): p. 263-8; discussion 269.
 346. Petricevic, A., et al., Surgical experience at the Rama war hospital in Bosnia and Herzegovina. *Israel Journal of Medical Sciences*, 1995. 31(10): p. 630-4.
 347. Porignon, D., et al., How robust are district health systems? Coping with crisis and disasters in Rutshuru, Democratic Republic of Congo. *Tropical Medicine & International Health*, 1998. 3(7): p. 559-65.
 348. Riddez, L., et al., The surgical and obstetrical activity at the ICRC field hospital in Banda Aceh in the aftermath of the tsunami 2004. *International Journal of Disaster Medicine*, 2005. 3(1-4): p. 55-60.
 349. Rukavina, A., et al., War-related transformation and work of surgery service of the Pozega Medical Center, East-Croatian Hospital unaffected by direct war activities. *Military Medicine*, 1995. 160(12): p. 604-8.
 350. Schreeb, J.v., et al., Foreign field hospitals in the recent sudden-onset disasters in Iran, Haiti, Indonesia, and Pakistan. *Prehospital and Disaster Medicine*, 2008. 23(2): p. 144-151.
 351. Sheng, Z.Y., Medical support in the Tangshan earthquake: a review of the management of mass casualties and certain major injuries. *Journal of Trauma-Injury Infection & Critical Care*, 1987. 27(10): p. 1130-5.
 352. Sowa, K., T. Nishikura, and K. Maruki, Report of two visits to the Tibetan refugee camp in Dharamsala, North India [I] - The present conditions of the medical system and the medical facilities in the refugee camp. *International Medical Journal*, 1997. 4(3): p. 193-197.
 353. VanRooyen, M.J., et al., Mobile medical relief and military assistance in Somalia. *Prehospital & Disaster Medicine*, 1995. 10(2): p. 118-20.
 354. von Saint Andre-von Arnim, A., et al., Intensive care for infants and children in Haiti in April 2010. *Pediatric Critical Care Medicine*, 2011. 12(4): p. 393-7.
 355. Walk, R.M., et al., Haitian Earthquake Relief: Disaster Response Aboard the USNS Comfort. *Disaster Medicine and Public Health Preparedness*, 2012. 6(4): p. 370-377.
 356. Wickramasinghe, W.A.K.K., et al., Are tsunami survivors satisfied with the provision and quality of healthcare they received? *Asia-Pacific Journal of Public Health*, 2007. 19 Spec No: p. 35-9.
 357. Zic, R., et al., Organization and work of the war hospital in Tomislavgrad during the war in Bosnia and Herzegovina from 1992 to 1995. *Military Medicine*, 2001. 166(1): p. 59-63.
-

4.9 Health systems

4.9.1 Systematic review

- The systematic review on health systems included both quantitative and qualitative studies given the particularly multifaceted nature of health systems. The search strategy yielded 16,997 papers, but only 56 papers met the inclusion criteria.
- The number of papers has been increasing with time (Figure 52), with a significant increase in papers published from 2010 onwards. It has some predictable surges following major humanitarian crises, such as the Tsunami. Interestingly only one paper was identified as looking at the health system context of natural disasters prior to 2004, with most papers focusing on conflicts from 1987 to 2003.
- The majority (36/56) of the papers focused on a context of conflict, 18 focused on a natural disaster and one on a political crisis. Of the papers on a natural disaster, 13 focused on earthquakes, five on the tsunami, three on floods and one on a cyclone (with some papers focusing on more than one crisis).
- The research was spread across four continents, with papers focussing on humanitarian crises in Asia (24 papers), Africa (19 papers), Europe (13 papers) and South America (8 papers). The crisis with most papers was the conflict in Kosovo (5 papers), followed by earthquakes and floods in Pakistan (4 papers) and conflict and tsunami in Indonesia.
- Two of the papers were graded as a high quality of evidence. Two papers were graded as a medium quality of evidence. Forty-four of the papers were assessed as low quality. Eight of the papers could not be assessed as the full paper could not be obtained.

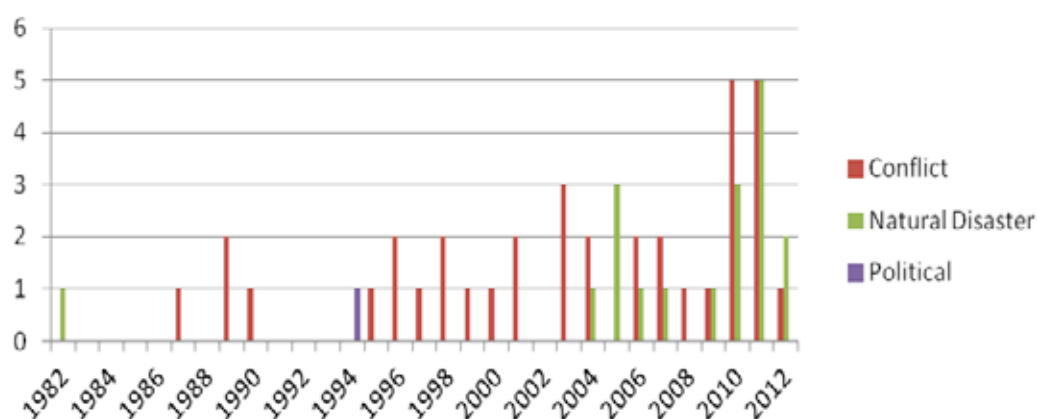


Figure 52: Quantity of health systems studies over time, by crisis type

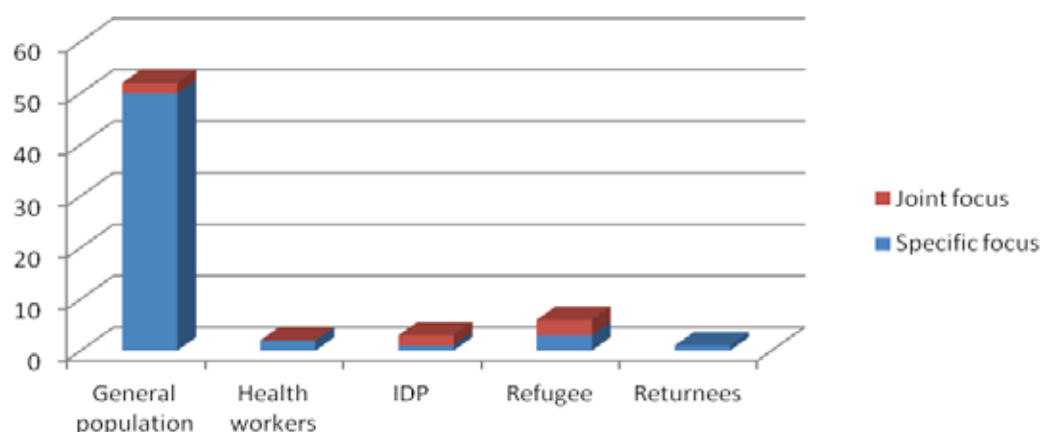


Figure 53: Health systems studies by target group

- The majority (48/56) of the papers focused on the general population, three papers focused on refugee populations, one on Internally Displaced People (IDP) populations, two on health workers and two on a mixed population (Figure 53).
- Most of the papers (37/56) were case studies from humanitarian crises. Other papers included 14 descriptive papers, 2 literature reviews, and 1 epidemiological community-based study.

Health system building blocks:

- The studies on different health system building blocks are shown in Figure 54.
- Eight papers had a focus on policy areas of leadership and governance, of which five looked at opportunities for policy and four on impact of the crisis (one looking at both areas).
- There were five papers with a focus on coordination, with coordination mentioned in 11 other papers.
- There were seven papers identified with a focus on health workforce and ten papers which mentioned health workforce. Five papers looked at the impact of crises on human resources and four papers looked at crises as opportunities for building back better.
- A single paper with a focus on health financing, and 10 others mentioned health financing.
- Only one paper was identified with a focus on medicines, which looked at essential medicines management following the earthquake in Pakistan. Three of the other papers had a mention of medicines.
- Eight papers had a focus on the use of Health Information Systems in response to humanitarian crises papers. Three other papers had a mention of Health Information Systems. Most of the papers specifically looked at disease surveillance systems.

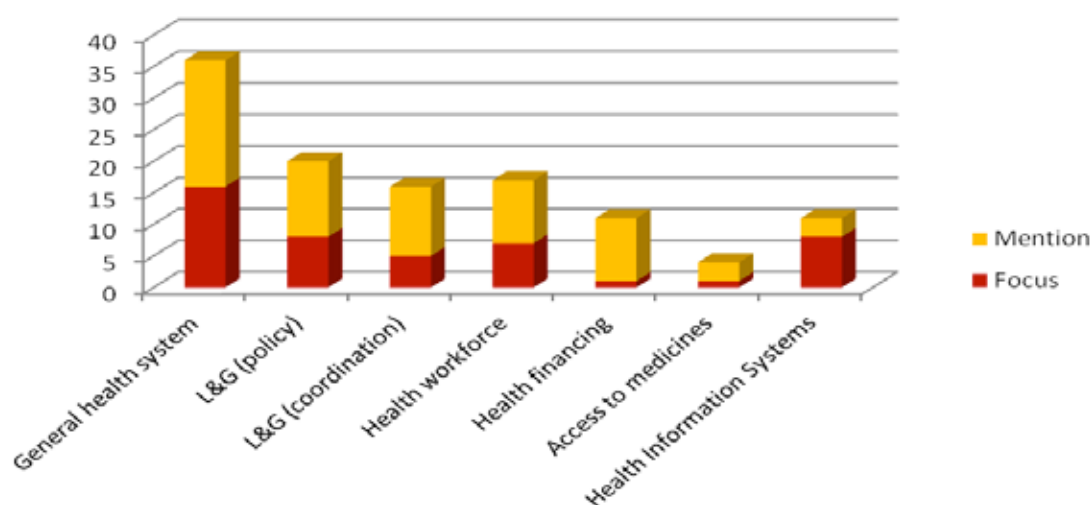


Figure 54: Studies by health system building block

4.9.2 Expert interviews

4.9.2.1 Methodologies and quality of evidence:

- There has been increasing interest in health systems research in humanitarian crises. There are nevertheless many questions about how to conduct health research in insecure and unpredictable settings. As a result, the quality of studies is questionable and has often been rated as low. There is a pressing need for introducing innovative and robust methods to study health systems in humanitarian crises.
- One constraint identified by the key informants is the lack of reliable health information system in most developing countries before the crisis starts. Researchers have to conduct research where baseline data is often inconsistent or missing.

4.9.2.2 Delivery and integration of interventions into local health systems:

- Humanitarian interventions often intervene in parallel to the local health systems, which has been most of the time weakened by the crisis. Many respondents mentioned the necessity of collaborating with local health services to ensure the continuity of care after the end of the humanitarian crisis. There is however little evidence on the most effective way of integrating humanitarian interventions into the local health system. There are additional research questions related to: which interventions should be integrated? Which one should be vertically delivered?
- The objective of universal coverage during humanitarian crises and often accompanied with free healthcare may create unexpected effects on local health services. These aspects have nevertheless not been explored by researchers.
- A third aspect highlighted by respondents is the importance of measuring the effectiveness of different models of delivery. Comparisons should be made between facility-based and community-based interventions as well as the delivery of comprehensive packages of interventions compared with single interventions. This field of investigation is broad as every health topic may have different models of delivery.

4.9.2.3 Continuity of care:

- The issue of integration is also related to the continuity of care, which, as many key informants explained, is a necessity in a context where chronic diseases and non communicable diseases (NCDs) are increasingly important. Studies should focus on the assessment of health systems capacities to deliver quality services after the departure of humanitarian actors.

4.9.2.4 The resilience of health systems:

- Research is needed to measure and predict the capacity of health systems to adapt to humanitarian crises. This notion of resilience is related to measurement but preparedness to crises. There is limited evidence on the impact of preparedness activities on the capacity of health systems to absorb or adjust to crises.

4.9.3 Recommendations for future research

- Whilst understanding the considerable challenges that exist when carrying out research in this area, there is a need for more high quality evidence with regards health systems context of humanitarian crises.

Health system strengthening

- There is a need for much more research into some of the specific areas of the health system, particularly influence of health financing and access to essential medicines in a humanitarian crisis.

Resilience

- Evidence on the resilience of health systems to absorb crises and on their capacities to continue the delivery of services (e.g. non communicable diseases) after the departure of humanitarian actors.
 - There are a number of papers that focus on conflict, but the evidence is weaker for natural disasters. These include the impact of natural disasters on the health system and opportunities arising from natural disasters for areas of the health system.
 - There is a need for further research to measure the impact crises can have on local health systems.
-

Integration of services

- Evidence on the effectiveness of different models of delivering health interventions during humanitarian crises: vertical versus integrated humanitarian interventions, facility-based versus community-based interventions, comprehensive package vs. single interventions.

Preparedness of crises

- There is a clear need for a strong evidence base on the impact of preparedness and whether stronger and better prepared health systems have improved health outcomes following a humanitarian crisis.

References: Health systems

358. Adams, P., Health-care dynamics in Haiti. *The Lancet*, 2010. 376(9744): p. 859-860.
359. Alonso, A. and R. Brugha, Rehabilitating the health system after conflict in East Timor: a shift from NGO to government leadership. *Health Policy Plan*, 2006. 21(3): p. 206-16.
360. Barnabas, G.A.B. and A. Zwi, Health policy development in wartime: Establishing the Baito health system in Tigray, Ethiopia. *Health Policy and Planning*, 1997. 12(1): p. 38-49.
361. Batley, N.J., J. Makhoul, and S.A. Latif, War as a positive medical educational experience. *Medical Education*, 2008. 42(12): p. 1166-71.
362. Betsi, N.A., et al., Effect of an armed conflict on human resources and health systems in Cote d'Ivoire: prevention of and care for people with HIV/AIDS. *AIDS Care*, 2006. 18(4): p. 356-65.
363. Bile, K.M., et al., Learning through crisis: Development and implementation of a health cluster strategy for internally displaced persons. [French] Apprendre grace a la crise: Elaboration et mise en oeuvre d'une strategie de groupe Sante en faveur des personnes deplacees. *Eastern Mediterranean Health Journal*, 2010. 16(SUPPL.): p. S82-90.
364. Bisika, T., Health systems strengthening in conflict situations. *East Afr J Public Health*, 2010. 7(3): p. 277-81.
365. Bissell, R.A., et al., Evidence of the effectiveness of health sector preparedness in disaster response: the example of four earthquakes. *Fam Community Health*, 2004. 27(3): p. 193-203.
366. Bornemisza, O., et al., Promoting health equity in conflict-affected fragile states. *Social Science & Medicine*, 2010. 70(1): p. 80-8.
367. Bradt, D.A., C.M. Drummond, and M. Richman, Complex emergencies in Indonesia. *Prehosp Disaster Med*, 2001. 16(4): p. 294-301.
368. Braveman, P. and D. Siegel, Nicaragua: a health system developing under conditions of war. *International Journal of Health Services*, 1987. 17(1): p. 169-178.
369. Brennan, R.J., et al., Rehabilitating public health infrastructure in the post-conflict setting: epidemic prevention and preparedness in Kosovo. *Prehosp Disaster Med*, 2001. 16(4): p. 244-51.
370. Bukhari, S.K.S., et al., Essential medicines management during emergencies in Pakistan. *Eastern Mediterranean Health Journal*, 2010. 16 Suppl: p. S106-13.
371. Bulbulia, S. and F. Alvarez-Castillo, Vulnerability, resilience and coping of communities and health systems in responding to infectious diseases in the context of war/conflict: Kandy, Sri Lanka. *African Safety Promotion*, 2004. 2(2): p. 73-75.
372. Buwa, D. and H. Vuori, Rebuilding a health care system: war, reconstruction and health care reforms in Kosovo. *European Journal of Public Health*, 2007. 17(2): p. 226-230.
373. Cometto, G., G. Fritsche, and E. Sondorp, Health sector recovery in early post-conflict environments: experience from southern Sudan. *Disasters*, 2010. 34(4): p. 885-909.
374. Curic, I., et al., Public health services in Herzegovina region during 1992-1995 war. *Collegium antropologicum*, 2010. 34 Suppl 1: p. 321-324.
375. Dodge, C.P., Health implications of war in Uganda and Sudan. *Soc Sci Med*, 1990. 31(6): p. 691-8.

376. Eisenbruch, M., J.T. de Jong, and W. van de Put, Bringing order out of chaos: a culturally competent approach to managing the problems of refugees and victims of organized violence. *Journal of Traumatic Stress*, 2004. 17(2): p. 123-31.
 377. EMRO, W., Health sector response to the Bam earthquake: lessons learnt. Health sector response to the Bam earthquake: lessons learnt, 2005. 40.
 378. Garfield, R.M., War-related changes in health and health services in Nicaragua. *Social Science & Medicine*, 1989. 28(7): p. 669-676.
 379. Giacaman, R., H.F. Abdul-Rahim, and L. Wick, Health sector reform in the Occupied Palestinian Territories (OPT): targeting the forest or the trees? *Health Policy Plan*, 2003. 18(1): p. 59-67.
 380. Goyens, P., et al., Humanitarian aid and health services in eastern Kivu, Zaire: collaboration or competition? *Journal of Refugee Studies*, 1996. 9(3): p. 268-280.
 381. Hill, P., Ethics and health systems research in 'post'-conflict situations. *Dev World Bioeth*, 2004. 4(2): p. 139-53.
 382. Ityavayar, D.A. and L.O. Ogbu, Violence, conflict and health in Africa. *Soc Sci Med*, 1989. 28(7): p. 649-57.
 383. Jones, L.M., et al., Crisis into opportunity: Setting up community mental health services in post-Tsunami Aceh. *Asia-Pacific Journal of Public Health*, 2007. 19(SEPC. ISS.): p. 60-68.
 384. Kapucu, N., Collaborative governance in international disasters: Nargis cyclone in Myanmar and Sichuan earthquake in China cases. *International Journal of Emergency Management*, 2011. 8(1): p. 1-25.
 385. Khankeh, H.R., et al., Disaster health-related challenges and requirements: a grounded theory study in Iran. *Prehosp Disaster Med*, 2011. 26(3): p. 151-8.
 386. Kohan, I., et al., Emergencies and disasters as opportunities to improve mental health systems: Peruvian experience in Huancavelica. *Intervention: International Journal of Mental Health, Psychosocial Work & Counselling in Areas of Armed Conflict*, 2011. 9(3): p. 237-248.
 387. Lanjouw, S., J. Macrae, and A.B. Zwi, Rehabilitating health services in Cambodia: the challenge of coordination in chronic political emergencies. *Health Policy & Planning*, 1999. 14(3): p. 229-42.
 388. Lopez Tagle, E. and P. Santana Nazarit, The 2010 earthquake in Chile: the response of the health system and international cooperation. (Special Issue on Internacional Health.) [Spanish]. *Revista Panamericana de Salud Publica/Pan American Journal of Public Health*, 2011. 30(2): p. 160-166.
 389. Macrae, J., A.B. Zwi, and L. Gilson, A triple burden for health sector reform: 'post'-conflict rehabilitation in Uganda. *Soc Sci Med*, 1996. 42(7): p. 1095-108.
 390. Melgaard, B., et al., Repair and recovery of health systems. *Prehospital and Disaster Medicine*, 2005. 20(6): p. 428-431.
 391. Morikawa, M.J., Primary care training in Kosovo. *Fam Med*, 2003. 35(6): p. 440-4.
 392. Morton, M. and J.L. Levy, Challenges in disaster data collection during recent disasters. *Prehosp Disaster Med*, 2011. 26(3): p. 196-201.
 393. Newbrander, W., R. Waldman, and M. Shepherd-Banigan, Rebuilding and strengthening health systems and providing basic health services in fragile states. *Disasters*, 2011. 35(4): p. 639-60.
 394. Okuonzi, S.A., From emergency to creating a just health system: what issues surround the proposed health policy for Uganda? *CUAMM News*, 1998.
 395. Patel, P.P., et al., Transitioning mental health & psychosocial support: from short-term emergency to sustainable post-disaster development. *Humanitarian Action Summit 2011. Prehosp Disaster Med*, 2011. 26(6): p. 470-81.
 396. Pavignani, E., Human resources for health through conflict and recovery: Lessons from African countries. *Disasters*, 2011. 35(4): p. 661-679.
 397. Peltz, R., et al., Disaster healthcare system management and crisis intervention leadership in Thailand--lessons learned from the 2004 Tsunami disaster. *Prehospital and disaster medicine : the official journal of the National Association of EMS Physicians and the World Association for Emergency and Disaster Medicine in association with the Acute Care Foundation*, 2006. 21(5): p. 299-302.
 398. Porignon, D., et al., The role of the Zairian health services in the Rwandan refugee crisis. *Disasters*, 1995. 19(4): p. 356-360.
-

399. Porignon, D., et al., How robust are district health systems? Coping with crisis and disasters in Rutshuru, Democratic Republic of Congo. *Trop Med Int Health*, 1998. 3(7): p. 559-65.
 400. Procacci, P., et al., Session 1.5: health policy and coordination: a critical review of experiences. *Prehospital & Disaster Medicine*, 2005. 20(6): p. 393-5.
 401. Rahim, M., et al., The impact of the disease early warning system in responding to natural disasters and conflict crises in Pakistan. *East Mediterr Health J*, 2010. 16 Suppl: p. S114-21.
 402. Raminashvili, D., et al., The health impact and consequences of war in Shida Kartli region. *Georgian Med News*, 2009(172-173): p. 104-6.
 403. Raviola, G., et al., Mental health response in Haiti in the aftermath of the 2010 earthquake: a case study for building long-term solutions. *Harv Rev Psychiatry*, 2012. 20(1): p. 68-77.
 404. Sabatinelli, G., Kakar, S.R., Khan, M.R., Malik, M., Kazi, B.M., M. Gayer, Husain, F., Brennan, M., Bilukha, O., Shaikh, I., and S. Cookson, Shahpar, C., Early warning disease surveillance after a flood emergency--Pakistan, 2010. *MMWR Morb Mortal Wkly Rep*, 2012. 61(49): p. 1002-7.
 405. Sabes-Figuera, R., et al., Long-term impact of war on healthcare costs: an eight-country study. *PLoS One*, 2012. 7(1): p. e29603.
 406. Seyedin, S.H., M.R. Aflatoonian, and J. Ryan, Adverse impact of international NGOs during and after the Bam earthquake: health system's consumers' points of view. *American Journal of Disaster Medicine*, 2009. 4(3): p. 173-9.
 407. Shuey, D.A., et al., Planning for health sector reform in post-conflict situations: Kosovo 1999-2000. *Health Policy*, 2003. 63(3): p. 299-310.
 408. Simunovic, V.J., Health care in Bosnia and Herzegovina before, during, and after 1992-1995 war: a personal testimony. *Conflict and Health*, 2007. 1(7).
 409. Thieren, M., Special issue: Health information systems; Gauging a response to humanitarian emergencies; Good data is vital for poverty reduction. (Special issue: Health information systems; Gauging a response to humanitarian emergencies; Good data is vital for poverty reduction.). *Bulletin of the World Health Organization*, 2005. 83(8): p. 561-640.
 410. Tiembre, I., et al., Impact of armed conflict on the health care system of a sanitary district in Cote d'Ivoire. *Revue Medecine Tropicale*, 2011. 71(3): p. 249-252.
 411. Ugalde, A., et al., Conflict and health: The health costs of war: can they be measured? Lessons from El Salvador. *BMJ*, 2000. 321(7254): p. 169-72.
 412. Val D'Espaux, S.d., et al., Strengthening mental health care in the health system in the occupied Palestinian territory. (Special Issue: Integrating mental health care into existing systems of health care: during and after complex humanitarian emergencies.). *Intervention International Journal of Mental Health, Psychosocial Work and Counselling in Areas of Armed Conflict*, 2011. 9(3): p. 279-290.
 413. Western, K.A., Epidemiologic surveillance after natural disaster. *Pan American Health Organization Scientific Publication*, 1982. 420(94).
-

5. Results for contextual factors

5.1 Access to healthcare

5.1.1 Systematic review

- The search strategy on this contextual factor captured a large number of related peer-reviewed articles (2224), the vast majority of which (2160) either did not discuss humanitarian crises or did not consider the impact of access to healthcare on a public health intervention during crisis.
 - There is only a modest body of available evidence assessing the impact of access to healthcare on the effectiveness of health interventions during humanitarian crises (64 papers).
 - There is increasing interest in the characterisation of the impact of access on healthcare interventions during humanitarian crises, with 58/64 (91%) of all studies conducted since 1980 being published in the last decade.
 - The majority of available evidence is of low to moderate quality: 18/64 (28%) of papers were from category C evidence, 27/64 (42%) were from category B, and 19/64 (30%) were from category A.
 - All studies were observational. 32/64 (50%) of studies were descriptive in design and of these 14/32 (44%) were comparative: half the comparative studies (7/14) compared changes during the period of a humanitarian crisis, the other half (7/14) compared changes before and after a crisis struck. 31/64 (48%) employed a cross sectional design and one paper (2%) was a retrospective cohort study.
 - Of the location-identified research on health access during humanitarian crises, the country most commonly studied was Afghanistan (10/64, 16%), followed by Pakistan (8/64, 13%), Sri-Lanka (5/64, 8%), then Burma (4/64, 6%). As a region, Africa followed Asia in being the most intensely studied, with 13/64 (20%) articles focusing on countries hereincluding, DRC (2), Côte d'Ivoire (2), Sudan (2), Botswana (1), Guinea-Bissau (1), Kenya (1), Nigeria (1), Sierra Leone (1) and Somalia (1). Indeed, these countries represent some of the most violent environments to live in during their respective times of conflict and would be expected to have been associated with reduced access to healthcare for their populations. Other countries studied included China (3), Colombia (3), Haiti (3), Indonesia (2), Jordan (2), Nepal (2), Nicaragua (1), Peru (1) and Syria (1). 5/64 (8%) papers studies multiple countries.
 - Evidence for the different types of humanitarian crises focused heavily on armed conflict - 53/64 (83%) considered these; 11/64 (17%) considered natural disaster, in particular earthquakes (8) and tsunamis (2).
 - Most papers (39/64, 61%) focused on the general population, 15/64 (23%) considered IDPs, and one paper compared the general population with IDPs. 9/64 (14%) papers considered refugee populations.
 - Most papers (41/64, 64%) considered both urban and rural settings, 14/64 (22%) considered only the rural setting, and 9/64 (14%) considered only the urban environment.
 - Evidence for access to healthcare during humanitarian crises focused principally on the access of end-users (56/64, 88%). Of these papers, 25/64 (39%) considered all aspects of access of end-users, 16/64 (25%) considered only their physical access, 4/64 (6%) only economic access, two papers focused on the issue of non-discrimination in healthcare access; and one on informational access. Only 3/64 (5%) articles considered primarily the access of health workers to provide healthcare to end-users. Of these, two papers considered their economic access in terms of feasibility of their planned public health interventions; one paper considered their physical access. Finally, 5/64 (8%) papers considered access issues of both end-user and health workers together.
-

- Regarding the types of public health interventions, 36/64, (56%) articles studied access to existing medical services. 18/64 (28%) articles considered access to international medical assistance or existing services supplemented by international intervention. The remaining articles (10/64, 16%) considered a combination of local governmental, non-governmental or undefined mechanism of supplementation of existing medical services.
- Female reproductive, antenatal and obstetric services together formed the health topic most studied regarding access (12/64, 19%). 10/64 (16%) papers considered all health services in general, 8/64 (13%) papers considered primary care and 4/64 (6%) considered mental health services. There was also specific evidence on access to infectious disease control: 6/64 (9%) papers studied malaria, 4/64 papers (6%) TB, and two papers HIV/AIDS.
- Concerning stage of crisis, 10/64 (16%) studies focused on the acute phase, 5/64 (8%) on early recovery, and the vast majority (49/64, 77%) on chronic situations.

5.1.2 Expert Interviews

Key findings from the expert interviews were as follows:

Priority gaps in the available evidence on access to healthcare which need to be filled include:

- Real-time mapping of access to healthcare of end-users.
- Optimising healthcare access in crisis areas outside government control for both end-users and healthcare workers.
- Health disparities arising from access inequities between resident and transiting populations within a crisis location.
- Role of mobile phones and other digital technologies in improving health access for end-users.
- Certain populations experiencing crisis, including adolescents; the disabled; the elderly; those with chronic disease; and prisoners or detainees.

Issues related to the type of crisis and access to healthcare:

- Gathering evidence and the study of this contextual factor is most difficult in the context of armed conflict and in situations where infrastructure has suffered severe and extensive destruction such as is typical after earthquakes.

Type of studies needed:

- Randomised and controlled trials would be an impractical, unfeasible and unethical means of seeking evidence on this contextual factor.
- The greatest source of shared knowledge likely lies within the grey literature, but the extent to which this can be used as scientific evidence is highly variable and its usefulness is seen to be dependent on the reputation of the agency producing it.
- By nature, innovations aimed at systemic transformative change need to transcend evidence-based interventions and therefore the quest for evidence must itself be carefully directed.

Use of guidelines and standards in the study or programmatic development of access to healthcare:

- The Geneva Conventions are the most widely used standards for this contextual factor
 - Other guidelines and standards which are particularly useful include: (i) government sources and statistics, (ii) International Crisis Group (ICG) reports, (iii) existing institutional guidelines, (iv) policy statements of agencies, (v) needs assessments of agencies, and (vi) informal peer advice.
 - Other than the Institutional Review Board (IRB) process, there are very few standardised ethical guidelines in the field of humanitarian research and programmatic development.
-

There was excellent consensus on the perceived research gaps in this contextual factor among the humanitarian experts interviewed.

5.1.3 Recommendations for future research

General

- Given the current interest in and debate surrounding the issue of access to service provisions during crises in the humanitarian sector, more quality research needs to be done in the domain of access to healthcare during humanitarian crises.

Evidence needed to explore the following issues:

- Real-time mapping of access to healthcare of end-users.
- Optimising healthcare access in crisis areas outside government control for both end-users and healthcare workers.
- Health disparities arising from access inequities between resident and transiting populations within a crisis location.
- Role of mobile phones and other digital technologies in improving health access for end-users.

Indicators, standards and guidelines

- In order to facilitate the generation of more relevant evidence, research into the development of standardised methods or indicators to measure the different aspects of both end-user and health worker access to healthcare would be most useful.

Context and populations

- Current evidence on this contextual factor focuses primarily on descriptions of what types of access to healthcare is affected during crises and not the influence of access on the impact of public health interventions, which therefore needs greater research attention.
- Research is needed to measure the impact of access to healthcare on health interventions during natural disasters and in the acute phase of crises.
- Populations needing increased research include IDP and refugee populations, adolescents, the disabled, the elderly, those with chronic disease, and prisoners, or detainees.

References: Access to health care

414. Abdelmoneium, A.O.A., Policy and practice: Non-governmental organisations and the health delivery system for displaced children in Khartoum, Sudan. *Child Abuse Review*, 2010. 19(3): p. 203-217.
 415. Abeyasinghe, R.R., et al., Malaria Control and Elimination in Sri Lanka: Documenting Progress and Success Factors in a Conflict Setting. *PLoS ONE*, 2012. 7(8).
 416. Ali, M., et al., Emergency obstetric care availability, accessibility and utilization in eight districts in Pakistan's North West Frontier Province. *Journal of Ayub Medical College, Abbottabad: JAMC*, 2006. 18(4): p. 10-5.
 417. Ameli, O. and W. Newbrander, Contracting for health services: effects of utilization and quality on the costs of the Basic Package of Health Services in Afghanistan. *Bulletin of the World Health Organization*, 2008. 86(12): p. 920-8.
 418. Balthazar, B., Needs and accessibility to health services: Attitudes and perceptions of internally displaced head-of-household victims from Medellin, Colombia, 2011, ProQuest Information & Learning: US.
 419. Bartlett, L.A., et al., Maternal mortality among Afghan refugees in Pakistan, 1999-2000. *Lancet*, 2002. 359(9307): p. 643-649.
-

420. Beeche, A.A., Disparities in key health indicators between vulnerable groups living in refugee and host communities. Case study: Largo refugee camp and host community, Kenema District, Sierra Leone, 2008, ProQuest Information & Learning: US.
 421. Bukhari, S.K.S., et al., Essential medicines management during emergencies in Pakistan. *Eastern Mediterranean Health Journal*, 2010. 16(SUPPL.): p. S106-113.
 422. Carruth, L., The aftermath of aid: Medical insecurity in the northern Somali Region of Ethiopia, 2012, ProQuest Information & Learning: US.
 423. Chan, E.Y. and S. Griffiths, Comparison of health needs of older people between affected rural and urban areas after the 2005 Kashmir, Pakistan earthquake. *Prehospital & Disaster Medicine*, 2009. 24(5): p. 365-71.
 424. Chan, G.J., et al., Improving health services to displaced persons in Aceh, Indonesia: a balanced scorecard. [Erratum appears in *Bulletin of the World Health Organization*. 2010 Oct 1;88(10):796]. *Bulletin of the World Health Organization*, 2010. 88(9): p. 709-12.
 425. Contini, S., et al., Emergency and essential surgical services in Afghanistan: still a missing challenge. *World Journal of Surgery*, 2010. 34(3): p. 473-9.
 426. Cope, J.R., Estimating the factors associated with health status and access to care among Iraqis displaced in Jordan and Syria using population assessment data, 2012, ProQuest Information & Learning: US.
 427. Daniels, A., et al., Access to Health Services and Care-seeking Behaviors After the 2007 Ica Earthquake in Peru. *Disaster Medicine and Public Health Preparedness*, 2009. 3(2): p. 97-103.
 428. Dijkzeul, D. and C.A. Lynch, NGO management and health care financing approaches in the Eastern Democratic Republic of the Congo. *Global Public Health*, 2006. 1(2): p. 157-72.
 429. Enwereji, E.E., Assessing interventions available to internally displaced persons in Abia State, Nigeria. *Libyan Journal of Medicine*, 2009. 4(1): p. 17-22.
 430. Fu, X.Q., et al., Emergency management and security of first-line medical supplies in the 3A hospital during the Wenchuan earthquake - May 12-June 30, 2008. *Chinese Journal of Evidence-Based Medicine*, 2009. 9(4): p. 384-388.
 431. Furst, T., et al., Dynamics of socioeconomic risk factors for neglected tropical diseases and malaria in an armed conflict. *PLoS Neglected Tropical Diseases*, 2009. 3(9).
 432. Gustafson, P., et al., Tuberculosis mortality during a civil war in Guinea-Bissau. *Journal of the American Medical Association*, 2001. 286(5): p. 599-603.
 433. Haththotuwa, R., et al., Models of care that have reduced maternal mortality and morbidity in Sri Lanka. *International Journal of Gynecology and Obstetrics*, 2012. 119(SUPPL.1): p. S45-S49.
 434. Haldal, E., et al., Successful management of a national tuberculosis programme under conditions of war. *International Journal of Tuberculosis and Lung Disease*, 1997. 1(1): p. 16-24.
 435. Hirose, A., et al., Difficulties leaving home: A cross-sectional study of delays in seeking emergency obstetric care in Herat, Afghanistan. *Social Science & Medicine*, 2011. 73(7): p. 1003-1013.
 436. Howard, N., et al., Malaria control under the Taliban regime: insecticide-treated net purchasing, coverage, and usage among men and women in eastern Afghanistan. *Malaria Journal*, 2010. 9.
 437. Jordans, M.J.D., et al., Practice-Driven Evaluation of a Multi-layered Psychosocial Care Package for Children in Areas of Armed Conflict. *Community Mental Health Journal*, 2010: p. 1-11.
 438. Khan, I.M. and U. Laaser, Burden of tuberculosis in Afghanistan: Update on a war-stricken country. *Croatian Medical Journal*, 2002. 43(2): p. 245-247.
 439. Kim, G., R. Torbay, and L. Lawry, Basic health, women's health, and mental health among internally displaced persons in Nyala Province, South Darfur, Sudan. *American Journal of Public Health*, 2007. 97(2): p. 353-361.
 440. Kim, Y.M., et al., Availability and quality of emergency obstetric and neonatal care services in Afghanistan. *International Journal of Gynecology and Obstetrics*, 2012. 116(3): p. 192-196.
 441. Krause, S.K., J.L. Meyers, and E. Friedlander, Improving the availability of emergency obstetric care in conflict-affected settings. *Global public health*, 2006. 1(3): p. 205-228.
-

442. Lee, C.I., et al., Internally displaced human resources for health: villager health worker partnerships to scale up a malaria control programme in active conflict areas of eastern Burma. *Global Public Health*, 2009. 4(3): p. 229-41.
 443. Lee, R.B., Delivering Maternal Health Care Services in an Internal Conflict Setting in Maguindanao, Philippines. *Reproductive Health Matters*, 2008. 16(31): p. 65-74.
 444. Liu, J., et al., Post-earthquake mental health and psychosocial support (MHPSS) capacity of health facilities in some areas in Sichuan: Questionnaire survey and key informant interview with grassroots health professionals. *Chinese Mental Health Journal*, 2011. 25(2): p. 102-106.
 445. Mahn, M., et al., Multi-level partnerships to promote health services among internally displaced in eastern Burma. *Global public health*, 2008. 3(2): p. 165-186.
 446. Mateen, F.J., et al., Medical conditions among Iraqi refugees in Jordan: data from the United Nations Refugee Assistance Information System. *Bulletin of the World Health Organization*, 2012. 90(6): p. 444-51.
 447. McIntyre, T., et al., Emergency Surgical Care Delivery in Post-earthquake Haiti: Partners in Health and Zanmi Lasante Experience. *World Journal of Surgery*, 2011. 35(4): p. 745-750.
 448. Mills, E.J., et al., Providing antiretroviral care in conflict settings. *Current HIV/AIDS Reports*, 2009. 6(4): p. 201-9.
 449. Mogollon-Perez, A.S. and M.L. Vazquez, Factors affecting access to health care institutions by the internally displaced population in Colombia. *Cadernos De Saude Publica*, 2008. 24(4): p. 745-754.
 450. Morikawa, M., Effect of security threats on primary care access in Logar province, Afghanistan. *Medicine, conflict and survival*, 2008. 24(1): p. 59-64.
 451. Mullany, L.C., et al., The MOM Project: Delivering Maternal Health Services among Internally Displaced Populations in Eastern Burma. *Reproductive Health Matters*, 2008. 16(31): p. 44-56.
 452. Mullany, L.C., et al., Access To Essential Maternal Health Interventions and Human Rights Violations among Vulnerable Communities in Eastern Burma. *Plos Medicine*, 2008. 5(12): p. 1689-1698.
 453. Oucho, J.O. and N.O. Ama, Immigrants' and refugees' unmet reproductive health demands in Botswana: Perceptions of public healthcare providers. *South African Family Practice*, 2009. 51(3): p. 237-243.
 454. Partap, U. and D.R. Hill, The Maoist insurgency (1996-2006) and child health indicators in Nepal. *International Health*, 2012. 4(2): p. 135-142.
 455. Pike, I.L., et al., Documenting the health consequences of endemic warfare in three pastoralist communities of northern Kenya: a conceptual framework. *Social Science & Medicine*, 2010. 70(1): p. 45-52.
 456. Ponsar, F., et al., Mortality, violence and access to care in two districts of Port-au-Prince, Haiti. *Conflict and Health*, 2009. 3: p. 4-4.
 457. Qayum, M., et al., Assessment of health services on relevant primary health care principles in internally displaced people of Pakistan based on SPHERE standards and indicators. *Journal of the College of Physicians and Surgeons Pakistan*, 2011. 21(5): p. 315-316.
 458. Qayum, M., et al., Sphere-based assessment of knowledge and preventive measures related to malaria among the Displaced Population of Jalozai, Pakistan. *Journal of the Pakistan Medical Association*, 2012. 62(4): p. 344-346.
 459. Raheel, H., et al., Knowledge, Attitudes and Practices of Contraception among Afghan Refugee Women in Pakistan: A Cross-Sectional Study. *Plos One*, 2012. 7(11).
 460. Rajabali, A., et al., Communicable disease among displaced Afghans: refuge without shelter. *Nature Reviews. Microbiology*, 2009. 7(8): p. 609-14.
 461. Rassekh, B.M., Utilization of health services for children after the Tsunami in Aceh, Indonesia, 2007, ProQuest Information & Learning: US.
 462. Roberts, B., et al., A basic package of health services for post-conflict countries: implications for sexual and reproductive health services. *Reproductive Health Matters*, 2008. 16(31): p. 57-64.
 463. Ruiz-Rodriguez, M., et al., Access to medicines among internally displaced and non-displaced people in urban areas in Colombia. *Cadernos De Saude Publica*, 2012. 28(12): p. 2245-2256.
 464. Saadi, A., B. Bond, and S. Percac-Lima, Perspectives on preventive health care and barriers to breast cancer
-

- screening among Iraqi women refugees. *Journal of Immigrant and Minority Health*, 2012. 14(4): p. 633-639.
465. Sarani, B., et al., The academic medical centre and nongovernmental organisation partnership following a natural disaster. *Disasters*, 2012. 36(4): p. 609-616.
 466. Saxena, S., M.V. Ommeren, and B. Saraceno, Mental health assistance to populations affected by disasters: World Health Organization's role. *International Review of Psychiatry*, 2006. 18(3): p. 199-204.
 467. Simetka, O., et al., Obstetrics during Civil War: six months on a maternity ward in Mallavi, northern Sri Lanka. *Medicine, Conflict & Survival*, 2002. 18(3): p. 258-70.
 468. Tiembre, I., et al., [Impact of armed conflict on the health care system of a sanitary district in Cote d'Ivoire]. *Medecine Tropicale*, 2011. 71(3): p. 249-52.
 469. Tiwari, S.K. and E.J. Love, Gender and tuberculosis control in armed conflict areas in Nepal. *International Medical Journal*, 2007. 14(4): p. 265-271.
 470. van der Hoek, W., D.A. Premasiri, and A.R. Wickremasinghe, Early diagnosis and treatment of malaria in a refugee population in Sri Lanka. *Southeast Asian Journal of Tropical Medicine & Public Health*, 1997. 28(1): p. 12-7.
 471. Van Herp, M., et al., Mortality, violence and lack of access to health-care in the Democratic Republic of Congo. *Disasters*, 2003. 27(2): p. 141-153.
 472. Varley, E., Targeted doctors, missing patients: Obstetric health services and sectarian conflict in Northern Pakistan. *Social Science and Medicine*, 2010. 70(1): p. 61-70.
 473. Ventevogel, P., et al., Improving Access to Mental Health Care and Psychosocial Support within a Fragile Context: A Case Study from Afghanistan. *Plos Medicine*, 2012. 9(5).
 474. Whelan, A. and J. Blogg, 'Halfway people': refugee views of reproductive health services. *Global public health*, 2007. 2(4): p. 373-394.
 475. Wickramasinghe, W.A.K.K., et al., Are Tsunami survivors satisfied with the provision and quality of healthcare they received? *Asia-Pacific Journal of Public Health*, 2007. 19(SEPC. ISS.): p. 35-39.
 476. Williams, J.L. and B. McCarthy, Observations from a maternal and infant hospital in Kabul, Afghanistan - 2003. *Journal of Midwifery and Women's Health*, 2005. 50(4): p. e31-e35.
 477. Zhang, L.L., et al., Emergency pharmaceutical administration of hospital for women and children in medical rescue after Wenchuan earthquake. *Chinese Journal of Evidence-Based Medicine*, 2008. 8(9): p. 692-697.

5.2 Accountability to end-users

5.2.1 Systematic review

- The search strategy on this contextual factor captured a large number of related peer-reviewed articles (3876), the vast majority of which (3846) either did not discuss humanitarian crises or did not consider the impact of accountability to end-users on a public health intervention during crisis.
 - There is little available evidence assessing the impact of accountability to end-users on the effectiveness of health interventions during humanitarian crises (30 papers).
 - There is increasing interest in the characterisation of the impact of accountability to end-users on healthcare interventions during humanitarian crises, with 26/30 (87%) of all studies conducted since 1980 being published in the last decade.
 - The majority of available evidence is of low to moderate quality: 12/30 (40%) of papers were from category C evidence; 7/30 (23%) were from category B; and 11/30 (37%) were from category A.
 - All studies were observational. Half of the studies were descriptive in design and none of these were comparative. The other half of the studies were cross-sectional; of these, 6/15 (40%) compared changes over a period of time during a humanitarian crisis.
-

- Of the location-identified research on accountability to end-users during humanitarian crises, the most commonly studied region was Asia (10/30, 33%) with Afghanistan and Pakistan being most studied here (three papers each), followed by Africa (6/30, 20%). A further 12/30 (40%) papers considered multiple (more than two) different countries across regions.
- Evidence for the different types of humanitarian crises focused primarily on armed conflict: 13/30 (43%) considered these; 10/30 (33%) considered both armed conflict and natural disasters; and 7/30 (23%) considered only natural disasters, in particular floods (3) and tsunamis (2).
- Most papers (20/30, 66%) focused on the general population, 6/30 (20%) considered IDPs only, 3/30 (10%) papers considered refugee populations only, and one paper compared IDPs and refugees.
- Most papers (17/30, 57%) considered both urban and rural settings, 12/30 (40%) considered only the rural setting, and one paper considered only the urban environment.
- Of all the available evidence, only 2/30 (7%) studies considered all three aspects of healthcare accountability to end-users, namely its acceptability, availability and quality. 15/30 (50%) of studies considered acceptability; of these four considered one other aspect in addition. 12/30 (40%) of articles considered quality of healthcare; of these six considered one other aspect in addition. 9/30 (30%) of studies considered availability; of these six considered one other aspect in addition.
- Regarding the types of public health interventions, 21/30 (70%) articles studied accountability of international medical assistance agencies; of these, 7/30 (23%) considered how they interacted with local existing health services, and 3/30 (10%) others concerned the organisation Médecins San Frontières (MSF) specifically. 6/30 (20%) further articles considered accountability to end-users of existing health services only.
- Basic, general and primary healthcare services together formed the public healthcare area most studied regarding accountability to end-users (19/30, 63%). 5/30 (17%) papers considered the health topic of communicable diseases, including TB (2 papers), malaria (1), HIV/AIDS (1), and cholera (1). 3/30 (10%) papers considered obstetric services.
- Concerning stage of crisis, 4/30 (13%) studies focused on the acute phase, 4/30 (13%) on early recovery, and the vast majority (22/30, 73%) on chronic situations.

5.2.2 Expert Interviews

Key findings from the expert interviews were as follows:

Priority gaps in the available evidence on accountability to end-users which need to be filled include:

- Role and methods of informed consent of end-users in crisis settings.
 - Perception of end-users regarding humanitarian healthcare delivery .
 - Validation of assumptions concerning end-users.
 - Nexus of human rights and humanitarian public health interventions .
 - Impact of the asymmetry of power between end-users and humanitarian agencies on public health interventions.
 - Quality of healthcare delivered to end-users in crisis.
 - Cost-benefit analyses of interventions and humanitarian health economics.
 - Role and methods of behavioural change of end-users in improving the impact of humanitarian healthcare delivery.
 - Ethical guidelines for humanitarian public health policy-making.
 - Certain populations experiencing crisis, including adolescents, the disabled, the elderly, those with chronic disease, and the LGBT community.
-

Issues related to the type of crisis and accountability to end-users:

- Gathering evidence and the study of this contextual factor is difficult and has been limited in all types of crises largely due to a lack of consensus on appropriate measures of accountability and optimal endpoints.

Type of studies needed:

- Randomised and controlled trials would be an impractical, unfeasible and unethical means of seeking evidence on this contextual factor.
- The greatest source of shared knowledge likely lies within the grey literature but the extent to which this can be used as scientific evidence is highly variable and its usefulness is seen to be dependent on the reputation of the agency producing it.
- By nature, innovations aimed at systemic transformative change need to transcend evidence-based interventions and therefore the quest for evidence must itself be carefully directed.
- The most useful contribution towards the progress of this contextual factor is likely to come from debate and consensus-building around moral, philosophical and professional considerations rather than from scientific evidence.

Use of guidelines and standards in the study or programmatic development of accountability to end-users:

- The Sphere Project standards are the most widely used standards for this contextual factor
- Other guidelines and standards which are particularly useful include: (i) ALNAP guidelines, (ii) CDC guidelines, (iii) UNICEF guidelines, (iv) WHO guidelines, (v) International Crisis Group (ICG) reports, (vi) existing institutional guidelines, (vii) policy statements of agencies, and (viii) informal peer advice.
- Other than the Institutional Review Board (IRB) process, there are very few standardised ethical guidelines in the field of humanitarian research and programmatic development.

There was excellent consensus on the perceived research gaps in this contextual factor among the humanitarian experts interviewed.

5.2.3 Recommendations for future research

General:

- Accountability to end-users has become a core value in the humanitarian sector but represents an area relatively devoid of high quality evidence and needs more research.
- High quality comparative studies are needed to inform how accountability influences health interventions and outcomes, in particular comparing health interventions of varying levels of accountability, and comparing different mechanisms of healthcare accountability (e.g. international vs. purely local or domestic accountability mechanism).
- More evidence is needed on (i) the role and methods of informed consent of end-users in crisis settings, (ii) the perception of end-users regarding humanitarian healthcare delivery, (iii) the asymmetry of power between end-users and humanitarian agencies on public health interventions, (iv) the role and methods of behavioural change of end-users in improving the impact of humanitarian healthcare delivery, and (v) mechanisms and policies which safeguard or improve accountability to end-users during humanitarian crises.

Context:

- Current evidence on this contextual factor focuses primarily on descriptions of the different aspects of accountability to end-users in healthcare provision during crises such as availability, acceptability, quality, but does not assess the influence of accountability on public health interventions.

Indicators, standards and guidelines

- In order to facilitate the generation of more relevant evidence, research into the development of standardised methods or indicators to measure the different aspects of accountability in health interventions would be most useful.

References: Accountability to end-users

478. Beitler, A.L., J.L. Junnila, and J.H. Meyer Jr, Humanitarian assistance in Afghanistan: A prospective evaluation of clinical effectiveness. *Military Medicine*, 2006. 171(9): p. 889-893.
 479. Black, R., Ethical codes in humanitarian emergencies: from practice to research? *Disasters*, 2003. 27(2): p. 95-108.
 480. Bohler, M., S.A. Mustafaa, and O. Morkve, Tuberculosis treatment outcome and health services: A comparison of displaced and settled population groups in Khartoum, Sudan. *International Journal of Tuberculosis and Lung Disease*, 2005. 9(1): p. 32-36.
 481. Brennan, T.A. and R. Kirschner, Medical ethics and human rights violations: The Iraqi occupation of Kuwait and its aftermath. *Annals of Internal Medicine*, 1992. 117(1): p. 78-82.
 482. Chevalier, A.C., I. Beauquesne, and R. Gagnayre, An analysis of preliminary conditions for the implementation of health training programmes within the framework of humanitarian aid. *Sante Publique*, 2002. 14(1): p. 37-46.
 483. Christensen Rand, E., S. Hirano, and I. Kelman, Post-tsunami housing resident satisfaction in Aceh. *International development planning review*, 2011. 33(2): p. 187-211.
 484. du Mortier, S. and M. Arpagaus, Quality improvement programme on the frontline: An international committee of the Red Cross experience in the democratic Republic of Congo. *International Journal for Quality in Health Care*, 2005. 17(4): p. 293-300.
 485. Guthmann, J.P., [Clinical research and humanitarian work: the role of Medecins sans Frontieres in the fight against malaria]. *M S-Medecine Sciences*, 2009. 25(3): p. 301-6.
 486. Harries, A.D., et al., The Union and Medecins Sans Frontieres approach to operational research. *International Journal of Tuberculosis & Lung Disease*, 2011. 15(2): p. 144-54, i.
 487. Hunt, M.R., Ethics beyond borders: how health professionals experience ethics in humanitarian assistance and development work. *Developing World Bioethics*, 2008. 8(2): p. 59-69.
 488. Hunt, M.R., Establishing moral bearings: ethics and expatriate health care professionals in humanitarian work. *Disasters*, 2011. 35(3): p. 606-622.
 489. Hussein, J., et al., Monitoring obstetric services: Putting the 'UN guidelines' into practice in Malawi: 3 Years on. *International Journal of Gynecology and Obstetrics*, 2001. 75(1): p. 63-73.
 490. Kirsch, T., et al., Satisfaction with the humanitarian response to the 2010 Pakistan floods: A call for increased accountability to beneficiaries. *Emergency Medicine Journal*, 2012.
 491. MacKenzie, C., C. McDowell, and E. Pittaway, Beyond 'do no harm': the challenge of constructing ethical relationships in refugee research. *Journal of refugee studies*, 2007. 20(2): p. 299-319.
 492. Mogollon Perez, A.S., M.L. Vazquez Navarrete, and M.D.M. Garcia Gil, Health-related needs of the displaced population due to armed conflict in Bogota. *Revista Espanola de Salud Publica*, 2003. 77(2): p. 257-266.
 493. O'Mathuna, D.P., Conducting research in the aftermath of disasters: Ethical considerations. *Journal of Evidence-Based Medicine*, 2010. 3(2): p. 65-75.
 494. Partamin, et al., Patterns in training, knowledge, and performance of skilled birth attendants providing emergency obstetric and newborn care in Afghanistan. *International Journal of Gynecology and Obstetrics*, 2012. 119(2): p. 125-129.
 495. Qayum, M., et al., Bathing and cleaning practices in the camp of jalozai pakistan, for internally displaced people, based on Sphere standards and indicators. *Journal of the Pakistan Medical Association*, 2011. 61(12): p. 1169-1172.
 496. Rutta, E., et al., Refugee perceptions of the quality of healthcare: findings from a participatory assessment in Ngara, Tanzania. *Disasters*, 2005. 29(4): p. 291-309.
-

497. Schwartz, L., et al., Models for humanitarian health care ethics. *Public health ethics*, 2012. 5(1): p. 81-90.
498. Sheather, J. and T. Shah, Ethical dilemmas in medical humanitarian practice: cases for reflection from *Medecins Sans Frontieres*. *Journal of Medical Ethics*, 2011. 37(3): p. 162-5.
499. Sullivan, T.M., N. Sophia, and C. Maung, Using evidence to improve reproductive health quality along the Thailand-Burma border. *Disasters*, 2004. 28(3): p. 255-68.
500. Wall, A., The context of ethical problems in medical volunteer work. *HEC Forum*, 2011. 23(2): p. 79-90.
501. Wang, Z., et al., A survey and analysis on residents' satisfactory degree to the rebuilding status of community health service system in Mianzhu City. *Chinese Journal of Evidence-Based Medicine*, 2012. 12(6): p. 647-650.
502. Zwi, A.B., et al., Placing ethics in the centre: negotiating new spaces for ethical research in conflict situations. *Global Public Health*, 2006. 1(3): p. 264-77.

5.3 Health assessment methods

5.3.1 Systematic review

- The search strategy on this contextual factor captured 663 related peer-reviewed articles, the vast majority of which (580) either did not discuss humanitarian crises or did not consider health assessment methods in such situations.
 - There is a relatively modest body of available evidence considering health assessment methods during humanitarian crises (83 papers).
 - There is increasing interest in the methodologies of assessment, evaluation and estimation of health and health-related factors during humanitarian crises, with 63/83 (76%) of all studies conducted since 1980 being published in the last decade.
 - The majority of available evidence is of low to moderate quality: 13/83 (16%) of papers were from category C evidence, 36/83 (43%) were from category B, and 34/83 (41%) were from category A.
 - All studies were observational. 16/83 (19%) of studies were descriptive in design and of these 9/16 (56%) were comparative. 67/83 (81%) employed a cross-sectional design and of these 13/67 (19%) were comparative. In the comparative studies, the points of comparison included assessment methods within different settings, different affected populations, and between different assessment methodologies themselves.
 - Of the location-identified research on health assessment methods during humanitarian crises, the most commonly studied region was Asia (29/83, 35%), followed by Africa (26/83, 31%), then the Middle East (11/83, 13%). The most commonly studied countries were Afghanistan and Thailand (six papers each), followed by Iraq, Pakistan, Sudan and Uganda (five papers each). A further 8/83 (10%) papers considered multiple (more than two) different countries across regions.
 - Evidence for the different types of humanitarian crises focused heavily on armed conflict: 60/83 (72%) considered these; 20/83 (24%) considered natural disasters, in particular earthquakes (8) and tsunamis (4); and 3/83 (4%) considered both types of crises.
 - Most papers (46/83, 55%) focused on the general population, 16/83 (19%) considered IDP, 15/83 (18%) considered refugees, and 6/83 (7%) included more than one population type.
 - Most papers (45/83, 54%) considered both urban and rural settings, 34/83 (41%) considered only the rural setting, and 4/83 (5%) considered only the urban environment.
 - Regarding the types of public health interventions, 68/83 (82%) articles used health assessment methods for care planning. 9/83 (11%) articles assessed health in the context of the use of existing health services. 3/83 (4%) articles studied health assessment methods to inform aspects of disaster preparedness.
 - Excess mortality and morbidity was the health topic most assessed in these studies (26/83, 31%), followed closely by nutrition and food security (25/83, 30%). 19/83 (23%) studies assessed mental health, 8/83 (10%) assessed basic or general health, and 3/83 (4%) focused on population estimation.
-

- A large array of different health assessment methods was studied covering a range of health topics. Within each health topic, there was little consistency in the assessment methods used with the exception of two health topics: nutrition and mental health. Of the nutritional assessment methods, anthropometric measurements (such as weight-for-height in children) were almost universally used. Of the mental health assessment methods, several assessment scales or checklists were used in more than one study: the Hopkins Symptoms Checklist was used in five studies, and the Harvard Trauma Questionnaire, Depression Self-Rating Scale, SF-36 Health Survey and Afghan Symptom Checklist (ASCL) were each used in two studies.
- Concerning stage of crisis, 42/83 (51%) studies focused on the acute phase, 13/83 (16%) on early recovery, and 28/83 (34%) on chronic situations.

5.3.2 Expert Interviews

Key findings from the expert interviews were as follows:

Priority gaps in the available evidence on health assessment methods which need to be filled include:

- Mortality estimates of crisis-affected populations.
- Identification of vulnerable populations.
- Burden of chronic disease.
- Reliable direct data gathering from end-users.
- Victim interview methodologies.
- Numbers of humanitarian workers involved in a crisis situation.
- The humanitarian system's 'fitness-for-purpose' for addressing health needs in a crisis situation.
- Appropriate indicators with which to measure humanitarian contextual factors.
- Long-term impact assessment methodologies.
- Consensus-building on the interpretation of assessment tools
- Assessment data management and security
- Certain populations experiencing crisis, including adolescents, the disabled, the elderly, those with chronic disease, and urban refugees.

Issues related to the type of crisis and health assessment methods:

- Despite significant data gathering and study of this contextual factor in the acute phase of crises, the application of available evidence in all types of crises has been limited largely due to a lack of consensus on the interpretation of assessment tools.

Type of studies needed:

- Randomised and controlled trials would be an impractical, unfeasible and unethical means of seeking evidence on this contextual factor.
- The greatest source of shared knowledge likely lies within the grey literature but the extent to which this can be used as scientific evidence is highly variable and its usefulness is seen to be dependent on the reputation of the agency producing it.
- By nature, innovations aimed at systemic transformative change need to transcend evidence-based interventions and therefore the quest for evidence must itself be carefully directed.

Use of guidelines and standards in the study or programmatic development of accountability to end-users:

- Existing institutional guidelines of the agencies or organisations within which humanitarian workers operate are the most widely used standards for this contextual factor.

- Other guidelines and standards which are particularly useful include: (i) Sphere Project standards, (ii) ALNAP guidelines, (iii) CDC guidelines, (iv) UNICEF guidelines, (v) WHO guidelines, (vi) policy statements of agencies, and (vii) informal peer advice.
- Other than the Institutional Review Board (IRB) process, there are very few standardised ethical guidelines in the field of humanitarian research and programmatic development.

There was very good consensus on the perceived research gaps in this contextual factor among the humanitarian experts interviewed. The areas where there was a lack of consensus were in the health assessment methods involving (i) direct data gathering from end-users and (ii) victim interview methodologies, where only a minority of experts believed these to be research priorities.

5.3.3 Recommendations for future research

- More quality research is needed on the development, comparison, testing and validation of health assessment methods.
- Greater research attention should therefore be given to the impact of different health assessment methodologies on the effectiveness of public health interventions during humanitarian crises.
- More evidence is needed in a number of areas: (i) mortality estimates of crisis-affected populations, (ii) identification of vulnerable populations, (iii) burden of chronic diseases, and (iv) indicators with which to measure humanitarian contextual factors.

References: Health assessment methods

503. Ager, A., et al., Child protection assessment in humanitarian emergencies: Case studies from Georgia, Gaza, Haiti and Yemen. *Child Abuse and Neglect*, 2011. 35(12): p. 1045-1052.
504. Ahoua, L., et al., High mortality in an internally displaced population in Ituri, Democratic Republic of Congo, 2005: results of a rapid assessment under difficult conditions. *Global public health*, 2006. 1(3): p. 195-204.
505. AlDoori, W., et al., Child nutrition and armed conflicts in Iraq. *Journal of Tropical Pediatrics*, 1994. 40(1): p. 32-36.
506. Amowitz, L.L., M. Heisler, and V. Iacopino, A population-based assessment of women's mental health and attitudes toward women's human rights in Afghanistan. *Journal of Women's Health*, 2003. 12(6): p. 577-587.
507. Andersson, N. and G. Lamothe, Clustering and meso-level variables in cross-sectional surveys: an example of food aid during the Bosnian crisis. *BMC Health Services Research*, 2011. 11 Suppl 2: p. S15.
508. article, R., et al., Rapid assessment of health needs after disasters: A systematic review. *Chinese Journal of Evidence-Based Medicine*, 2011. 11(6): p. 605-612.
509. Atuyambe, L.M., et al., Land slide disaster in eastern Uganda: Rapid assessment of water, sanitation and hygiene situation in Bulucheke camp, Bududa district. *Environmental Health: A Global Access Science Source*, 2011. 10(1).
510. Barath, A., Children's well-being after the war in Kosovo: Survey in 2000. *Croatian Medical Journal*, 2002. 43(2): p. 199-208.
511. Bengtsson, L., et al., Improved response to disasters and outbreaks by tracking population movements with mobile phone network data: A post-earthquake geospatial study in haiti. *PLoS Medicine*, 2011. 8(8).
512. Benner, M.T., et al., Reproductive health and quality of life of young Burmese refugees in Thailand. *Conflict and Health*, 2010. 4: p. 5-5.
513. Bern, C., et al., Risk factors for mortality in the Bangladesh cyclone of 1991. *Bulletin of the World Health Organization*, 1993. 71(1): p. 73-8.
514. Betancourt, T.S., et al., A qualitative study of mental health problems among children displaced by war in Northern Uganda. *Transcultural Psychiatry*, 2009. 46(2): p. 238-256.
515. Bisimwa, B.G., et al., Efficacité des relais communautaires dans le dénombrement et la détermination des populations vulnérables dans un contexte de malnutrition endémique et de conflit armé : Cas d'un district sanitaire en RD Congo. *Cahiers D'Études et De Recherche Francophone / Santé*, 2009. 19(2): p. 81-86.

516. Boss, L.P., M.J. Toole, and R. Yip, Assessments of mortality, morbidity, and nutritional status in Somalia during the 1991-1992 famine: Recommendations for standardization of methods. *Journal of the American Medical Association*, 1994. 272(5): p. 371-376.
 517. Brown, V., et al., Rapid assessment of population size by area sampling in disaster situations. *Disasters*, 2001. 25(2): p. 164-171.
 518. Cardozo, B.L., et al., Karenni refugees living in Thai-Burmese border camps: Traumatic experiences, mental health outcomes, and social functioning. *Social Science and Medicine*, 2004. 58(12): p. 2637-2644.
 519. Cheung, E., et al., An epidemic of scurvy in Afghanistan: assessment and response. *Food & Nutrition Bulletin*, 2003. 24(3): p. 247-55.
 520. Cronin, A.A., et al., Quantifying the burden of disease associated with inadequate provision of water and sanitation in selected sub-Saharan refugee camps. *Journal of Water and Health*, 2009. 7(4): p. 557-568.
 521. Degomme, O. and D. Guha-Sapir, Patterns of mortality rates in Darfur conflict. *Lancet*, 2010. 375(9711): p. 294-300.
 522. Ertl, V., et al., Validation of a mental health assessment in an african conflict population. *Psychological Assessment*, 2010. 22(2): p. 318-324.
 523. Ezard, N., et al., Six rapid assessments of alcohol and other substance use in populations displaced by conflict. *Conflict and Health*, 2011. 5: p. 1-1.
 524. Fernando, G.A., Assessing Mental Health and Psychosocial Status in Communities Exposed to Traumatic Events: Sri Lanka as an Example. *American Journal of Orthopsychiatry*, 2008. 78(2): p. 229-239.
 525. Field, J.O. and R.M. Russell, Nutrition mission to Iraq for UNICEF. *Nutrition Reviews*, 1992. 50(2): p. 41-46.
 526. Galway, L.P., et al., A two-stage cluster sampling method using gridded population data, a GIS, and Google Earth (TM) imagery in a population-based mortality survey in Iraq. *International Journal of Health Geographics*, 2012. 11.
 527. Garfield, R. and C.S. Leu, A multivariate method for estimating mortality rates among children under 5 years from health and social indicators in Iraq. *International Journal of Epidemiology*, 2000. 29(3): p. 510-515.
 528. Glass, R.I., et al., Rapid assessment of health status and preventive-medicine needs of newly arrived Kampuchean refugees, Sa Kaeo, Thailand. *Lancet*, 1980. 1(8173): p. 868-72.
 529. Grais, R.F., et al., Are rapid population estimates accurate? A field trial of two different assessment methods. *Disasters*, 2006. 30(3): p. 364-376.
 530. Grandesso, F., et al., Mortality and malnutrition among populations living in South Darfur, Sudan: Results of 3 surveys, September 2004. *Journal of the American Medical Association*, 2005. 293(12): p. 1490-1494.
 531. Grein, T., et al., Mortality among displaced former UNITA members and their families in Angola: A retrospective cluster survey. *British Medical Journal*, 2003. 327(7416): p. 650-653.
 532. Guerená-Burgueno, F., et al., Rapid assessment of health needs and medical response after the tsunami in Thailand, 2004-2005. *Military Medicine*, 2006. 171(10 SUPPL.): p. 8-11.
 533. Guerrier, G., et al., Malnutrition and mortality patterns among internally displaced and non-displaced population living in a camp, a village or a town in Eastern Chad. *PLoS ONE [Electronic Resource]*, 2009. 4(11): p. e8077.
 534. Guha-Sapir, D. and W.G. Van Panhuis, The importance of conflict-related mortality in civilian populations. *Lancet*, 2003. 361(9375): p. 2126-2128.
 535. Hemrich, G., Matching food security analysis to context: the experience of the Somalia food security assessment unit. *Disasters*, 2005. 29(1(Supp.)): p. 67-91.
 536. Holt, B.Y., et al., Planning STI/HIV prevention among refugees and mobile populations: situation assessment of Sudanese refugees. *Disasters*, 2003. 27(1): p. 1-15.
 537. Hu, J.B., et al., [Reliability and validity of the self-reporting questionnaire for assessing mental health applied in Wenchuan earthquake]. *Chung-Hua Yu Fang i Hsueh Tsa Chih [Chinese Journal of Preventive Medicine]*, 2008. 42(11): p. 810-3.
-

538. Jarrah, S., O. Nassar, and H. Amre, Iraqi refugees in Jordan: Assessment of health needs. *Jordan Medical Journal*, 2006. 40(4): p. 241-249+52.
 539. Kaiser, R., et al., Using design effects from previous cluster surveys to guide sample size calculation in emergency settings. *Disasters*, 2006. 30(2): p. 199-211.
 540. Khawaja, M., et al., Civic engagement, gender and self-rated health in poor communities: evidence from Jordan's refugee camps. *Health Sociology Review*, 2006. 15(2): p. 192-208.
 541. Kim, A.A., et al., HIV infection among internally displaced women and women residing in river populations along the congo river, democratic republic of Congo. *AIDS and Behavior*, 2009. 13(5): p. 914-920.
 542. Kolbe, A., et al., Mortality, crime and access to basic needs before and after the Haiti earthquake: a random survey of Port-au-Prince households. *Medicine, conflict and survival*, 2010. 26(4): p. 281-297.
 543. Laude, M., Assessment of nutritional status, cognitive development, and mother- child interaction in Central American refugee children. *Revista Panamericana de Salud Publica/Pan American Journal of Public Health*, 1999. 6(3): p. 164-171.
 544. Lee, T.J., et al., Mortality rates in conflict zones in Karen, Karenni, and Mon states in eastern Burma. *Tropical Medicine and International Health*, 2006. 11(7): p. 1119-1127.
 545. Mayaud, P., et al., STD rapid assessment in Rwandan refugee camps in Tanzania. *Genitourinary Medicine*, 1997. 73(1): p. 33-38.
 546. McGrath, M., A. Seal, and A. Taylor, Infant feeding indicators for use in emergencies: an analysis of current recommendations and practice. *Public Health Nutrition*, 2002. 5(3): p. 365-372.
 547. McVicar, T.R. and P.N. Bierwirth, Rapidly assessing the 1997 drought in Papua New Guinea using composite AVHRR imagery. *International Journal of Remote Sensing*, 2001. 22(11): p. 2109-2128.
 548. Miller, K.E., The effects of state terrorism and exile on indigenous Guatemalan refugee children: A mental health assessment and an analysis of children's narratives. *Child Development*, 1996. 67(1): p. 89-106.
 549. Miller, K.E., et al., The Afghan symptom checklist: A culturally grounded approach to mental health assessment in a conflict zone. *American Journal of Orthopsychiatry*, 2006. 76(4): p. 423-433.
 550. Miller, L.C., et al., Afghan refugee children and mothers. *Archives of Pediatrics and Adolescent Medicine*, 1994. 148(7): p. 704-708.
 551. Moore, P.S., et al., Mortality rates in displaced and resident populations of central Somalia during 1992 famine. *Lancet*, 1993. 341(8850): p. 935-938.
 552. Movaghar, A.R., et al., The impact of Bam earthquake on substance users in the first 2 weeks: A rapid assessment. *Journal of Urban Health*, 2005. 82(3): p. 370-377.
 553. Mukalay, A.W.M., P.M.K. Kalenga, and M. Dramaix, Predictive factors of malnutrition in under 5s in Lubumbashi (DRC). *Santé publique*, 2010. 22(5): p. 541-550.
 554. Orach, C.G., Morbidity and mortality amongst southern Sudanese in Koboko refugee camps, Arua District, Uganda. *East African Medical Journal*, 1999. 76(4): p. 195-199.
 555. Osborne Daponte, B., Wartime estimates of Iraqi civilian casualties. *International review of the Red Cross*, 2007. 89(868): p. 943-957.
 556. Panter-Brick, C., et al., Violence, suffering, and mental health in Afghanistan: a school-based survey. *The Lancet*, 2009. 374(9692): p. 807-816.
 557. Pawar, A.B., et al., A rapid assessment of mosquito breeding, vector control measures and treatment seeking behaviour in selected slums of Surat, Gujarat, India, during post-flood period. *Journal of Vector Borne Diseases*, 2008. 45(4): p. 325-327.
 558. Pawar, A.T., S. Shelke, and V.A. Kakrani, Rapid assessment survey of earthquake affected Bhuj block of Kachchh District, Gujarat, India. *Indian Journal of Medical Sciences*, 2005. 59(11): p. 488-94.
 559. Pinto, A., et al., Setting up an early warning system for epidemic-prone diseases in Darfur: a participative approach. *Disasters*, 2005. 29(4): p. 310-322.
-

560. Potts, A., K. Myer, and L. Roberts, Measuring human rights violations in a conflict-affected country: results from a nationwide cluster survey in Central African Republic. *Conflict and Health*, 2011. 5: p. 4-4.
 561. Prasad, A.N., Disease profile of children in Kabul: The unmet need for health care. *Journal of Epidemiology and Community Health*, 2006. 60(1): p. 20-23.
 562. Rasekh, Z., et al., Women's health and human rights in Afghanistan. *Journal of the American Medical Association*, 1998. 280(5): p. 449-455.
 563. Roberts, B., et al., A new method to estimate mortality in crisis-affected and resource-poor settings: Validation study. *International Journal of Epidemiology*, 2010. 39(6): p. 1584-1596.
 564. Rossi, L., N. Mangasaryan, and F. Branca, Nutritional status and poverty assessment of vulnerable population groups in Armenia. *Sozial-Und Praventivmedizin*, 2005. 50(3): p. 166-176.
 565. Safran, M.A., et al., Evaluating Mental Health After the 2010 Haitian Earthquake. *Disaster Medicine and Public Health Preparedness*, 2011. 5(2): p. 154-157.
 566. Salama, P., et al., Malnutrition, measles, mortality, and the humanitarian response during a famine in Ethiopia. *JAMA*, 2001. 286(5): p. 563-71.
 567. Shears, P., et al., EPIDEMIOLOGIC ASSESSMENT OF THE HEALTH AND NUTRITION OF ETHIOPIAN REFUGEES IN EMERGENCY CAMPS IN SUDAN, 1985. *British Medical Journal*, 1987. 295(6593): p. 314-318.
 568. Singh, M.B., et al., Studies on the nutritional status of children aged 0-5 years in a drought-affected desert area of western Rajasthan, India. *Public Health Nutrition*, 2006. 9(8): p. 961-967.
 569. Sollom, R., et al., Health and human rights in Chin State, Western Burma: A population-based assessment using multistaged household cluster sampling. *PLoS Medicine*, 2011. 8(2).
 570. Souza, R., et al., Mental health status of vulnerable tsunami-affected communities: A survey in Aceh Province, Indonesia. *Journal of Traumatic Stress*, 2007. 20(3): p. 263-269.
 571. Spiegel, P.B., et al., Quality of malnutrition assessment surveys conducted during famine in Ethiopia. *Journal of the American Medical Association*, 2004. 292(5): p. 613-618.
 572. Spiegel, P.B., et al., The accuracy of mortality reporting in displaced persons camps during the post-emergency phase. *Disasters*, 2001. 25(2): p. 172-180.
 573. Stark, L., et al., Measuring violence against women amidst war and displacement in northern Uganda using the "neighbourhood method". *Journal of Epidemiology and Community Health*, 2010. 64(12): p. 1056-1061.
 574. Sullivan, K., S.M.M. Hossain, and B.A. Woodruff, Mortality rate and confidence interval estimation in humanitarian emergencies. *Disasters*, 2010. 34(1): p. 164-175.
 575. Sullivan, K.M. and S.M.M. Hossain, Earthquake mortality in Pakistan. *Disasters*, 2010. 34(1): p. 176-183.
 576. Swain, M. and M. Swain, Impact of super cyclone on life and livelihood of women: a micro level study of two coastal districts in Orissa. *Asian economic review*, 2005. 47(3): p. 485-515.
 577. Thapa, S.B. and E. Hauff, Perceived needs, self-reported health and disability among displaced persons during an armed conflict in Nepal. *Social Psychiatry and Psychiatric Epidemiology*, 2012. 47(4): p. 589-595.
 578. Thienkrua, W., et al., Symptoms of posttraumatic stress disorder and depression among children in tsunami-affected areas in southern Thailand. *JAMA*, 2006. 296(5): p. 549-59.
 579. Van Griensven, F., et al., Mental health problems among adults in tsunami-affected areas in southern Thailand. *Journal of the American Medical Association*, 2006. 296(5): p. 537-548.
 580. Yamout, R. and M. Chaaya, Individual and collective determinants of mental health during wartime. A survey of displaced populations amidst the July-August 2006 war in Lebanon. *Global public health*, 2011. 6(4): p. 354-370.
 581. Yamout, R. and S. Jabbour, Complexities of research during war: Lessons from a survey conducted during the summer 2006 war in Lebanon. *Public Health Ethics*, 2010. 3(3): p. 293-300.
 582. Zhao, G.F., et al., [Application of the Children's Impact of Event Scale (Chinese Version) on a rapid assessment of posttraumatic stress disorder among children from the Wenchuan earthquake area]. *Chung-Hua Liu Hsing Ping Hsueh Tsa Chih Chinese Journal of Epidemiology*, 2009. 30(11): p. 1160-4.
-

5.4 Coordination

5.4.1 Systematic review

- The search strategy on this contextual factor captured 662 peer-reviewed articles, the vast majority of which (637) either did not discuss humanitarian crises or did not consider the impact of coordination on a public health intervention during crisis.
 - There is little available evidence assessing the impact of coordination on the effectiveness of health interventions during humanitarian crises (25 papers).
 - There is increasing interest in the characterisation of the impact of coordination on healthcare interventions during humanitarian crises, with 22/25 (88%) of all studies conducted since 1980 being published in the last decade.
 - The majority of available evidence is of low to moderate quality: 13/25 (52%) of papers were from category C evidence, 8/25 (32%) were from category B, and only 4/25 (16%) were from category A.
 - All studies were observational. All studies were purely descriptive, a study design very low down in the hierarchy of evidence. Only one of these was comparative, comparing two humanitarian information coordination bodies.
 - Of the location-identified research on coordination during humanitarian crises, Haiti and Pakistan were the most commonly studied countries (4/25, 16% papers each). A further 10/25 (40%) papers considered multiple (more than two) different countries across regions.
 - Evidence for the different types of humanitarian crises focused primarily on natural disasters: 10/25 (40%) considered these, in particular earthquakes, floods and tsunamis. 8/25 (32%) considered armed conflict only, and 7/25 (28%) considered both armed conflict and natural disasters.
 - Most papers (21/25, 84%) focused on the general population; 2/25 (8%) considered entrapped populations, one paper considered IDPs only, and one paper considered both IDPs and refugees.
 - Most papers (21/25, 84%) considered both urban and rural settings, 4/25 (16%) considered only the rural setting, and no studies considered only the urban environment.
 - Regarding the types of public health interventions, 14/25 (56%) articles considered the coordination of international medical assistance agencies with existing health services. 9/25 (36%) further articles considered the coordination of only international medical assistance agencies. Just 2/25 (8%) studies considered the coordination of only domestic humanitarian capabilities (both were conducted in China).
 - Of the available evidence on health coordination during humanitarian crises, 9/25 (36%) studies considered the UN OCHA and Cluster Approach systems, and 3/25 (12%) studies considered civil-military coordination. The majority of remaining papers (10/25, 40%) explored various domains of coordination which could be improved to increase the overall effectiveness of coordination during humanitarian crises, including: institutional and social networks (4 papers), trust between agencies (2), disaster preparedness and response (1), information management (1), logistics (1), and operational security (1).
 - Basic, general and primary healthcare services together formed the public healthcare area most studied regarding coordination during humanitarian crises (21/25, 84%). Of the remaining studies, there was one article written on each of the following health areas: hospital inpatient and surgical care; patient medical transfers; distribution of medical materials; and sexual and reproductive health.
 - Concerning stage of crisis, the majority (16/25, 64%) of studies focused on the acute phase, only 1/25 (4%) on early recovery, and 8/25 (32%) on chronic situations.
-

5.4.2 Expert Interviews

Key findings from the expert interviews were as follows:

Priority gaps in the available evidence on coordination which need to be filled include:

- OCHA's 'fitness-for-purpose' for addressing health needs
- Non UN/OHCA-centric mechanisms of coordination
- Impact of integrated UN missions on healthcare delivery
- Role of UNHCR in the coordination of healthcare delivery to IDPs and refugees
- How international communities coordinate with local government
- Advantages and disadvantages of pooled funding within the UN structure
- Cost-benefit analysis of coordination of humanitarian public health interventions
- Role of generating competitive market forces between agencies in improving coordination and healthcare delivery efficiency
- Certain populations experiencing crisis, including adolescents, the disabled, the elderly, those with chronic disease, IDP and refugees, and urban populations.

Issues related to the type of crisis and coordination:

- Gathering evidence and the study of this contextual factor is most limited and difficult in the context of armed conflict.

Type of studies needed:

- Randomised and controlled trials would be an impractical, unfeasible and unethical means of seeking evidence on this contextual factor.
- The greatest source of shared knowledge likely lies within the grey literature but the extent to which this can be used as scientific evidence is highly variable and its usefulness is seen to be dependent on the reputation of the agency producing it.
- By nature, innovations aimed at systemic transformative change need to transcend evidence-based interventions and therefore the quest for evidence must itself be carefully directed.

Use of guidelines and standards in the study or programmatic development of access to healthcare:

- The IASC guidelines are the most widely used standards for this contextual factor.
- Other guidelines and standards which are particularly useful include: (i) UNEG (UN Evaluation Group) norms and standards, (ii) ALNAP guidelines, (iii) International Crisis Group (ICG) reports, (iv) existing institutional guidelines, (v) policy statements of agencies, and (vi) informal peer advice.
- Other than the Institutional Review Board (IRB) process, there are very few standardised ethical guidelines in the field of humanitarian research and programmatic development.

There was excellent consensus on the perceived research gaps in this contextual factor among the humanitarian experts interviewed. The area where there was a lack of consensus was in the role of UNHCR in the coordination of healthcare delivery to IDPs and refugees, where only a minority of experts believed this to be a research priority.

5.4.3 Recommendations for future research

General:

- Greater research is needed to understand the impact that coordination has on public health interventions during armed conflict.
- Greater research attention should be given to the cost-benefit analysis of coordination of humanitarian public health interventions.
- More research is needed into mechanisms and policies that safeguard or improve coordination during humanitarian crises.
- Evidence is needed to understand OCHA's 'fitness-for-purpose' for helping to address health needs.

Integration with local systems

- More evidence is needed on the impact of integrated UN missions on healthcare delivery.
- More research is required to analyse how international communities coordinate with local government.

Comparing different coordination mechanisms

- High quality comparative studies are needed to inform how coordination influences public health interventions, in particular the comparison of health interventions under varying levels of coordination; international vs. purely local/domestic mechanisms of coordination; urban vs. rural settings; and in natural disasters vs. armed conflict.
- There is a need for research into the characterisation and influence of different aspects of coordination on public healthcare interventions, including coordination of information and its management; logistics; human and material resources; technologies; and institutional, trust and social networks.
- Greater research attention could be given to the advantages and disadvantages for health of pooled funding within the UN structure.

References: Coordination

583. Akashi, H., N. Fujita, and R.K. Akashi, Aid coordination mechanisms for reconstructing the health sector of post-conflict countries. *Japan Medical Association Journal*, 2006. 49(7-8): p. 251-259.
 584. Bile, K.M., et al., Protecting the right to health of internally displaced mothers and children: The imperative of inter-cluster coordination for translating best practices into effective participatory action. *Eastern Mediterranean Health Journal*, 2011. 17(12): p. 981-989.
 585. Bile, K.M., K.A. Lashari, and A.F. Shadoul, "Delivering as one" UN reform process to improve health partnerships and coordination: Old challenges and encouraging lessons from Pakistan. *Eastern Mediterranean Health Journal*, 2010. 16(SUPPL.): p. S122-131.
 586. Bollettino, V., Understanding the security management practices of humanitarian organisations. *Disasters*, 2008. 32(2): p. 263-279.
 587. Chen, J., et al., Trans-province transfer of 10373 patients injured in Wenchuan earthquake. *Chinese Journal of Evidence-Based Medicine*, 2009. 9(12): p. 1267-1271.
 588. Cheng, Y.Z., et al., Construction and operation of a system for secure and precise medical material distribution in disaster areas after Wenchuan earthquake. *Chinese Journal of Evidence-Based Medicine*, 2009. 9(12): p. 1263-1266.
 589. Coles, J.B., J. Zhuang, and J. Yates, Case study in disaster relief: a descriptive analysis of agency partnerships in the aftermath of the January 12th, 2010 Haitian earthquake. *Socio-economic planning sciences*, 2012. 46(1): p. 67-77.
 590. Dar, O.A., M.S. Khan, and V. Murray, Conducting rapid health needs assessments in the cluster era: experience from the Pakistan flood. *Prehospital & Disaster Medicine*, 2011. 26(3): p. 212-6.
 591. Harmer, A., Integrated missions: a threat to humanitarian security? *International peacekeeping*, 2008. 15(4): p. 528-539.
-

592. Joyce, N., Civilian-military coordination in the emergency response in Indonesia. *Military Medicine*, 2006. 171(10 SUPPL.): p. 66-82.
 593. Laan, E.d., et al., Managing information cycles for intra-organisational coordination of humanitarian logistics. *International Journal of Services Technology and Management*, 2009. 12(4): p. 362-390.
 594. Landegger, J., et al., Strengths and weaknesses of the humanitarian Cluster Approach in relation to sexual and reproductive health services in northern Uganda. *International Health*, 2011. 3(2): p. 108-114.
 595. Macalister-Smith, P., Non-governmental organizations and coordination of humanitarian assistance. *International review of the Red Cross*, 1987. 260: p. 501-512.
 596. McCann, D.G.C. and H.P. Cordi, Developing international standards for disaster preparedness and response: How do we get there? *World Medical and Health Policy*, 2011. 3(1).
 597. Moore, S., E. Eng, and M. Daniel, International NGOs and the role of network centrality in humanitarian aid operations: a case study of coordination during the 2000 Mozambique floods. *Disasters*, 2003. 27(4): p. 305-318.
 598. Øverland, I., Humanitarian organizations in Tajikistan and the coordination of aid to displaced Afghans in no man's land. *Journal of refugee studies*, 2005. 18(2): p. 133-150.
 599. Péliissier, R. and T. Lanzer, The UN Department of Humanitarian Affairs in Angola. A model for the coordination of humanitarian assistance? *Journal of Southern African studies*, 1996. 22(4): p. 657-670.
 600. Sommaruga, C., Strengthening of the coordination of humanitarian emergency assistance of the United Nations Organization. *International review of the Red Cross*, 1993. 292: p. 49-49.
 601. Stephenson, J.M., Making humanitarian relief networks more effective: operational coordination, trust and sense making. *Disasters*, 2005. 29(4): p. 337-350.
 602. Stephenson, J.M., Toward a descriptive model of humanitarian assistance coordination. *Voluntas*, 2006. 17(1): p. 41-57.
 603. Stephenson, J.M. and M.H. Schnitzer, Interorganizational trust, boundary spanning, and humanitarian relief coordination. *Nonprofit management and leadership*, 2006. 17(2): p. 211-233.
 604. Stumpfenhorst, M., R. Stumpfenhorst, and O. Razum, The un OCHA cluster approach: Gaps between theory and practice. *Journal of Public Health*, 2011. 19(6): p. 587-592.
 605. Tapia, A.H., et al., Coordinating humanitarian information: the problem of organizational and technical trajectories. *Information technology and people*, 2012. 25(3): p. 240-258.
 606. Tarantino, D., Asian tsunami relief: Department of Defense public health response: Policy and strategic coordination considerations. *Military Medicine*, 2006. 171(10 SUPPL.): p. 15-18 .
-

5.5 Security of healthcare workers

5.5.1 Systematic review

- The search strategy on this contextual factor captured a modest number of related peer-reviewed articles (344), the vast majority of which (328) either did not discuss humanitarian crises or did not consider the impact of security of healthcare workers on a public health intervention during crisis.
 - There is very limited available evidence assessing the impact of security of healthcare workers on the effectiveness of health interventions during humanitarian crises (16 papers).
 - There is increasing interest in the characterisation of the impact of security of healthcare workers on health interventions during humanitarian crises, with 11/16 (69%) of all studies conducted since 1980 being published in the last decade.
 - The large majority of available evidence is of low to moderate quality: 12/16 (75%) of papers were from category C evidence; 2/16 (13%) were from category B; and only 2/16 (13%) were from category A.
 - All studies were observational. The large majority (14/16, 88%) were descriptive in design; the remaining (2/16, 13%) were cross-sectional. No studies were comparative.
 - Of the location-identified research on the security of healthcare workers in humanitarian crises, Afghanistan, Iraq and Jordan had 2/16 (13%) articles specifically written on each of them; 1 article out of 16 (6%) studied Pakistan specifically. Indeed, these countries have been affected by some of the most violent armed conflicts in recent history. The remaining 9/16 (57%) studies considered multiple (more than two) different countries across regions.
 - All studies considered the security of healthcare workers in armed conflict; of these, 3/16 (19%) studies also considered natural disasters.
 - Nearly all papers (14/16, 88%) focused on the general population; just 2/16 (13%) considered only refugees. No studies considered only IDPs.
 - Nearly all papers (14/16, 88%) considered both urban and rural settings; just 2/16 (13%) considered rural settings alone. There were no studies on urban settings alone.
 - Evidence on the security of healthcare workers public health interventions during humanitarian crises concentrated around four main themes. The first, examined by 6/16 (38%) of the studies, is the different forms of violence faced by healthcare workers, including murder, gun violence, kidnappings and physical threats. The second theme, considered by 5/16 (31%) studies, is strategies on how security of healthcare workers could be improved. The third, considered by 3/16 (19%), is how violence against healthcare workers decimates health systems. Finally, 2/16 (13%) studies explored methods of measuring violence towards healthcare workers during humanitarian crises.
 - Regarding the types of public health interventions 10/16 (63%) articles considered security of healthcare workers in settings of international medical assistance or existing services supplemented by international intervention. The remaining articles (6/16, 38%) considered security of healthcare workers in local existing medical services only.
 - Basic, general, emergency and primary healthcare services together formed the public healthcare area most studied regarding security of healthcare workers (15/16, 94%). One paper considered the health topic of obstetric services specifically.
 - Concerning stage of crisis, 4/16 (25%) studies focused on the acute phase, none (0%) on early recovery, and the vast majority (8/16, 75%) on chronic situations.
-

5.5.2 Expert Interviews

Key findings from the expert interviews were as follows:

Priority gaps in the available evidence on security of healthcare workers which need to be filled include:

- Increased risks posed by integrated UN missions.
- Impact of using foreign over local healthcare workers.
- Identification of risk factors associated with security threats to healthcare workers.
- Impact of asymmetry of power within a conflict setting on security.
- Impact of international involvement on security.
- Impact of religious context on security.
- Impact of end-user perception on security.
- Political role of healthcare worker kidnappings in conflict negotiation.
- Certain populations experiencing crisis, including adolescents, the disabled, the elderly, those with chronic disease, and urban refugees.

Issues related to the type of crisis and security of healthcare workers:

- Gathering evidence and the study of this contextual factor is difficult in the context of armed conflict since this in itself may be dangerous to the investigator.

Type of studies needed:

- Randomised and controlled trials would be an impractical, unfeasible and unethical means of seeking evidence on this contextual factor.
- The greatest source of shared knowledge likely lies within the grey literature but the extent to which this can be used as scientific evidence is highly variable and its usefulness is seen to be dependent on the reputation of the agency producing it.
- By nature, innovations aimed at systemic transformative change need to transcend evidence-based interventions and therefore the quest for evidence must itself be carefully directed.

Use of guidelines and standards in the study or programmatic development of access to healthcare:

- The (i) Geneva Conventions and (ii) existing institutional guidelines of the agencies or organisations within which humanitarian workers operate are the most widely used standards for this contextual factor.
- Other guidelines and standards which are particularly useful include: (i) IASC guidelines, (ii) ALNAP guidelines, (iii) International Crisis Group (ICG) reports, (iv) policy statements of agencies, and (v) informal peer advice.
- Other than the Institutional Review Board (IRB) process, there are very few standardised ethical guidelines in the field of humanitarian research and programmatic development.

There was excellent consensus on the perceived research gaps in this contextual factor among the humanitarian experts interviewed. The area where there was a lack of consensus was in the political role of healthcare worker kidnappings in conflict negotiations, where only a minority of experts believed this to be a research priority.

5.5.3 Recommendations for future research

- There needs to be more research on how healthcare worker security influences the effectiveness of public health interventions in humanitarian crises.
- High quality comparative studies are needed to inform how security influences health interventions and outcomes, in particular comparing crises of varying security levels, crises in urban vs. rural settings, and crises with international vs. purely local or domestic health assistance.
- Further evidence is needed on the impact on public health interventions of: (i) increased risks posed by integrated UN missions, (ii) using foreign over local healthcare workers, (iii) risk factors associated with security threats to healthcare workers, (iv) religious context on security, (v) the impact of end-user perception on security.

References: Security of health care workers

607. Burnham, G., et al., Understanding the impact of conflict on health services in Iraq: information from 401 Iraqi refugee doctors in Jordan. *International Journal of Health Planning & Management*, 2012. 27(1): p. e51-64.
 608. Donaldson, R.I., et al., A survey of national physicians working in an active conflict zone: the challenges of emergency medical care in Iraq. *Prehospital & Disaster Medicine*, 2012. 27(2): p. 153-61.
 609. Doocy, S., S. Malik, and G. Burnham, Experiences of Iraqi doctors in Jordan during conflict and factors associated with migration. *American Journal of Disaster Medicine*, 2010. 5(1): p. 41-7.
 610. Faiz, A., Health care under the Taliban. *Lancet*, 1997. 349(9060): p. 1247-8.
 611. Fast, L.A., Mind the gap: Documenting and explaining violence against aid workers. *European Journal of International Relations*, 2010. 16(3): p. 365-389.
 612. Hawkes, N., Attacks on doctors rise as rules of conduct in conflict zones are abandoned. *British Medical Journal*, 2012. 344.
 613. Kett, M., S. Rushton, and A. Ingram, Rethinking the space for health and conflict? *Medicine, Conflict & Survival*, 2010. 26(1): p. 1-3.
 614. Rogers, C.S., B. Sytsma, and S. Custer, World vision security manual: safety awareness for aid workers. *Development in practice*, 2001. 11(5): p. 648-650.
 615. Rowley, E.A., B.L. Crape, and G.M. Burnham, Violence-related mortality and morbidity of humanitarian workers. *American Journal of Disaster Medicine*, 2008. 3(1): p. 39-45.
 616. Schulte, J.M., et al., Violence and threats of violence experienced by public health field-workers. *Jama-Journal of the American Medical Association*, 1998. 280(5): p. 439-442.
 617. Van Brabant, K., Cool ground for aid providers: Towards better security management in aid agencies. *Disasters*, 1998. 22(2): p. 109-125.
 618. Varley, E., Targeted doctors, missing patients: obstetric health services and sectarian conflict in northern Pakistan. *Social Science & Medicine*, 2010. 70(1): p. 61-70.
 619. Vastag, B., Afghanistan aid workers struggle through threats. *JAMA*, 2001. 286(19): p. 2387-9.
 620. Webster, P., Medical faculties decimated by violence in Iraq. *CMAJ Canadian Medical Association Journal*, 2009. 181(9): p. 576-8.
 621. Webster, P.C., The deadly effects of violence against medical workers in war zones. *CMAJ Canadian Medical Association Journal*, 2011. 183(13): p. E981-2.
-

5.6 Urbanisation

5.6.1 Systematic review

- The search strategy on this contextual factor captured a large number of related peer-reviewed articles (3141), the vast majority of which (3114) either did not discuss humanitarian crises or did not consider the impact of urbanisation on a public health intervention during crisis.
 - There is little available evidence assessing the impact of urbanisation on the effectiveness of healthcare interventions during humanitarian crises (27 papers).
 - There is increasing interest in the identification of health challenges particular to humanitarian crises in urban settings and the development of appropriate policies to address these, with 24/27 (89%) of all studies conducted since 1980 being published in the last decade.
 - The majority of available evidence is of low to moderate quality: 7/27 (26%) of papers were from category C evidence, 9/27 (33%) were from category B, and 11/27 (41%) were from category A.
 - All studies were observational. 17/27 (63%) of studies were purely descriptive in design and of these four were comparative. The remaining 10/27 (37%) employed a cross-sectional design and of these also four were comparative. Of all the comparative studies, 5/8 (63%) compared urban with rural settings, 2/8 (25%) compared general and IDP populations within urban settings, and one study compared two computer models to predict flood extent in an urban setting.
 - The majority of location-identified research on the influence of urbanisation on humanitarian crises was conducted in Asia (12/27, 44%), possibly due to the fact that Asia has been projected to lead the urban population growth over the coming decades and it is also the geographic region of the world most prone to natural disasters. 6/27 (22%) further studies considered urban settings across multiple different countries and regions.
 - Evidence for the different types of humanitarian crises focused heavily on natural disasters: 16/27 (59%) considered these, in particular floods (6/16) and earthquakes (6/16); 7/27 (23%) considered armed-conflict; and one paper evaluated both natural disasters and armed-conflict. A third and distinct category of humanitarian crisis – situations of “urban violence” – was identified by the literature: 3/27 (11%) focused specifically on this environment.
 - Most papers 22/27 (81%) considered the general population, 2/27 (7%) considered both the general population and IDPs, and one (4%) considered only IDPs. 2/27 (7%) of papers considered refugee populations.
 - As defined by this contextual factor, all papers considered urban settings. Of these, 6/27 (22%) considered rural settings in addition, and 5/6 (83%) of these conducted comparative analysis between these two environments. 3/27 (11%) further papers specifically identified the urban setting of study as “slums”.
 - Evidence for the influence of urbanisation on public health interventions during humanitarian crises concentrated around three main themes. The first, identified in 7/27 (26%) of studies, is the relative greater vulnerability of urban environments to excess mortality as a result of both natural disasters such as floods and droughts, as well as armed conflict. The second theme, identified in 7/27 (26%) further studies, are the particular health challenges faced by urban environments during humanitarian crises, including access to healthcare; collapse of the health system and the management of NCDs; food security; sanitation and diarrhoeal disease; and the detrimental impact of poverty on health. Thirdly, 3/27 (11%) studies identified a relatively greater capacity of urban environments for recovery in the areas of health access, mental health and urban infrastructure.
 - Regarding the types of public health interventions, 13/27 (48%) articles focused on care planning, 9/27 (33%) on disaster preparedness, 3/27 (11%) on use of existing health services, and 2/27 (7%) on a combination of these interventions.
-

- Access to healthcare was the health-related topic most studied regarding urbanisation (10/27, 37%). 5/27 (19%) studies considered mental health, 5/27 (19%) considered nutrition and food security, 3/27 (11%) considered water, sanitation and hygiene, and 2/27 (7%) considered NCDs.
- Concerning stage of crisis, only 4/27 (15%) of studies focused on the acute phase, 5/27 (19%) on early recovery, and the vast majority (18/27, 67%) on chronic situations.

5.6.2 Expert Interviews

Key findings from the expert interviews were as follows:

Priority gaps in the available evidence on urbanisation which need to be filled include:

- Meaningful indicators for the measurement of urban health, including ones which are location-specific, able to differentiate between health states arising out of chronic deprivation and acute crisis, and able to measure associated tipping points or threshold criteria.
- Optimal methods of integrating humanitarian health interventions into existing urban healthcare infrastructures.
- Strategies to improve the baseline health status and robustness of health systems in rapidly urbanising populations to mitigate the detrimental health impacts of crises.
- Civil engineering and urban planning directed towards disaster preparedness, prevention and mitigation.
- Management of chronic disease during collapse of health systems in urban settings.
- Community-based humanitarian healthcare interventions.
- Monitoring and surveillance methodologies of health in urban settings.
- Efficient methods in the identification of and targeted intervention in specific populations (e.g. IDPs, refugees, women) within non-camp urban settings.
- Slum populations.
- Estuarine populations.
- Populations living on landslide prone or soft land areas unsuitable for urbanisation.

Issues related to the type of crisis and coordination:

- Gathering evidence and the study of this contextual factor is most limited and difficult in the context of armed conflict, other situations of urban violence and where there is a lack of social capital between researchers and affected communities.

Type of studies needed:

- Randomised and controlled trials would be an impractical, unfeasible and unethical means of seeking evidence on this contextual factor. However, stratification of data by similarities of interest in neighbourhoods and communities for comparative analysis is needed.
- The greatest source of shared knowledge likely lies within the grey literature but the extent to which this can be used as scientific evidence is highly variable and its usefulness is seen to be dependent on the reputation of the agency producing it. Grey literature can be very location specific which can be particularly useful.
- By nature, innovations aimed at systemic transformative change need to transcend evidence-based interventions and therefore the quest for evidence must itself be carefully directed.

Use of guidelines and standards in the study or programmatic development of access to healthcare:

- Government statistics are the most widely used standards for this contextual factor, although it is acknowledged that they can be technically inaccurate or reflect a political agenda.

- Other guidelines and standards which are particularly useful include: (i) UN Habitat reports and guidelines, (ii) IASC guidelines, (iii) ALNAP guidelines, (iv) existing institutional guidelines, (v) policy statements of agencies, and (vi) informal peer advice.
- Other than the Institutional Review Board (IRB) process, there are very few standardised ethical guidelines in the field of humanitarian research and programmatic development.

There was excellent consensus on the perceived research gaps in this contextual factor among the humanitarian experts interviewed. The area where there was a lack of consensus was in the importance put on the need for evidence in the management of chronic disease during collapse of health systems in urban crises, where a minority of experts believed this to be an over-emphasised research priority reflecting a current vogue.

5.6.3 Recommendations for future research

- Research is needed to analyse the influence of further aspects particular to urbanised environments on public health interventions, including:
 - Opportunities for disaster preparedness
 - Opportunities for coordination
 - Civil engineering and urban planning in disaster prevention and mitigation
 - Opportunities for the use of social media and other forms of mass communication
 - Opportunities for the control of infectious disease outbreaks.
- Efficient research methods of identification and targeted intervention of IDP and refugee populations within non-camp urban settings are needed.

References: Urbanisation

622. Blood, C.G. and M.E. Anderson, The battle for Hue: casualty and disease rates during urban warfare. *Military Medicine*, 1994. 159(9): p. 590-5.
 623. Brown, A., A. Dayal, and C. Rumbaitis Del Rio, From practice to theory: emerging lessons from Asia for building urban climate change resilience. *Environment and Urbanization*, 2012. 24(2): p. 531-556.
 624. Doocy, S., et al., Food security and humanitarian assistance among displaced Iraqi populations in Jordan and Syria. *Social Science and Medicine*, 2011. 72(2): p. 273-282.
 625. Furusawa, T., et al., Communicable and non-communicable diseases in the Solomon Islands villages during recovery from a massive earthquake in April 2007. *New Zealand Medical Journal*, 2011. 124(1333).
 626. Godoy-Paiz, P., B. Toner, and C. Vidal, 'Something in our hearts': Challenges to mental health among urban Mayan women in post-war Guatemala. *Ethnicity and Inequalities in Health and Social Care*, 2011. 4(3): p. 127-137.
 627. Goudet, S.M., et al., Pregnant women's and community health workers' perceptions of root causes of malnutrition among infants and young children in the slums of Dhaka, Bangladesh. *American Journal of Public Health*, 2011. 101(7): p. 1225-33.
 628. Goudet, S.M., et al., Impact of flooding on feeding practices of infants and young children in Dhaka, Bangladesh Slums: What are the coping strategies? *Maternal and Child Nutrition*, 2011. 7(2): p. 198-214.
 629. Guterres, A. and P. Spiegel, The state of the world's refugees: Adapting health responses to urban environments. *JAMA - Journal of the American Medical Association*, 2012. 308(7): p. 673-674.
 630. Hadley, C., et al., Household capacities, vulnerabilities and food insecurity: Shifts in food insecurity in urban and rural Ethiopia during the 2008 food crisis. *Social Science & Medicine*, 2011. 73(10): p. 1534-1542.
 631. Harroff-Tavel, M., Violence and humanitarian action in urban areas: new challenges, new approaches. *International review of the Red Cross*, 2010. 92(878): p. 329-350.
-

632. Hosseini, K.A., et al., Development of urban planning guidelines for improving emergency response capacities in seismic areas of Iran. *Disasters*, 2009. 33(4): p. 645-64.
 633. Houghton, A., HEALTH IMPACT ASSESSMENTS A Tool for Designing Climate Change Resilience into Green Building and Planning Projects. *Journal of Green Building*, 2011. 6(2): p. 66-87.
 634. Hurford, A.P., C. Maksimovic, and J.P. Leita, Urban pluvial flooding in Jakarta: applying state-of-the-art technology in a data scarce environment. *Water Science & Technology*, 2010. 62(10): p. 2246-55.
 635. Kirsch, T.D., et al., Impact of the 2010 Pakistan Floods on Rural and Urban populations at six months. *PLoS Currents*, 2012(AUG): p. 1-7.
 636. Liu, Q.A., X.J. Ruan, and P.L. Shi, Selection of emergency shelter sites for seismic disasters in mountainous regions: Lessons from the 2008 Wenchuan Ms 8.0 Earthquake, China. *Journal of Asian Earth Sciences*, 2011. 40(4): p. 926-934.
 637. Liu, W.-M., et al., Posttraumatic stress symptoms and related factors among adolescents in Dujiangyan district 6 months after the earthquake. *Chinese Mental Health Journal*, 2010. 24(9): p. 647-651.
 638. Lucchi, E., Between war and peace: humanitarian assistance in violent urban settings. *Disasters*, 2010. 34(4): p. 973-995.
 639. Lucchi, E., Moving from the 'why' to the 'how': reflections on humanitarian response in urban settings. *Disasters*, 2012. 36(Suppl. 1): p. S87-S104.
 640. Mullen, P.M.D., Protracted conflict, economic status and health services as determinants of health outcomes among the general population in Burundi, 2008, ProQuest Information & Learning: US.
 641. Munslow, B. and T. O'Dempsey, Globalisation and climate change in Asia: the urban health impact. *Third World Quarterly*, 2010. 31(8): p. 1339-356.
 642. Najarian, L.M., et al., The effect of relocation after a natural disaster. *Journal of Traumatic Stress*, 2001. 14(3): p. 511-526.
 643. Ochoa, S.F., et al., Supporting group decision making and coordination in urban disasters relief efforts. *Journal of Decision Systems*, 2007. 16(2): p. 143-172.
 644. Puertas, G., C. Rios, and H. del Valle, The prevalence of common mental disorders in urban slums with displaced persons in Colombia. *Revista Panamericana De Salud Publica-Pan American Journal of Public Health*, 2006. 20(5): p. 324-330.
 645. Rashid, S.F., The urban poor in Dhaka City: their struggles and coping strategies during the floods of 1998. *Disasters*, 2000. 24(3): p. 240-53.
 646. Suriya, S., B.V. Mudgal, and P. Nelliya, Flood damage assessment of an urban area in Chennai, India, part I: methodology. *Natural Hazards*, 2012. 62(2): p. 149-158.
-

ANNEX 1:

LIST OF KEY CONTRIBUTORS TO THE PROJECT

Principal Investigators: Karl Blanchet and Bayard Roberts (LSHTM)

Co-investigators: Vera Sistenich (Harvard) and Mazeda Hossain (LSHTM)

Advisor: Sara Pantuliano (ODI)

Researchers (by topic):

Anita Ramesh (Communicable disease control; water, sanitation and hygiene)

Séverine Frison (Nutrition)

James Smith (Nutrition; communicable disease control)

Emily Warren (Sexual and reproductive health (SRH), including maternal health, gender-based violence)

Mazeda Hossain (SRH, including maternal health, gender-based violence)

Bayard Roberts (Mental health and psychosocial support)

Maysoon Dahab (Mental health and psychosocial support)

Aniek Woodward (Mental health and psychosocial support)

Abigail Knight (Non communicable diseases; health service delivery)

Karl Blanchet (Injury and physical rehabilitation; Health systems; Health service delivery)

Chris Lewis (Health systems)

Vera Sistenich (Contextual factors of health care access, accountability, health assessment methods, coordination, health worker security, and urbanisation)

Advisory Committee:

André Briend, Independent

Claude Bruderlein, Harvard School of Public Health (HSPH)

Joanna Busza, LSHTM

Sandy Cairncross, LSHTM

Allen Foster, LSHTM

Peter Smith, LSHTM

Martin McKee, LSHTM

Deirdre Beecher, LSHTM

Jeroen Ensink, LSHTM

Project Steering Committee:

Chris Whitty (DFID)

Jimmy Whitworth (The Wellcome Trust)

Project Management Committee:

Chris Lewis (UK Department for International Development, DFID)

Val Snewin (The Wellcome Trust)

Daniel Davies (ELRHA)

Jessica Camburn (ELRHA)

Francesco Checchi (Save the Children UK)

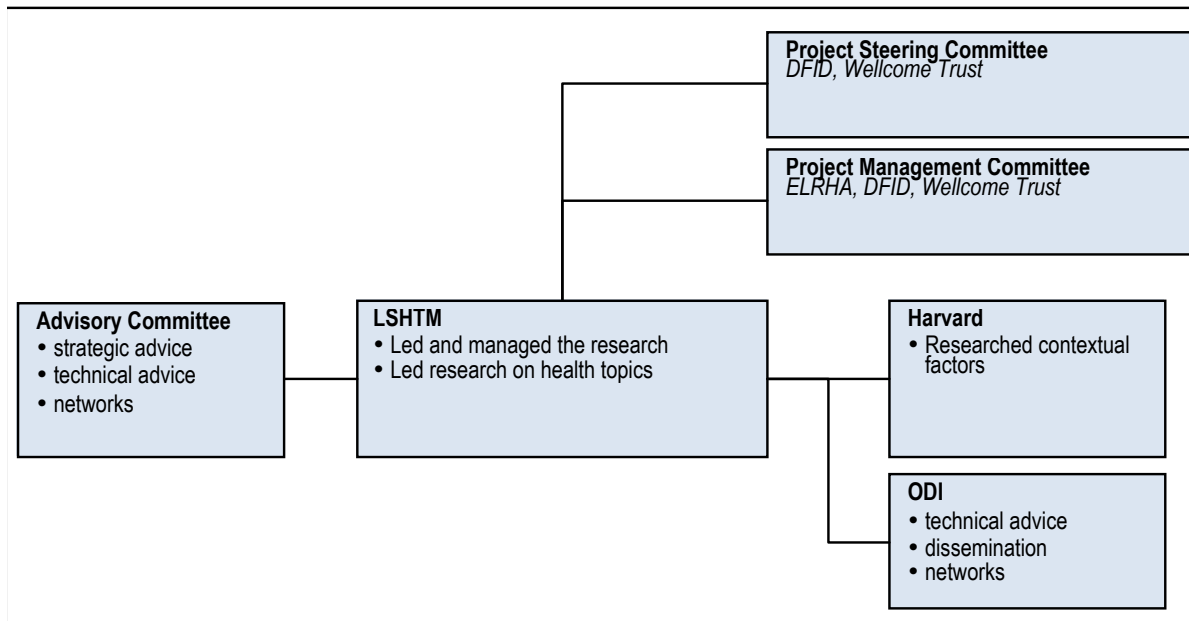


Figure 55: Project Structure

ANNEX 2:

LIST OF EXPERT INTERVIEWEES

Consultancy meetings (all topics):

Paris:

Pierre Salignon, Médecins du Monde, France
 Jean-Hervé Bradol, CRASH, Foundation Médecins Sans Frontières, France
 Myriam Aissa, Action contre la Faim, France
 Cécile Salpeteur, Action contre la Faim, France
 Sevan Khadeej, WAHA, France
 Boris Martin, Humanitaire, France

Geneva:

Paul Spiegel, UNHCR, Switzerland
 Micelf Yao, WHO, Switzerland
 Nenette Motus, IOM, Switzerland
 Kaisa Kontunen, IOM, Switzerland
 Thierry Agagliate, Terre des hommes, Switzerland
 Capucine Jacquier, Terre des hommes, Switzerland

London:

Louise Knight, Merlin, UK
 Alice Fay, Save the Children, UK
 Andrew Hall, Save the Children, UK
 Bethan Lewis, Save the Children, UK
 Kate Godden, Nutrition Works, UK
 Anne Bush, Nutrition Works, UK
 Victoria Sibsen, Independent, UK
 David Bates, MoD, UK
 Marcus Skinner, HelpAge, UK
 Trudi Skinner, International Health Partner, UK
 Natasha Lelijveld, UCL, UK
 Andrew Seal, UCL, UK
 Mamoun Abu-Anqub, Islamic relief, UK
 Carla Stanke, Public Health England, UK
 Saskia de Pee, WFP, The Netherlands
 Claire Allen, Evidence Aid, UK
 Amy Hughes, UKIETR UKMed, UK
 Emily Mates, ENN, UK
 Margaret Lancaster, Concern Worldwide, UK
 Peter Medway, International Medical Corps, UK
 Topic specific (by telephone or in-person):

Communicable Disease Control:

Muireann Brennan, CDC, USA
 David Bates, Ministry of Defence, UK
 David Heymann, LSHTM and Chatham House, UK
 Heather Papowitz, UNICEF, USA

Toby Leslie, LSHTM, UK

Farooq Mansoor, Health Protection and Research Organization, Afghanistan

Ismail Mayen, Health Protection and Research Organization, Afghanistan

Asif Alokozai, Health Protection and Research Organization, Afghanistan

WASH

Andy Bastabale, Oxfam, UK

Sandy Cairncross, LSHTM, UK

Jeroen Ensink, LSHTM, UK

Paul Shanahan, UNICEF/Global WASH Cluster

Nutrition

Cecile Salpeteur, Action Contre la Faim, France

Emmanuel Baron, Epicentre, France

Jay Berkeley, KEMRI Wellcome Trust, Kenya

Jeremy Shoham, Emergency Nutrition Network, UK

Kate Sadlers, Valid International, UK

Marie McGrath, Emergency Nutrition Network, UK

Marko Kerac, Malawi College of Medicine/UCL, Malawi

Myriam Aissa, Action Contre la Faim, France

Oleg Bilukha, CDC, USA

Rebecca Grais, Epicentre, France

Saul Guerrero, Action Against Hunger, UK

Reproductive health and gender-based violence

Basia Tomczyk, CDC, USA

Bethan Cobley, Marie Stopes International, UK

Catrin Schulte-Hillen, MSF, France

Chris Orach, Makerere University, Uganda

Emma Simpson-Independent Consultant, UK

Farhad Javid, Marie Stopes International, Afghanistan

Gina L. Bramucci, IRC, France

Julie Taft, Independent Consultant, UK

Lisa Jane Thomas, Department of Reproductive Health and Research, WHO, Switzerland

Lydia Ettema, Marie Stopes International, Belgium

Mairi MacRae, IRC, UK

Mihoko Tanabe, Women's Refugee Commission, USA

Nadine Cornier, UNHCR, Switzerland

Natasha Howard, LSHTM, UK

Pam DeLargy, UNFPA, Sudan

Samira Sami, CDC, USA

Mental health and psychosocial support

Ananda Galappatt, MHPSS network, University of Colombo, Sri Lanka

Barbara Lopes-Cardozo, CDC, USA

Cécile Bizouerne, ACF, France

Derrick Silove, University of New South Wales, Australia

Florence Baingana, Makerere University, Uganda

Grace Akello, Gulu University, Uganda
 Inka Weissbecker, IMC, Ethiopia
 Karen Abbs, consultant, UK.
 Lynne Jones, consultant, UK
 Mahesan Ganesan, Global Initiative on Psychiatry, Sri Lanka
 Mark Jordans, HealthNet TPO, Netherlands
 Mark Van Ommeren, WHO, Switzerland
 Paul Bolton, Johns Hopkins University, USA
 Peter Ventevogel, consultant, Netherlands
 Pierre Bastin, ICRC, Geneva
 Robert van Voren, Global Initiative on Psychiatry, Netherlands
 Wietse Tol, Johns Hopkins University, USA

NCDs

Pascale Fritsch, HelpAge International, UK
 Richard Garfield, CDC, USA
 Peter Lamptey, FH360, USA
 Louise Lillywhite, Chatham House, UK
 Dorothea Nitsch, LSHTM, UK
 Neil Pearce, LSHTM, UK
 Marcus Skinner, HelpAge International, UK
 Richard Sullivan, Kings Health Partners, UK

Injury and physical rehabilitation

Jim Gosner, The International Society of Physical and Rehabilitation Medicine, USA
 Barbara Rau, ICRC, Switzerland
 Claude Tardiff, ICRC, Switzerland
 Isabelle Urseau, Handicap International, France
 Valerie Scherrer, CBM, Belgium
 Jan Reinhardt, The International Society of Physical and Rehabilitation Medicine, Switzerland
 Alana Officer, WHO, Switzerland

Health services and systems

Egbert Sondorp, Royal Tropical Institute, the Netherlands.
 Emily Ying Yang Chan, Hong Kong University
 Preeti Patel, King's College London
 Sarah Hersey, CDC, South Sudan
 Ann Cannavan, International Medical Corps, USA
 Philip Du Cros, MSF, UK
 Beverly Collin, MSF, UK

Contextual factors

Abby Stoddard, Humanitarian Outcomes, USA
 Barnaby Willitts-King, Independent Consultant, USA
 Colleen Hardy, CDC, USA
 Elizabeth Ferris, Brookings Institution, USA
 Hansjoerg Strohmeyer, UN OCHA, USA

Iain Levine, Human Rights Watch, USA

James Shepherd-Barron, Independent Consultant, USA

Jeremie Labbe, International Peace Institute, USA

Mark Steinbeck, ICRC, USA

Peter Walker, Feinstein International Center, USA

Ronak Patel, Harvard Humanitarian Initiative, USA

Ruwan Ratnayake, International Rescue Committee, USA

Sophie Delaunay, MSF, USA

ANNEX 3:

SEARCH TERMS USED FOR KEY BIBLIOGRAPHIC DATABASES

(see Annexes for health topic specific search terms which were added on to these)

- 1 exp Disasters
 - 2 exp Relief Work
 - 3 Rescue Work
 - 4 Emergencies
 - 5 Emergency Medicine
 - 6 Emergency Medical Services
 - 7 Disaster Medicine
 - 8 Mass Casualty Incidents
 - 9 Emergency Responders
 - 10 Medical Missions, Official
 - 11 (humanitarian adj2 (crisis or crises or relief or response or agenc\$)).tw.
 - 12 humanitarian.tw.
 - 13 (disaster adj3 (relief or plan\$)).tw.
 - 14 ((relief or aid) adj2 work\$).tw.
 - 15 Refugees
 - 16 (refugee or evacuee or evacuated).tw.
 - 17 (displace\$ adj2 (force\$ or population or human or internal\$)).tw.
 - 18 Altruism
 - 19 exp War
 - 20 war.tw.
 - 21 ((armed or zone) adj2 conflict\$).tw.
 - 22 (conflict affected adj3 (population\$ or person\$ or communit\$)).tw.
 - 23 Avalanches
 - 24 Earthquakes
 - 25 Floods
 - 26 Landslide
 - 27 Tidal Waves
 - 28 Tsunamis
 - 29 Cyclonic Storms
 - 30 (typhoon\$ or hurricane\$ or cyclone\$).tw.
 - 31 (avalanche\$ or earthquake\$ or flood or floods or flooding or flooded or landslide\$ or tsunami\$).tw.
 - 32 (disaster adj2 (natural or victim)).tw.
 - 33 Droughts
 - 34 drought\$.tw.
 - 35 Starvation
 - 36 (starvation or famine\$).tw.
 - 37 or/1-36
 - 38 randomized controlled trial
 - 39 controlled clinical trial
-

- 40 cross-sectional studies
 - 41 case-control studies
 - 42 cohort studies
 - 43 pilot studies
 - 44 (random\$ or controlled).tw.
 - 45 (control adj3 (area or cohort? or compare? or condition or design or group? or intervention? or participant? or study)).ab. not (controlled clinical trial or randomized controlled trial).pt.
 - 46 ((evaluat\$ or prospective or retrospective) adj1 study).tw.
 - 47 ("quasi-experiment\$" or quasiexperiment\$ or "quasi random\$" or quasirandom\$ or "quasi control\$" or quasicontrol\$ or ((quasi\$ or experimental) adj3 (method\$ or study or trial or design\$))).tw.
 - 48 ("time series" adj2 interrupt\$).tw.
 - 49 (intervention\$ or impact or effectiveness or efficacy or service\$ or outcome\$ or output or treatment\$ or management or program\$ or project\$).tw.
 - 50 economics
 - 51 cost-benefit analysis
 - 52 cost control
 - 53 Cost savings
 - 54 cost of illness
 - 55 cost \$utility.tw.
 - 56 (Cost\$ adj2 effective\$).tw.
 - 57 cost-effective\$.tw.
 - 58 (cost adj3 utility).tw.
 - 59 cost-utilit\$.tw.
 - 60 or/38-59
 - 61 developing countries
 - 62 exp asia
 - 63 exp africa
 - 64 exp pacific islands
 - 65 exp eastern europe
 - 66 exp china
 - 67 balkan peninsula/ or europe, eastern/ or transcaucasia
 - 68 caribbean region/ or central america/ or "gulf of mexico"/ or latin america/ or south america
 - 69 atlantic islands/ or indian ocean islands/ or macau/ or pacific islands/ or philippines/ or prince edward island/ or svalbard/ or west indies
 - 70 or/61-69
 - 71 Japan
 - 72 70 not 71
 - 73 37 and 60 and 72
 - 74 limit 73 to yr="1980 -2013"
-

ANNEX 4:

DETAILS FOR SYSTEMATIC REVIEW ON COMMUNICABLE DISEASE CONTROL

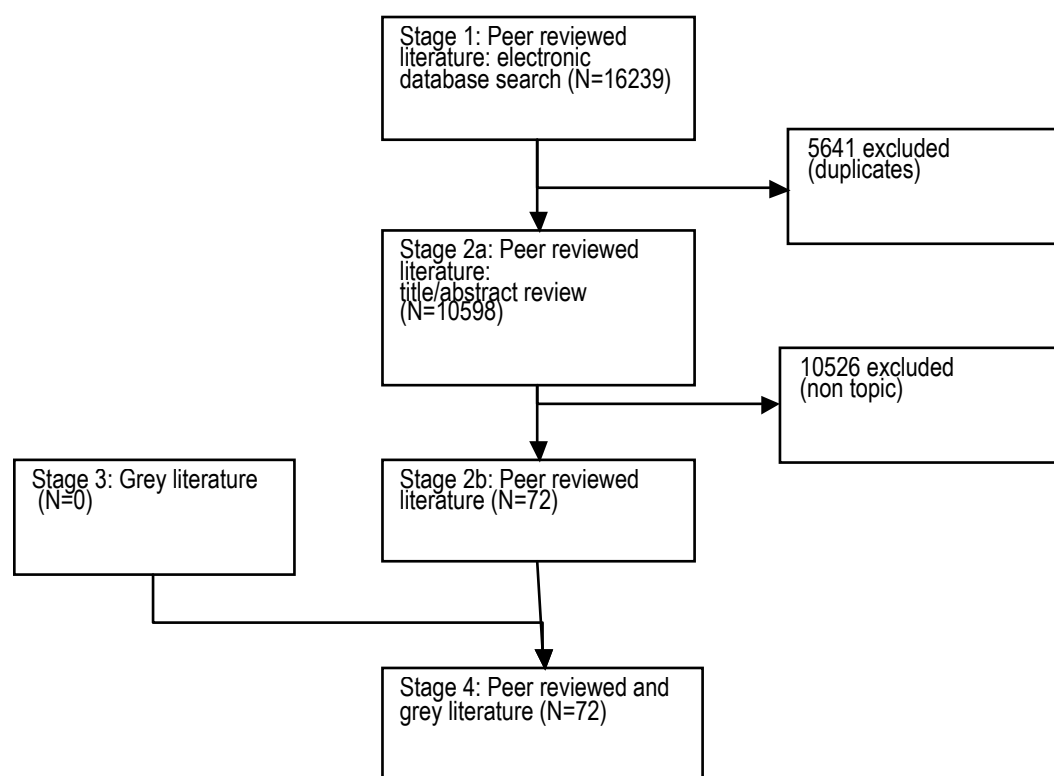
Sources:

Published literature: Embase, Global Health, Medline.

Grey literature: R4D, MSF Field Research, UNHCR, WaterAid, SHARE, WHO, United States Center for Disease Control and Prevention (CDC).

Health topic specific search terms:

'Communicable disease' or 'infectious disease' or 'infection' or 'zoonoses' or 'environmental microbiology' or 'virus diseases' or 'viral diseases' or 'virus infections' or 'viral infections' or 'bacteria diseases' or 'bacterial diseases' or 'bacteria infections' or 'bacterial infections' or 'parasite diseases' or 'parasitic diseases' or 'parasite infections' or 'parasitic infections' or 'diarrhoeal diseases' or 'diarrheal diseases' or 'respiratory infections' or 'acute respiratory infections' or 'malaria' or 'tuberculosis' or 'TB' or 'HIV' or 'AIDS' or 'acquired immune deficiency syndrome' 'sexually-transmitted diseases' or 'STDs' or 'sexually transmitted infections' or 'STIs' or 'vaccine preventable diseases' or 'measles' or 'meningitis' or 'cholera' or 'typhoid' or 'shigella' or 'hepatitis' or 'dengue' or 'malaria' or 'leptospirosis' or 'scabies' or mycosis or viruses or bacteria or parasites or helminthes or worms or fungi or 'microorganism or micro-organism or 'pathogens' or 'pathogenic, virus' or viral, bacteria, fungi, fungal, fungus, mould, mycoses, parasite, incidence, prevalence, epidemic, seroepidemiological, occurrence, seroprevalence, exposure, exposed, aetiology, burden or risk, emerging, risk-factors, risk-assessment.



Study authors (year)	Study country	Setting	Population type	Humanitarian crisis type	Crisis stage	Health outcome(s)	Type(s) of health intervention	Study design	Target age group	Evidence category
Aaby (2002)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Diphtheria, tetanus, pertussis	Vaccination	Cohort	Children < 6 months	A
Aaby (2002)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Measles	Vaccination	Cohort	Children < 6 months	A
Aaby (2002)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Polio	Vaccination	Cohort	Children < 6 months	A
Aaby (2003)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Diphtheria, tetanus, pertussis	Vaccination	Cohort	Children < 6 months	A
Aaby (2003)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Measles	Vaccination	Cohort	Children < 6 months	A
Aaby (2003)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Polio	Vaccination	Cohort	Children < 6 months	A
Aaby (2005)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Diphtheria, tetanus, pertussis	Vaccination	Cohort	Children < 6 months	A
Aaby (2005)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Measles	Vaccination	Cohort	Children < 6 months	A
Aaby (2005)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Polio	Vaccination	Cohort	Children < 6 months	A
Ahmadzai (2008)	Afghanistan	Rural	General	Armed conflict	Acute crisis	Tuberculosis	DOTS	Cohort	All ages	B
Arumugam (2006)	India	Rural	General	Natural disaster	Acute crisis	Measles	Vaccination	Before/after	All ages	A
Bam (2007)	Nepal	Camp	Refugee	Armed conflict	Stabilized	Tuberculosis	DOTS	Cohort	All ages	A
Bansal et al (2007)	India	Urban	General	Natural disaster	Early recovery	Cholera	Rehydration	Before/after	All ages	C
Bansal et al (2007)	India	Urban	General	Natural disaster	Early recovery	Leptospirosis	Hospitalization	Before/after	All ages	C
Bansal et al (2007)	India	Urban	General	Natural disaster	Early recovery	Malaria	Antimalarials	Before/after	All ages	C
Bizuneh (1980)	Sudan	Camp	Refugee	Armed conflict	Acute crisis	Tuberculosis	TB treatment (pre DOTS)	Before/after	All ages	C
Bohler (2005)	Sudan	Urban	IDP	Armed conflict	Acute crisis	Tuberculosis	DOTS	Before/after	All ages	A
Bollag (1980)	Cambodia	Camp	Refugee	Armed conflict	Acute crisis	Typhoid	Vaccination	Cross sectional	All ages	C
Bourma (1996)	Pakistan	Rural	Refugee	Armed conflict	Acute crisis	Malaria	Insecticide spraying (environment)	Non random trial	All ages	A
Brand (2003)	Liberia	Urban	General	Armed conflict	Acute crisis	Cholera	Cholera treatment centre (undefined)	Before/after	All ages	C
Burns (2012)	Sierra Leone	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Insecticide treated polyethylene sheeting	RCT	All ages	A
Centers for Disease Control and Prevention (1995)	Sudan	Both	General	Armed conflict	Acute crisis	Diarrhoea_general	Oral rehydration	Cross sectional	All ages	C
Centers for Disease Control and Prevention (1995)	Sudan	Both	General	Armed conflict	Acute crisis	Dracunculiasis	Cloth filter distribution	Before/after	All ages	B
Centers for Disease Control and Prevention (1995)	Sudan	Both	General	Armed conflict	Acute crisis	Measles	Vaccination	Cross sectional	All ages	C

Centers for Disease Control and Prevention (1995)	Sudan	Both	General	Armed conflict	Acute crisis	Onchocerciasis	Mass drug administration	Before/after	All ages	B
Centers for Disease Control and Prevention (1995)	Sudan	Both	General	Armed conflict	Acute crisis	Polio	Vaccination	Cross sectional	All ages	C
Centers for Disease Control and Prevention (1995)	Sudan	Both	General	Armed conflict	Acute crisis	Tuberculosis	BCG vaccination	Cross sectional	All ages	C
Centers for Disease Control and Prevention (2003)	Afghanistan	Both	General	Armed conflict	Acute crisis	Measles	Vaccination	Before/after	Children <1	B
Coninx (1998)	Mozambique	Both	General	Armed conflict	Acute crisis	Diphtheria, tetanus, pertussis	Vaccination	Cross sectional	Children < 5 years	C
Coninx (1998)	Mozambique	Both	General	Armed conflict	Acute crisis	Measles	Vaccination	Cross sectional	Children < 5 years	C
Coninx (1998)	Mozambique	Both	General	Armed conflict	Acute crisis	Polio	Vaccination	Cross sectional	Children < 5 years	C
Coninx (1998)	Mozambique	Both	General	Armed conflict	Acute crisis	Tuberculosis	BCG vaccination	Cross sectional	Children < 5 years	C
De Beer	South Sudan	Urban	Refugee	Armed conflict	Acute crisis	Visceral leishmaniasis	Sodium stibogluconate	Before/after	All ages	C
Depoortere (2005)	Zambia	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Antimalarials	RCT	All ages	A
Djeddah (1988)	Africa' (camp A B)	Camp	Refugee	Armed conflict	Natural disaster	Cholera	Oral rehydration; antibiotic	Before/after	All ages	A
Dorelencourt (1999)	Uganda	Camp	Refugee	Armed conflict	Early recovery	Cholera	Vaccination	Before/after	All ages	A
Elsayed (2004)	Sudan	Both	Refugee	Armed conflict	Acute crisis	Measles	Vaccination	Cross sectional	Children <5 years	B
Garenne (1997)	Mozambique	Both	General	Armed conflict	Stabilised	Diarrhoea, general	Vaccination	Cohort	Children < 5 years	A
Garenne (1997)	Mozambique	Both	General	Armed conflict	Stabilised	Diphtheria, tetanus, pertussis	Vaccination	Cohort	Children < 5 years	A
Garenne (1997)	Mozambique	Both	General	Armed conflict	Stabilised	Measles	Vaccination	Cohort	Children < 5 years	A
Galy (2006)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Diarrhoea	Antibiotic therapy	RCT	All ages	A
Galy (2006)	Guinea Bissau	Urban	General	Armed conflict	Early recovery	Respiratory infections	Antibiotic therapy	RCT	All ages	A
Goma Epidemiology Group (1995)	Zaire	Camp	Refugee	Armed conflict	Acute crisis	Cholera	WASH (point of use)	Before/after	All ages	B
Goma Epidemiology Group (1995)	Zaire	Camp	Refugee	Armed conflict	Acute crisis	Meningitis	Antibiotic therapy	Before/after	All ages	B
Goma Epidemiology Group (1995)	Zaire	Camp	Refugee	Armed conflict	Acute crisis	Shigella	Vaccination	Before/after	All ages	B
Gonzaga (1998)	Kenya	Camp	Refugee	Armed conflict	Acute crisis	Intestinal helminths	Anthelmintics	Before/after	All ages	A
Gonzaga (1998)	Kenya	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Antimalarials	Before/after	All ages	A
Gorbacheva (2010)	Nepal	Camp	Refugee	Armed conflict	Stabilised	Tuberculosis	Active case-finding; Directly Observed Treatment Short course (DOTS)	Cross sectional	All ages	C
Greikspoor (1999)	Sudan	Rural	General	Armed conflict	Acute crisis	Leishmaniasis	Sodium stibogluconate	Economic study	All ages	A

Gustafson (2001)	Guinea Bissau	Urban	General	Armed conflict	Acute crisis	Tuberculosis	Directly Observed Therapy Short course (DOTS)	Before/after	All ages	A
Habib (2010)	Pakistan	Camp	General	Natural disaster	Acute crisis	Diarrhoea_general	Zinc provision	Cohort	All ages	A
Haelterman (1996)	Democratic Republic of Congo	Camp	IDP	Armed conflict	Acute crisis	Meningitis	Vaccination	Before/after	All ages	A
Heidal (1997)	Nicaragua	Urban	General	Armed conflict	Stabilized	Tuberculosis	TB treatment (pre DOTs)	Before/after	All ages	B
Heyman et al (1997)	Zaire	Camp	Refugee	Armed conflict	Acute crisis	Cholera	Fluid therapy	Before/after	All ages	A
Heyman et al (1997)	Zaire	Camp	Refugee	Armed conflict	Acute crisis	Shigella	Antibiotic therapy	Before/after	All ages	A
Hindiye (2009)	Palestine	Camp	Refugee	Armed conflict	Acute crisis	Mumps	Vaccination	Before/after	Children <15	B
Homeida (1988)	Sudan	Urban	General	Natural disaster	Acute crisis	Malaria	Antimalarials	Before/after	All ages	B
Homeida (1988)	Sudan	Urban	General	Natural disaster	Acute crisis	Shigella	Antibiotic therapy	Before/after	All ages	B
Huhn (2006)	Liberia	Camp	IDP	Armed conflict	Acute crisis	Yellow fever	Vaccination	Before/after	All ages	B
Isaza (1980)	Honduras	Camp	Refugee	Natural disaster	Acute crisis	Diarrhoea_general	Rehydration	Before/after	Children < 2 years	A
Jacquet (2006)	Haiti	Both	General	Natural disaster	Acute crisis	Tuberculosis	Directly Observed Therapy Short course (DOTS)	Before/after	All ages	A
Kamugisha (2003)	Tanzania	Camp	Refugee	Armed conflict	Acute crisis	Measles	Vaccination	Cross sectional	Children <15 years	B
Keittivuti (1984)	Thailand	Camp	Refugee	Armed conflict	Acute crisis	Schistosomiasis	Antibiotic therapy	Non random trial	All ages	B
Keus (2003)	South Sudan	Rural	General	Armed conflict	Acute crisis	Tuberculosis	TB treatment_HRZE	Before/after	All ages	B
Legros (1999)	Sudan	Camp	Refugee	Armed conflict	Acute crisis	Cholera	Vaccination	Economic study	All ages	B
Majambere (2010)	Gambia	Both	General	Natural disaster	Stabilised	Malaria	Microbial larvicide	Non random trial	All ages	A
Mallik (2011)	India	Both	General	Natural disaster	Early recovery	Measles	Vaccination	Cross sectional	Children <5 years	C
Marfin (1994)	Nepal	Camp	Refugee	Armed conflict	Stabilised	Cholera	Rehydration	Before/after	All ages	B
Marfin (1994)	Nepal	Camp	Refugee	Armed conflict	Stabilised	Measles	Vaccination	Before/after	All ages	B
Marfin (1994)	Nepal	Camp	Refugee	Armed conflict	Stabilised	Meningitis	Vaccination	Before/after	All ages	B
Marfin (1994)	Nepal	Camp	Refugee	Armed conflict	Stabilised	Shigella	Antibiotic therapy	Before/after	All ages	B
Martins (2006)	East Timor	Both	General	Armed conflict	Stabilised	Tuberculosis	Directly Observed Therapy Short course (DOTS)	Before/after	All ages	B
Mastro (1988)	Thailand	Camp	Refugee	Armed conflict	Acute crisis	Tuberculosis	TB treatment (pre DOTs)	Before/after	All ages	B
Matthys (1998)	Democratic Republic of Congo	Camp	Refugee	Armed conflict	Acute crisis	Cholera	Rehydration	Before/after	All ages	C
Mauch (2010)	Afghanistan,	Both	General	Armed conflict	Acute crisis	Tuberculosis	Directly Observed Therapy Short course (DOTS)	Before/after	All ages	A
Mauch (2010)	Democratic Republic of Congo	Both	General	Armed conflict	Acute crisis	Tuberculosis	Directly Observed Therapy Short course (DOTS)	Before/after	All ages	A
Mauch (2010)	Haiti	Both	General	Armed conflict	Acute crisis	Tuberculosis	Directly Observed Therapy Short course (DOTS)	Before/after	All ages	A
Mauch (2010)	Somalia	Both	General	Armed conflict	Acute crisis	Tuberculosis	Directly Observed Therapy Short course (DOTS)	Cohort	All ages	A

M'Boussa (2002)	Democratic Republic of Congo	Both	General	Armed conflict	Acute crisis	Tuberculosis	Directly Observed Therapy Short course (DOTS)	Cohort	All ages	A
Miles (1984)	Cambodia	Camp	Refugee	Armed conflict	Acute crisis	Tuberculosis	TB treatment (pre DOTS)	Cohort	All ages	B
Minetti (2010)	Thailand	Camp	Refugee	Armed conflict	Acute crisis	Tuberculosis	TB treatment (pre DOTS, DOTS)	Cohort	All ages	A
Mupere (2005)	Uganda	Camp	IDP	Armed conflict	Acute crisis	Measles	Vaccination	Before/after	All ages	A
Myint (2011)	Myanmar	Both	General	Natural disaster	Acute crisis	Dengue	Education	Before/after	All ages	B
Myint (2011)	Myanmar	Both	General	Natural disaster	Acute crisis	Diarrhoea	Rehydration	Before/after	All ages	B
Myint (2011)	Myanmar	Both	General	Natural disaster	Acute crisis	Diphtheria, tetanus, pertussis	Vaccination	Before/after	All ages	B
Myint (2011)	Myanmar	Both	General	Natural disaster	Acute crisis	Malaria	Antimalarials; education	Before/after	All ages	B
Myint (2011)	Myanmar	Both	General	Natural disaster	Acute crisis	Measles	Vaccination	Before/after	All ages	B
Myint (2011)	Myanmar	Both	General	Natural disaster	Acute crisis	Tuberculosis	TB treatment	Before/after	All ages	B
Ndongosieme (2007)	Democratic Republic of Congo	Both	General	Armed conflict	Acute crisis	Tuberculosis	DOTS	Before/after	All ages	B
Norval (1998)	Cambodia	Both	General	Armed conflict	Stabilised	Tuberculosis	Directly Observed Therapy Short course (DOTS)	Before/after	All ages	A
Nosten (1996)	Thailand	Camp	Refugee	Armed conflict	Stabilised	Malaria	Vaccination	RCT	Children aged 2-15 years	A
Paquet (1995)	Rwanda	Camp	Refugee	Armed conflict	Acute crisis	Shigella	Antibiotic therapy	Before/after	All ages	A
Porter (1990)	Malawi	Camp	Refugee	Armed conflict	Acute crisis	Measles	Vaccination	Before/after	Children < 5 years	A
Rieder (1985)	Thailand	Both	General	Armed conflict	Acute crisis	Tuberculosis	TB treatment (pre DOTS)	Before/after	All ages	B
Roca (2011)	Tanzania	Camp	Refugee	Armed conflict	Stabilized	Malaria	Antimalarials	Before/after	All ages	A
Rowland (1994)	Pakistan	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Insecticide spraying (environment)	Before/after	All ages	A
Rowland (1996)	Pakistan	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Insecticide treated nets	Before/after	All ages	A
Rowland (1997)	Pakistan	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Insecticide treated nets	RCT	All ages	A
Rowland (1997)	Pakistan	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Indoor residual spraying	Before/after	All ages	A
Rowland (1999)	Pakistan	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Insecticide treated bednets; indoor residual spraying	Cohort	All ages	A
Rowland (1999)	Pakistan	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Insecticide treated sheets	RCT	All ages	A
Rowland (1999)	Pakistan	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Antimalarials	RCT	All ages	A
Rowland (2001)	Pakistan	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Indoor residual spraying	Cohort	All ages	A
Rowland (2002)	Pakistan	Camp	Refugee	Armed conflict	Acute crisis	Malaria	Insecticide treated nets	Cohort, cross sectional and case-control	All ages	A
Rowland (2004)	Pakistan	Camp	Refugee	Armed conflict	Acute crisis	Malaria	DEET repellent	RCT	All ages	A
Rutta (2001)	Tanzania	Camp	Refugee	Armed conflict	Acute crisis	Tuberculosis	Directly Observed Therapy Short course (DOTS)	Before/after	All ages	A

ANNEX 5:

DETAILS FOR SYSTEMATIC REVIEW ON COMMUNICABLE DISEASE CONTROL

Sources:

Published literature: Embase, Global Health, Medline.

Grey literature: R4D, MSF Field Research, UNHCR, UN-Habitat, WaterAid, SHARE, UN-Water

Secretariat of the United Nations Convention to Combat Desertification (UNCCD), UNDP, UNEP,

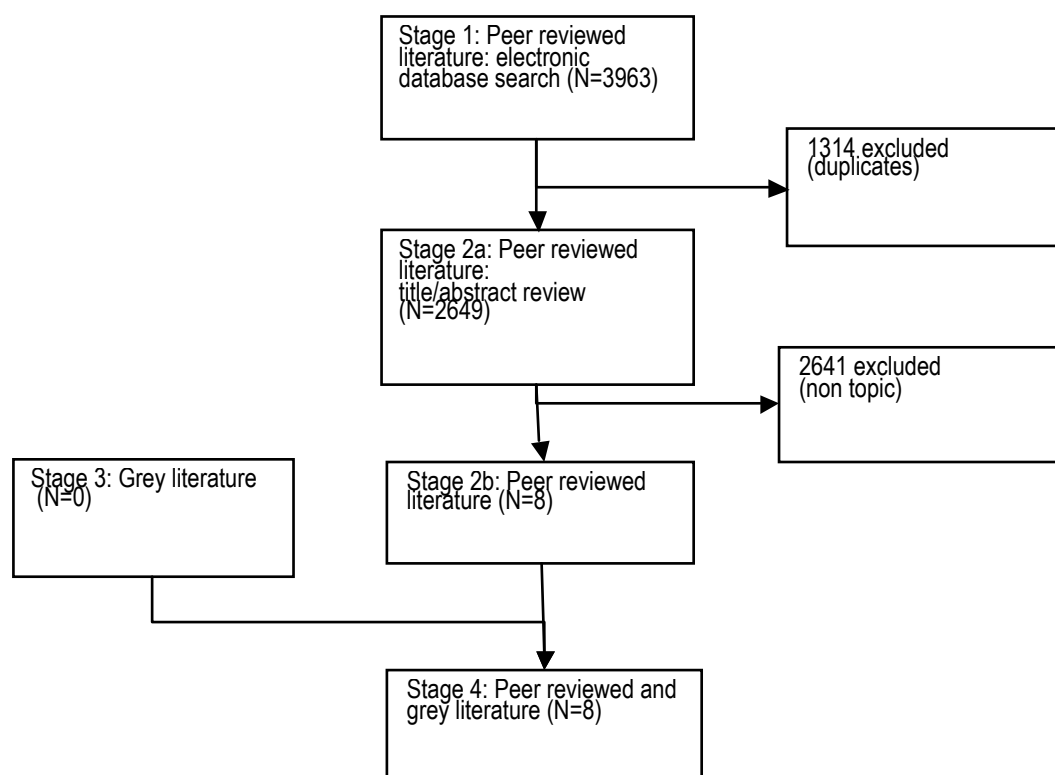
UN International Strategy for Disaster Reduction (UNISDR), International Water Resources Association (IWRA), Global

Water Partnership, International Water Association (IWA), Public Services International (PSI), Gender and Water

Alliance (GWA), Women for Water Partnership, Conservation International, Water.org, UN International Groundwater, Resources Assessment Centre (IGRAC).

Health topic specific search terms:

"Water" or "water supply" or "water source" or "body of water" or "water bodies" or "drinking water" or "fresh water" or "water pollutants" or "sanitation" or "septic tank" or "latrine" or "pit latrine" or "public water" or "private water" or "domestic water" or "toilet" or "feces" or "faeces" or "defecation" or "hygiene" or "WASH" or "watsan" or "drainage" or "latrine" or "septic tank" or "hygiene" or "hand washing" or "handwashing" or "hand hygiene" or "soap" or "detergent" or "bore well" or "borewell" or "point of use" or "water provision" or "faecal-oral disease" or "fecal-oral disease" or "hygiene promotion" or "open defecation" or "flying latrines" or "interagency plastic slab" or "Oxfam bucket" or "water table" or "faecal sludge" or "waste disposal" or "waste treatment"



Study authors/year	Study country	Setting	Population type	Humanitarian crisis type	Crisis stage	Health outcome(s)	Type(s) of health interventions	Study design	Target age group	Evidence category
Doocy et al (2006)	Liberia	Camp	IDP	Armed conflict	Acute crisis	Diarrhoea (general)	Safe water storage; flocculant disinfectant (PuR)	RCT	All > five	A
Dunston et al (2001)	Madagascar	Rural	General population	Natural disaster	Emergency	Cholera	Water treatment (sodium hypochlorite: Sur'Eau)	Economic study	All	C
Elarousi et al (2009)	Sudan	Camp	IDP	Armed conflict	Acute crisis	Diarrhoea (general)	Household iodinated water filter (Lifestraw)	Non random trial	All	A
Moll (2007)	El Salvador, Guatemala, Honduras, Nicaragua	Both	IDP	Natural disaster	Acute crisis; early recovery	Diarrhoea (general)	Safe water storage (provision, upgrades); latrines (pour, flush, VIP, or composting) WASH education	Controlled before/after	Children < 3	A
Peterson (1998)	Malawi (Mozambique refugees)	Camp	Refugee	Armed conflict	Early recovery	Diarrhoea (general)	Soap distribution	Controlled before/after	All	A
Reller et al (2001)	Madagascar	Rural	General population	Natural disaster	Acute crisis	Cholera	Water treatment (sodium hypochlorite: Sur'Eau); hand washing; safe water storage	Case-control	All	A
Roberts (2001)	Malawi	Camp	Refugee	Armed conflict	Early recovery	Diarrhoea (general)	Safe water storage (provision); WASH education	RCT	All, children < 5	A
Walden (2005)	Sudan	Camp	IDP	Armed conflict	Acute crisis	Shigella, diarrhoea (general)	Mass water container disinfection	Controlled before/after	All	B

ANNEX 6:

DETAILS FOR SYSTEMATIC REVIEW ON NUTRITION

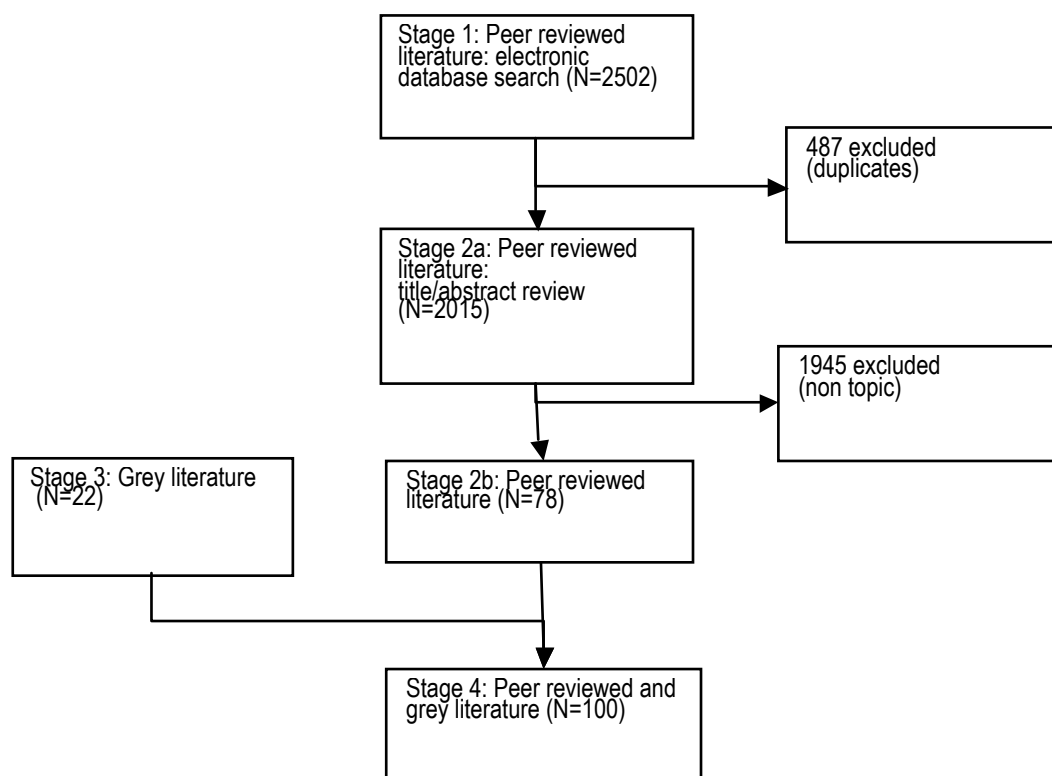
Sources:

Published literature: Embase, Global Health, Medline.

Grey literature: Emergency Nutrition Network, The Global Nutrition Cluster, The United Nations Standing Committee on Nutrition, CMAM forum, The International Lipid-Based Nutrient Supplements Project, the e-Library of Evidence for Nutrition Actions, Humanitarian Practice Network.

Health topic specific search terms:

Malnutrition or under-nutrition or nutrition or malnourished or wasted or wasting or ((arm or midarm or mid-arm or mid-upper arm) and circumference) or MUAC or weight-for-height or weight-for-length or WHZ or WHM or weight- for- age or WAZ or height- for-age or HAZ or kwashiorkor or nutritional deficiency or nutrition disorder or protein-energy malnutrition or starvation or hunger or micronutrient deficiency or food fortification or vitamin or multi-micronutrient sprinkles or scurvy or vitamin C deficiency or pellagra or niacin deficiency or beriberi or thiamine deficiency or goitre or iodine deficiency or breastfeeding or complementary food or nutrition assessment or nutrition survey or nutrition surveillance or malnutrition prevalence or supplementary feeding or selective feeding or therapeutic feeding or feeding centre or stabilisation centre or outpatient therapeutic care or outpatient therapeutic programme or therapeutic food or ready-to use therapeutic food or RUTF or ready to use supplementary food or RUSF or lipid based supplement or fortified milk or high energy milk or vitamin mix or micronutrient powder or mineral mix or food aid or food relief or general food distribution or general ration distribution or targeted food distribution or cash or voucher.



Summary data extraction table:

Study authors (year)	Study country	Setting	Population type	Humanitarian crisis type	Crisis stage	Health outcome(s)	Type(s) of health interventions	Study design	Target age group 1	Target age group 2	Evidence category
Aaby et al (1999)	Guinea-Bissau	Rural & urban	IDP & general	Armed conflict	Acute Crises	Acute malnutrition, Mortality	GFD	Follow-up	9 to 24 months		A
ACF (1999)	Burundi			Armed conflict			Treatment of SAM	Follow-up	6 to 59 months		C
Adhisivam et al (2006)	India	Rural	General	Natural disaster	Stabilised/early recovery	Diarrhoea	IYCF	Cross-sectional	< 6 months	6 to 59 months	A
Amthor et al (2009)	Malawi	Rural	General	Natural disaster	Acute Crises	Acute malnutrition	Treatment of SAM	Follow-up	6 to 59 months		A
Andersson et al (2010)	Federation of Bosnia and Herzegovina & Republica Srpska	Rural & urban	General	Armed conflict	Acute Crises	Acute malnutrition	IYCF	Cross-sectional	<1 year	6 to 59 months	A
Andersson et al (2012)	Bosnia and Herzegovina	Rural & urban	General	Armed conflict	Acute Crises		GFD	Cross-sectional	All		C
Baquet et al (2000)	Angola	Rural	IDP	Armed conflict			Address micro-nutrient deficiencies	Follow-up	All	15 years +	C
Bielik et al (1981)	Uganda		General	Natural disaster			GFD	Cross sectional	6 to 59 months	all	C
Bilukha et al (2011)	Nepal	Camps	Refugee	Armed conflict	Stabilised/early recovery	Anaemia, Acute malnutrition, Chronic malnutrition, Underweight	Address micro-nutrient deficiencies	Cross sectional	6 to 59 months		A
Briend et al (1999)	Chad	Urban	General	Armed conflict	Stabilised/early recovery	Acute malnutrition	Treatment of SAM	Follow-up	12-59 months		A
Brown (1997)	Kenya	Rural & urban	General	Natural disaster	Acute Crises	Acute malnutrition	BSFP & Treatment of SAM & TSFP	Follow-up	6 to 59 months	PLW	B
Buchanan-Smith et al (1999)	Kenya	Rural	General	Natural disaster	Acute Crises	Acute malnutrition	GFD & TSFP	Cross sectional	6 to 59 months, elderly	all	B
Bush (1995)	Kenya	Rural	General	Natural disaster	Acute Crises	Acute malnutrition	GFD	Cross-sectional	6 to 59 months		B
Caldwell (2004)	Multiple (Ethiopia, South Sudan, Malawi)			Both			Treatment of SAM	Cost-effectiveness	6 to 59 months		C
CDC, 2012	Kenya	Rural & urban	General	Natural disaster	Acute crises	Acute malnutrition	BSFP	Prospective cohort	6 to 36 months	PLW	A
Chuang et al (2003)	Afghanistan	Rural	General	Natural disaster			Address micro-nutrient deficiencies	Follow-up			C
Collins et al (1998)	Somalia	Urban	General	Both	Acute crises	Acute malnutrition	Treatment of SAM	Follow-up	Adults		A
Collins et al (2002)	Ethiopia	Rural	General	Natural disaster	Acute crises	Acute malnutrition	Treatment of SAM	Prospective cohort	6-120 months		B
Collins et al (2006)	Multiple (Malawi, Ethiopia, North & South Sudan)	Rural & urban	Multiple	Both	Multiple	Acute malnutrition	Treatment of SAM	Follow-up	6 to 59 months		B
Collins (1993)	Somalia	Urban	General	Armed conflict	Acute Crises	Acute malnutrition	Treatment of SAM	Follow-up	Adults		B
Colombatti et al (2008)	Guinea-Bissau	Urban	General	Armed conflict	Stabilised/early recovery	Underweight	TSFP	Follow-up	1m to 17 years		B
Corbett (2000)	Liberia			Armed conflict			Treatment of SAM	Follow-up	< 6 months		C
Cosgrave et al (2010)	Sudan		IDP & general	Both			GFD & TSFP	Follow-up			C

De Waal et al (2006)	Ethiopia	Rural & urban	General	Natural disaster	Stabilised/early recovery	Mortality	GFD	Cross sectional	6 to 59 months		A
Defourny et al (2009)	Niger	Rural	General	Natural disaster	Preparedness	Acute malnutrition	BSFP	Cross sectional & Follow-up	6 to 36 months		A
Desenclos et al (1989)	Somalia & Sudan		Refugee	Both	Acute crises	Scurvy	Address micro-nutrient deficiencies	Cross sectional	All		A
Desjeux et al (1998)	Multiple (Angola, Chad, Burundi, Tanzania)		Refugee	Both	Multiple	Acute malnutrition	Treatment of SAM	Follow-up	6 to 59 months		B
Dodge et al (1986)	Uganda		General	Both			TSFP	Follow-up	6 to 59 months		C
Donnen et al (1998)	DRC	Rural & urban	General	Armed conflict	Acute crises	Growth (MUAC, Weight, Height)	Address micro-nutrient deficiencies	RCT	0-72 months		A
Doocy et al (2005)	Ethiopia	Rural & urban	General	Natural disaster	Acute crises	Acute malnutrition	Microfinance program	Cross sectional	Adults	6 to 59 months	A
Dubray et al (2007)	Sudan	Urban	IDP	Armed conflict	Stabilised/early recovery	Acute malnutrition	Treatment of SAM	RCT	6 to 59 months		A
Dzumhur et al (1995)	Bosnia and Herzegovina	Urban	General	Armed conflict	Acute crises	Underweight	Treatment of SAM	Follow-up	1 to 14 years		B
Fawzi et al (1997)	Sudan	Rural	General	Both	Stabilised/early recovery	Growth (Weight, Height, Acute malnutrition, Chronic Malnutrition)	Address micro-nutrient deficiencies	Follow-up	6-72 months		A
Gaboulaud et al (2007)	Niger	Rural & urban	General	Natural disaster	Stabilised/early recovery	Acute malnutrition	Treatment of SAM	Follow-up	6 to 59 months		B
Gibb (1986)	Sudan		Refugee	Armed conflict	Stabilised/early recovery	Acute malnutrition	TSFP	Follow-up	6 to 59 months		B
Greco et al (2006)	Uganda	Rural & urban	General	Armed conflict	Stabilised/early recovery	Acute malnutrition	Treatment of SAM	Follow up	6 to 59 months		A
Grellety et al (2012)	Niger	Rural	General	Natural disaster	Preparedness	Acute malnutrition, Chronic Malnutrition, Mortality	BSFP	Cohort	6 to 24 months		A
Guerrero et al (2010)	Multiple (Ethiopia, North & South Sudan, Malawi, Niger, DRC)			Both			Treatment of SAM	mix-methods	6 to 59 months		C
Hall et al (2011)	Kenya	Rural & urban	General	Natural disaster	Stabilised/early recovery		BSFP	follow up	6 to 59 months		C
Hamad et al (2009)	Palestine	Urban	General	Armed conflict	Acute crises	Anaemia, Acute malnutrition, Chronic malnutrition, Underweight	Address micro-nutrient deficiencies & TSFP	Follow-up	6 to 36 months		B
Hipgrave et al (2012)	Indonesia	Rural & urban	General	Natural disaster	Acute crises	Diarrhoea	IYCF	Cross sectional	<24 months		A
Hossain et al (2003)	Bangladesh	Rural	General	Natural disaster	Acute crises	Acute malnutrition	GFD	Cross sectional	6 to 59 months		A
Hossain et al (2009)	Pakistan	Rural	General	Natural disaster	Acute crises	Acute malnutrition	GFD	Cross sectional	6 to 59 months		A

Huybregts et al (2012)	Chad	Urban	General	Both	Preparedness	Anaemia, Acute malnutrition, Chronic malnutrition, Malaria/fever, Diarrhoea, ARI/ Cough	BSFP	RCT	6 to 36 months		A
Isanaka et al (2009)	Niger	Rural	General	Natural disaster	Preparedness	Acute Malnutrition, Chronic Malnutrition, Mortality, Malaria/ fever, Diarrhoea, ARI/ Cough.	BSFP	RCT	6 to 59 months		A
Isanaka et al (2010)	Niger	Rural	General	Natural disaster	Preparedness	Acute Malnutrition, Chronic Malnutrition, Mortality, Malaria, Diarrhoea, and ARI.	BSFP	Cohort	6 to 36 months		A
Jakobsen et al (2003)	Guinea Bissau	Urban	General	Armed conflict	Acute Crises	Mortality	IYCF	Cohort	9-35months		A
Jayatissa et al (2012)	Sri Lanka	Rural & urban	IDP & general	Both	Stabilised/early recovery	Acute malnutrition	Treatment of SAM & TSFP	Cross sectional	6 to 59 months		B
Kassim et al (2012)	Kenya	Rural	Refugee	Armed conflict	Acute Crises	Iodine deficiency/ excess	Address micro-nutrient deficiencies	Cross sectional	Pregnant women		A
Khatib et al (2010)	Jordan	Rural	Refugee	Armed conflict			GFD	Cross sectional			C
Kopplow (2003)	Afghanistan	Rural	General	Both	Acute crises	Acute malnutrition	TSFP	Cross sectional	6 to 59 months	15 years +	B
Kumar et al (2005)	India	Rural	General	Natural disaster	Acute crises	Underweight	TSFP	Cross sectional	6 to 59 months		B
Lopriore et al (1999)	Algeria	Rural	Refugee	Armed conflict	Stabilised/early recovery	Anaemia, Chronic Malnutrition	Address micro-nutrient deficiencies	Cross sectional	6 to 59 months		A
Lopriore et al (2004)	Algeria	Rural	Refugee	Armed conflict	Stabilised/early recovery	Anaemia, Growth (Weight, Height, Acute malnutrition, Chronic Malnutrition, Underweight)	Address micro-nutrient deficiencies	RCT	3 to 6 years old		A
Luxemburger et al (2003)	Thailand	Rural	Refugee	Armed conflict	Acute Crises	Vitamin B1 deficiency	Address micro-nutrient deficiencies	Cohort	1		A
Magoni et al (2008)	Palestine	Urban	General	Armed conflict	Acute crises	Anaemia, Acute malnutrition, Chronic malnutrition, Underweight	Address micro-nutrient deficiencies & TSFP	Cross sectional	6 to 59 months		A
Malfait et al (1993)	Malawi	Rural	Refugee	Armed conflict	Acute Crises	Niacin deficiency	Address micro-nutrient deficiencies	Case-Control	All		A
Mange et al (1992)	Thailand	Rural	Refugee	Armed conflict	Acute Crises	Acute malnutrition	GFD & TSFP	Cross sectional	6 to 59 months		B
Mattinen (2008)	Sudan	Rural	IDP	Armed conflict	Acute crises	Acute malnutrition	BSFP	Cross sectional	6 to 59 months		B
Matunga et al (2012)	Somalia	Rural & urban	IDP & general	Both	Acute crises	Acute malnutrition	Treatment of SAM & TSFP	Follow-up	6 to 59 months		B
Menon et al (2007)	Haiti	Rural	General	Natural disaster	Stabilised/early recovery	Anaemia	Address micro-nutrient deficiencies	RCT	9-23months		A

Mumro (2002)	Zimbabwe	Rural	General	Natural disaster	Stabilised/early recovery	Acute malnutrition	BSFP	Cross sectional	6 to 59 months		C
Nackers et al (2010)	Niger		General	Natural disaster	Stabilised/early recovery	Acute malnutrition	TSFP	RCT	6 to 59 months		A
Navarro-Colorado et al (2005)	Sierra Leone	Urban	IDP & general	Armed conflict	Acute crises	Acute malnutrition	Treatment of SAM	Follow-up	12 to 59 months		A
Ndemwa et al (2011)	Kenya	Camp	Refugee	Armed conflict	Acute Crises	Anaemia	Address micro-nutrient deficiencies	Cohort	6 to 59 months	18 to 49 years	A
Nielsen et al (2004)	Guinea-Bissau	Urban	IDP & general	Armed conflict	Acute crises	Acute malnutrition, Mortality	TSFP	Follow-up	6 to 59 months		B
Nielsen et al (2005)	Guinea-Bissau	Urban	IDP & general	Armed conflict	Acute crises	Mortality	Address micro-nutrient deficiencies	Follow-up	6 to 59 months		A
Pecoul et al (1992)	Niger	Urban	General	Natural disaster	Stabilised/early recovery	Acute malnutrition	Treatment of SAM	Retrospective and prospective cohorts	6 to 59 months		B
Pee et al (2007)	Indonesia		General	Natural disaster			Address micro-nutrient deficiencies	Cross sectional	6 to 59 months		C
Quisumbing (2003)	Ethiopia	Rural	General	Natural disaster	Stabilised/early recovery	Acute malnutrition, Chronic malnutrition	GFD & Food for work	Cross sectional	0 to 10 years	15 to 65 years	A
Rah et al (2011)	Bangladesh	Rural	General	Natural disaster	Stabilised/early recovery	Anaemia, Acute malnutrition, Chronic malnutrition, Underweight, Diarrhoea	Address micro-nutrient deficiencies	Mix-methods	6 to 59 months	Adult and 13 to 18 years	A
Reed et al (1998)	DRC	Urban	Refugee	Armed conflict		Acute malnutrition	GFD	Cross-sectional	All		C
Roesel et al (1988)	Thailand	Rural	Refugee	Armed conflict	Stabilised/early recovery	Acute malnutrition	TSFP	Follow-up	6 to 59 months	women	B
Rossi et al (2006)	DRC		General	Armed conflict			Treatment of SAM & TSFP	Cross sectional	6 to 59 months	6 to 18 years	C
Rossi et al (2007)	Burundi	Rural & urban	General	Both	Stabilised/early recovery	Acute malnutrition	Treatment of SAM & TSFP	Follow-up	6 to 59 months	All	B
Sadler (2001)	Ethiopia	Rural	General	Natural disaster	Acute crises	Acute malnutrition	Treatment of SAM & TSFP	Cross sectional	6 to 59 months	PLW	B
Sadler et al (2007)	Malawi	Rural & urban	General	Natural disaster	Stabilised/early recovery	Acute malnutrition	Treatment of SAM	Cross sectional	6 to 59 months		B
Seal et al (2005)	Multiple (Kenya, Uganda, Ethiopia, Algeria)		Refugee	Armed conflict			Address micro-nutrient deficiencies	Cross-sectional	6 to 59 months		C
Seal et al (2007)	Angola	Rural & urban	General	Armed conflict	Stabilised/early recovery	Niacin deficiency	Address micro-nutrient deficiencies	Cross-sectional	6 to 59 months	non pregnant women (ages 15–49 y)	A
Seal et al (2008)	Zambia	Rural	Refugee	Armed conflict	Stabilised/early recovery	Vitamin A and iron status	Address micro-nutrient deficiencies	Cohort	5	3 + women (20–49 years)	A
Seguin et al (2010)	Kenya & RCA	Rural & urban	General	Natural disaster	Acute crises		Treatment of SAM	Cross sectional	6 to 59 months		C
Skau et al (2009)	Ethiopia	Rural	General	Natural disaster	Stabilised/early recovery	Acute malnutrition	TSFP	Cohort	6 to 59 months	PLW	A

Stuetz et al (2012)	Thailand	Rural	Refugee	Armed conflict	Stabilised/early recovery	Iron, Vit A, Thiamin, Zinc deficiencies	Address micro-nutrient deficiencies	Cross sectional			A
Talley et al (2009)	Tanzania	Rural	Refugee	Armed conflict	Stabilised/early recovery	Anaemia	Address micro-nutrient deficiencies	Cross sectional	6 to 59 months		A
Tansey et al (2007)	Sudan	Rural	IDP	Armed conflict	Acute Crises	Anaemia	Address micro-nutrient deficiencies	Follow-up	6 to 59 months		A
Taylor (1983)	Somalia	?	IDP	Both	Acute crises	Acute malnutrition	TSFP	Follow-up	6 to 59 months	PLW + TB/ill people	B
Tekeste et al (2011)	Ethiopia	Rural & urban	General	Natural disaster	Stabilised/early recovery	Acute malnutrition	Treatment of SAM	Cost effectiveness	6 to 59 months		A
Therry (2005)	Afghanistan	Urban	General	Armed conflict	Stabilised/early recovery	Acute malnutrition	Treatment of SAM	Follow-up	6 to 59 months		B
Tomashek et al (2001)	Tanzania	Rural	Refugee	Armed conflict	Stabilised/early recovery	Anaemia	Address micro-nutrient deficiencies	RCT	6 to 59 months		A
Toole et al (1988)	Sudan & Thailand	Rural	Refugee	Both	Acute crises	Acute malnutrition, Mortality	BSFP & Treatment of SAM & TSFP	Mix-methods	6 to 59 months	ALL	B
Toole et al (1992)	Ethiopia	Rural	Refugee	Armed conflict	Acute crises	Acute malnutrition, Mortality	BSFP	Cross sectional	6 to 59 months		B
Trenouth et al (2009)	Kenya	Urban	Refugee	Armed conflict			Voucher	Follow-up	6 to 59 months		C
Vautier et al (1999)	Liberia, Burundi, DRC	Rural & urban	IDP & general	Armed conflict	Acute crises	Acute malnutrition	TSFP	Follow-up	6 to 59 months		B
Vazquez-Garcia (1998)	Kenya	Rural & urban	IDP & general	Natural disaster	Acute crises	Acute malnutrition	TSFP	Follow-up	6 to 59 months		B
Vincent et al (2007)	Thailand/Burma border	Rural	Refugee	Armed conflict			Address micro-nutrient deficiencies	Cross sectional	under 6 years	6 months to 12 years	C
WFP (1998)	Bosnia and Herzegovina		General	Armed conflict			GFD	Cross sectional			C
Widyastuti et al (2006)	Indonesia		General	Natural disaster			Address micro-nutrient deficiencies & GFD	Cross sectional			C
Young et al (1988)	Ethiopia & Sudan		Refugee & general	Both			TSFP	Cost effectiveness			C

Note: Empty cells are for C grade papers (low evidences category) as these were not evaluated in detail

ANNEX 7:

DETAILS FOR SYSTEMATIC REVIEW ON NUTRITION

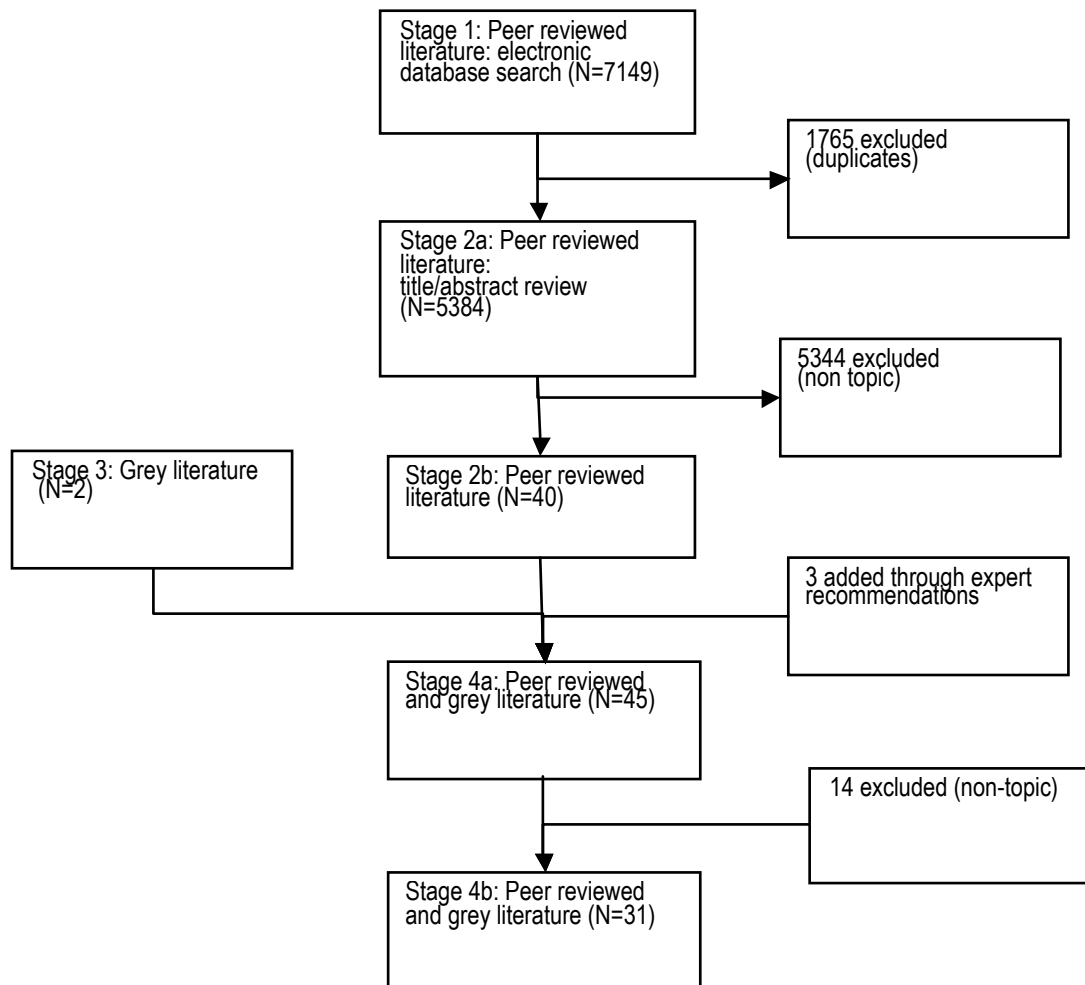
Sources:

Published literature: Embase, Global Health, and Medline.

Grey literature: R4D, Reproductive Health Response in Crisis Consortium (RHRC), MSF Field Research, UNFPA, RAISE Initiative, lawg.net, Save the Children, The International Rescue Committee (IRC), CARE, ICRC, International Planned Parenthood Federation (IPPF), AIDS Alliance, Marie Stopes International (MSI).

Health topic specific search terms:

sexual health or sexual health or reproductive health or sexual and reproductive health or maternal health or maternal welfare or neonatal health or perinatal care or perinatal health or prenatal care/ or prenatal health or ante\$natal health or post\$natal health or post\$part* or newborn health or family planning or family planning or contracepti* or condom\$ or pregnan* or abortion or induced abortion or abort* or birth or miscarriage or spontaneous abortion or stillb* or Minimum Initial Service Package or obstetric* or gyn\$ecology or maternal welfare or safe motherhood or emergency obstetric \$ care or EmO\$C or safe delivery or skilled birth attend* or sexually transmitted infection* or sexually transmitted disease* or HIV or Human immunodeficiency virus or AIDS or acquired immune deficiency syndrome or PMTCT or fistula or rectovaginal fistula or urethra fistula or fistula or urinary tract fistula or adolescent sexual health or adolescent reproductive health or genital trauma or genital injury or vaginal trauma or vaginal injury or gender?based violence or partner violence or family violence or violence against women or domestic violence or sexual abuse or sexual abuse or sex crime or sexual crime or domestic violence or domestic violence or sexual violence or rape or physical violence or rape or rape or intimate partner violence or partner violence or partner abuse or partner violence or partner violence or partner violence or assault or physical assault or sexual assault or sexual crime or sexual harassment or sexual harassment or sexual coercion or forced sex or sexual slavery



Study authors (year)	Study country	Setting	Population type	Humanitarian crisis type	Crisis stage	Health outcome(s)	Type(s) of health intervention	Study design	Target age group	Evidence category
SEXUAL & REPRODUCTIVE HEALTH										
Ahoua, L. (2010)	Uganda	Rural	General	Armed Conflict	Stabilised	Reduced MTCT, reduced neonatal deaths	PMCT	Cohort	Women of Reproductive Age (WRA) and <6 Months	A
Ameh, C. (2012)	Somalia	Camp	General	Armed Conflict	Early Recovery	Improved emergency obstetric outcomes	Capacity building for skilled birth attendants	Cohort	WRA	C
Ayoya, M (2013)	Haiti	Urban/ Camp	IDP	Natural Disaster	Acute	Decreased infant morbidity, malnutrition, and mortality	Breast-feeding tents	Cross-Sectional	<1 yrs	B
Carrara, V. I. (2011)	Thailand	Rural/ Camp	Refugee	Armed Conflict	Early Recovery	Improved maternal & new-born health	ANC clinic in camp; migrant ANC clinics	Cross-Sectional	WRA and <6 Months	A
Casey, S. E (2013)	Uganda	Rural	IDP	Armed Conflict	Early Recovery	Family planning service provision	Mobile outreach, Public health centre strengthening	Cross-Sectional	WRA	C
Ciccio, L. (2010).	Uganda	Rural	General	Armed Conflict	Early Recovery	Improved HIV knowledge, attitudes and practice	Adolescent prevention package: media campaign, peer counselling, life skills, youth activities	Cross-Sectional	10-19 yrs	B
Damme, W. V. (1998)	Guinea	Rural	General	Armed Conflict	Stabilised	Improved OB outcomes	Free access to health services for refugees in host population hospital	Cross-Sectional	WRA	A
Dolan, G. (1993)	Thailand	Camp	IDP	Armed Conflict	Stabilised	Reduced malaria incidence in pregnancy	Impregnated bed net provision	RCT	WRA	A
Gilbert, H et al. (2011).	Mozambique	Camp	Refugee	Armed Conflict	Stabilised	HIV/AIDS awareness, prevention, access to services & treatment	HIV/AIDS management programmes	Cross-Sectional	Unclear	C
Hussein, S. (2009)	Sudan	Camp	General	Armed Conflict	Stabilised	Perceived ability for surgical outcomes	Training of surgeons	Cross-Sectional	Unclear	C
Larsen, M. (2004)	Sierra Leone	Urban	General	Armed Conflict	Early Recovery	Increased knowledge of HIV/AIDS, condom use	HIV/AIDS prevention among high-risk populations (CSW, military)	Controlled Before-After	WRA and Adults (20-49 yrs)	B
Leigh, B. (1997)	Sierra Leone	Urban	General	Armed Conflict	Early Recovery	Improved emergency obstetric care	Staff hired and trained, hospital facilities improved	Controlled Before-After	WRA and Adults (20-49 yrs)	B
Mayaud, P (2001)	Tanzania	Rural	IDP	Natural Disaster	Stabilised	Train health workers on STIs/HIV/AIDS; improve treatment and cure rates; improve clinic attendance	Provision of STI/HIV/AIDS health care, condom supply and promotion, health promotion	Controlled Before-After	Unclear	B
McGinn, T. (2006)	Guinea	Camp	Refugee	Armed Conflict	Early Recovery	Improved literacy skills, SRH, and child health	Health-based literacy classes	Controlled Before-After	WRA	B
McPherson, R. A. (2006)	Nepal	Urban/ Rural	General	Armed Conflict	Early Recovery	Reduced maternal and new-born mortality	Birth preparedness package	Controlled Before-After	WRA	A
Miller, L. C. (1995)	Pakistan	Camp	Refugee	Armed Conflict	Stabilised	Improved health behaviours including breast feeding, nutrition, immunisation and hygiene	training traditional birth attendants	Cross-Sectional	WRA	B

Orach, C.G. (2007)	Uganda	Urban/ Rural	Refugee	Armed Conflict	Stabilised	Comparison of cost and cost-effectiveness of RH services for refugee and host populations	Economic calculations	Economic Study	WRA and Adults	A
Rutta, E. (2008)	Tanzania	Urban/ Rural	Refugee	Natural Disaster	Stabilised	PMCT; HIV testing acceptance rates; % of women who do post-test counselling; Nevirapine uptake; HIV prevalence among pregnant women and infants	Community sensitisation, healthcare trainings, voluntary testing and counselling, infant feeding, counselling and administration of Nevirapine	Cross-Sectional	<6 months	B
Purdin, S. (2009)	Pakistan	Urban/ Rural	Refugee	Armed Conflict	Stabilised	Reduced maternal mortality	Improving access to EmOC, improve community knowledge of danger signs, promote use of health information	Controlled Before-After	WRA	B
Raheel, H. (2012)	Pakistan	Urban	Refugee	Armed Conflict	Stabilised	Uptake of family planning	subsidised health care	Cross-Sectional	WRA	A
Samai, O. (1997)	Tanzania	Rural	IDP	Armed Conflict	Stabilised	Train health workers on STIs/HIV/AIDS; improve treatment and cure rates; improve clinic attendance	Provision of STI/HIV/AIDS health care, condom supply and promotion, health promotion	Controlled Before-After	Unclear	B
Samai, O. (1997)	Sierra Leone	Urban	General	Armed Conflict	Acute	Improved emergency obstetric outcomes	Implementing a car and motor bike scheme to reduce delays in seeking care for OB emergencies	Controlled Before-After	WRA	B
Schneider, J. (1999)	Angola	Urban/ Rural	General	Both	Acute	Reduced maternal mortality	TBA educational course	Case-Control	WRA	B
Shaikh, M.A. (2008)	Somaia	Camp	IDP	Both	Stabilised	Improved reproductive health outcomes	Creating GIS maps of camps to facilitate health visits	Controlled Before-After	WRA	B
Viswanathan, K (2012)	Afghanistan	Rural	Entrapped	Armed Conflict	Stabilised	Reduced MMR	Community health workers training	Cross-Sectional	WRA	B
Woodward, A. (2011)	Guinea	Camp	Refugee	Armed Conflict	Stabilised	Improved HIV knowledge, attitudes and practice	Peer-education	Cross-Sectional	Unclear	A
Bass (2013)	DRC	Rural	General	Armed Conflict	Acute	Mental health status following rape and psychological support	Psychological support to women who have been raped	RCT	Adults	A
GENDER BASED VIOLENCE										
Hustache, S. (2009)	Congo	Urban	General	Armed Conflict	Stabilised	Improved mental health	Psychological support to women who have been raped by combatants	Cohort	WRA	B
Jordans, M.J. (2010)	Nepal	Rural/Urban/Camp	General	Both	Early Recovery	Mental health status following conflict exposure	School-based psychosocial intervention	RCT	School Children	A
Reid, T. (2008)	Kenya	Camp	General	Armed Conflict	Stabilised	Use of HAART	comprehensive HIV programme, primary care clinic	Cross-Sectional	Unclear	C

ANNEX 8:

DETAILS FOR SYSTEMATIC REVIEW ON MENTAL HEALTH AND PSYCHOSOCIAL SUPPORT

Sources:

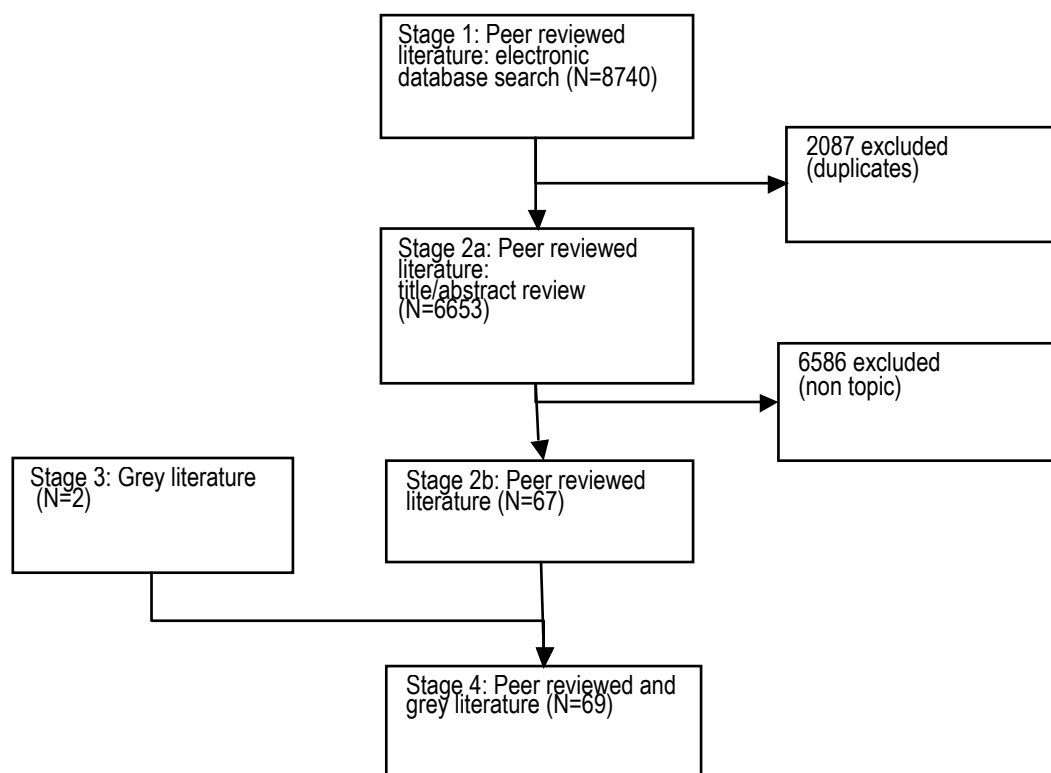
Published literature: Embase, Global Health, Medline, PsychInfo, PsychExtra

Grey literature: R4D, ReliefWeb, MSF Field Research, WHO, HealthNet-TPO, Global \

Initiative on Psychiatry, ALNAP, The Mental Health and Psychosocial Support Network, The Regional Psychosocial Support Initiative.

Health topic specific search terms:

psychosocial or mental or psychos* or mental disorders or psychiatr* or psychology or depress* or PTSD or post?traumatic stress disorder or neurotic or neuros* or anxiety or anxious or schizophrenic or schizothyme or mania or manic or delusion or OCD or phobia or phobic or somatic or somatoform or suicid* or dementia or alzheimer or epilepsy or alcohol or liquor or substance use or substance misuse or substance abuse or substance related disorders or psychotic or mood or affective or obsessive compulsive or panic or child behaviour or common mental disorder* or mental trauma or stress.



Study author, year	Study country	Setting	Population type	Humanitarian crisis type	Health outcome(s)	Intervention type (1)	Intervention type (2)	Intervention type (3)	Age group	Evidence category
Ager A et al, 2001	Uganda	Camp	IDPs	Armed conflict	Resilience	Play therapy	Recreational		School children	A
Ayoughi S, 2009	Afghanistan	Urban	General	Armed conflict	Depression, anxiety	Counselling			adults	A
Basoglu M et al, 2005	Turkey	Urban & rural	General	Natural disaster	PTSD	Behaviour therapy			adults	A
Basoglu M et al, 2003	Turkey	Urban & rural	General	Natural disaster	PTSD, depression	CBT			adults	A
Bass et al, 2013	DRC	Rural	General	Armed conflict	PTSD, depression/anxiety, functioning	CPT			adults	A
Bass J et al, 2012	Indonesia	Rural	General	Armed conflict	General mental health, functioning	Counselling			adults	A
Bastfin P et al, 2013	Lebanon	Camp	Refugees	Armed conflict	General mental health, functioning	Various (unspecified)			adults	B
Becker et al, 2009	India	Rural	General	Natural disaster	Distress, functioning	Mixed psychosocial			adults	A
Berger R et al, 2009	Sri Lanka	Rural	General	Natural disaster	PTSD, depression, somatic, functioning problems	School-based psychosocial			School children	A
Betancourt TS et al, 2012	Uganda	Camp	IDPs	Armed conflict	Depression	Psychotherapy	Play therapy	Recreational	adolescents	A
Bolton P et al, 2007	Uganda	Camp	IDPs	Armed conflict	Depression, anxiety	Psychotherapy	Activity-based		adolescents	A
Budosan B et al, 2009	Sri Lanka	Rural	General	Natural disaster	Training	Training			adults	A
Catani C, 2009	Sri Lanka	Rural	IDPs	Natural disaster	PTSD	Narrative exposure therapy	Mind-body techniques		School children	A
Constantinides et al 2011	Palestine	Urban & rural	General	Armed conflict	Psychosocial	Mixed psychosocial			adolescents	B
Descilo T et al, 2010	India	Urban & rural	General	Natural disaster	PTSD, depression	Yoga			adults	A
Dybdahl R, 2001	Bosnia and Herzegovina	Urban & rural	IDPs	Armed conflict	General mental health, functioning	Counselling			adults	A
Ferdos G et al, 2007	Iran	Urban & rural	General	Natural disaster	PTSD, coping	Problem solving training			adults	A
Gabouloud V et al, 2010	Palestine	Urban & rural	General	Armed conflict	PTSD, anxiety, mood disorder	Psychotherapy			School children	A
Gelkopf M et al, 2008	Sri Lanka	Urban & rural	General	Natural disaster	Training, resilience	Training	Mixed psychosocial		adults	A
Goenjian AK et al, 1997	Armenia	Urban	General	Natural disaster	PTSD, depression	Psychotherapy			adolescents	A
Goenjian AK et al, 2005	Armenia	Urban	General	Natural disaster	PTSD, depression	Psychotherapy			adolescents	A
Gordon et al, 2004	Kosovo	Urban & rural	General	Armed conflict	PTSD	Mind-body techniques			adolescents	B
Gordon JS et al, 2008	Kosovo	Urban & rural	General	Armed conflict	PTSD	Mind-body techniques			adolescents	A
Gupta L et al, 2008	Siera Leone	Camp	IDPs	Armed conflict	PTSD	Psychoeducation	Play therapy		School children	A
Hasonovic M et al, 2009	Bosnia and Herzegovina	Urban & rural	General	Armed conflict	PTSD	School-based psychosocial			School children	A
Hustache S et al, 2009	Republic of Congo	Urban	General	Armed conflict	PTSD, functioning anxiety	Psychological support			adults	A
Jiang R et al, 2010	China	Urban & rural	General	Natural disaster	General mental health	Unspecified			adults	A
Johnson C et al, 2001	Kosovo	Urban & rural	General	Armed conflict	PTSD	Thought Field Therapy			adults	A
Jordans et al, 2010	Nepal	Rural	General	Armed conflict	PTSD, depression, anxiety	School-based psychosocial			School children	A

Jordans et al, 2011	Burundi, Indonesia, Sudan, Sri Lanka	Urban & rural	General	Armed conflict	Various, cost	School-based psychosocial			School children	B
Karam EG et al, 2008	Lebanon	Rural	General	Armed conflict	PTSD, depression, anxiety	Mixed psychosocial			School children	A
Khamis V et al, 2004	Palestine	Urban & rural	General	Armed conflict	Functioning	School-based psychosocial			School children	B
Konuk E et al, 2006	Turkey	Urban & rural	General	Natural disaster	PTSD	Eye movement desensitisation & reprocessing			adults	A
Krishnaswamy S, et al 2012	Malaysia	Urban & rural	General	Natural disaster	Various	Play therapy	Behaviour therapy	Psychoeducation	adults	C
Layne CM et al, 2001	Bosnia and Herzegovina	Urban & rural	General	Armed conflict	PTSD, depression, functioning	Psychotherapy			School children	B
Layne CM et al, 2008	Bosnia and Herzegovina	Urban & rural	General	Armed conflict	PTSD	Psychoeducation	psychotherapy		adolescents	A
Le Roch K et al, 2010	Lebanon	Urban & rural	Refugees	Armed conflict	Unspecified	Mixed psychosocial			adults	B
Loughny M et al, 2006	Palestine	Urban & rural	General	Armed conflict	Behaviour, hopefulness, parental support	Recreational	Play therapy		School children	A
Madfis J et al, 2010	Haiti and Solomon Islands	Camp	IDPs	Natural disaster	Behaviour	Safe spaces			School children	B
Mahmoudi-Gharaei J et al, 2006	Iran	Urban	General	Natural disaster	PTSD	CBT			adolescents	A
Meng X et al, 2012	China	Urban & rural	General	Natural disaster	General mental health, functioning	Chinese herbal formula			adults	A
Mooren TT et al, 2003	Bosnia and Herzegovina	Urban & rural	General	Armed conflict	General mental health	Counselling			adults	B
Morris et al, 2012	Uganda	Camp	IDPs	Armed conflict	Maternal mood	Psychoeducation			adults	A
Mueller Y et al, 2011	Philippines	Urban & rural	IDPs	Armed conflict	General mental health, functioning	psychological first aid	psychotherapy		adults	A
Neuner F et al, 2004	Uganda	Camp	Refugees	Armed conflict	PTSD	Narrative exposure therapy	Counselling	Psychoeducation	adults	A
Neuner F et al, 2008	Uganda	Camp	Refugees	Armed conflict	PTSD	Narrative exposure therapy			adults	A
Pityaratstian et al, 2007	Thailand	Rural	General	Natural disaster	PTSD	CBT			School children	A
Priebe S et al, 2010	Serbia and Croatia	Urban & rural	General	Armed conflict	PTSD, functioning costs	Psychological support			adults	B
Qouta SR et al, 2012	Palestine	Urban	General	Armed conflict	PTSD	Recovery techniques			School children	A
Salcioglu E, 2007	Turkey	Urban & rural	General	Natural disaster	PTSD	CBT			adults	A
Selimbasic Z et al, 2001	Bosnia and Herzegovina	Urban & rural	Refugees	Armed conflict	PTSD	Psychotherapy			School children	B
Shooshary MH et al, 2008	Iran	Urban	General	Natural disaster	PTSD	CBT			adolescents	A
Sonderegger R et al, 2011	Uganda	Camp	IDPs	Armed conflict	Functioning	CBT			adults	A

Staples JK et al, 2011	Palestine	Urban & rural	General	Armed conflict	PTSD, depression, hopelessness	Mind-body techniques			adolescents	A
Telles S et al, 2007	Andaman Islands	Rural	General	Natural disaster	Distress	Yoga			adults	A
Telles S et al, 2010	India	Rural	General	Natural disaster	Distress	Yoga			adults	A
Thabet AA et al, 2005	Palestine	Camp	Refugees	Armed conflict	PTSD, depression	Play therapy	Psychoeducation		School children	A
Tol W et al, 2008	Indonesia	Urban & rural	General	Armed conflict	PTSD, depression, anxiety	School-based psychosocial			School children	A
Tol W et al, 2009	Nepal	Urban & rural	IDP and general	Armed conflict	Various	Mixed psychosocial			adults	A
Tol W et al, 2012	Sri Lanka	Urban & rural	General	Armed conflict	PTSD, depression, anxiety	CBT	Play therapy	Recreational	adolescents	A
Urrego Z et al, 2009	Colombia	Urban & rural	General	Armed conflict	Depression, general mental health	Psychotherapy			adults	B
Vijayakumar L et al, 2006	India	Urban	General	Natural disaster	Various	Mixed psychosocial			School children	A
Vijayakumar L et al, 2008	India	Urban	General	Natural disaster	PTSD, depression, general mental health	Emotional support			adults	A
Wagner B et al, 2012	Iraq	Urban & rural	General	Armed conflict	PTSD, depression, functioning	Internet-based CBT			adults	A
Wikrama K et al, 2011	Sri Lanka	Rural	General	Natural disaster	PTSD, depression	Community resources & participation			adults	A
Woodside D et al, 1999	Croatia	Urban	General	Armed conflict	PTSD	Psychoeducation			School children	B
Wu S et al, 2009	China	Urban & rural	General	Natural disaster	General mental health	CBT	Pharmacotherapy	Hypnotherapy	adults	A
Yeomans PD et al, 2010	Burundi	Rural	General	Armed conflict	PTSD	Psychoeducation			adults	B
Zang Y et al, 2013	China	Urban & rural	General	Natural disaster	PTSD, depression, anxiety	Narrative exposure therapy	Mind-body techniques		adults	A

ANNEX 9:

DETAILS FOR SYSTEMATIC REVIEW ON NON-COMMUNICABLE DISEASE

Sources:

Published literature: Embase, Global Health, Medline, PsychInfo, IBSS.

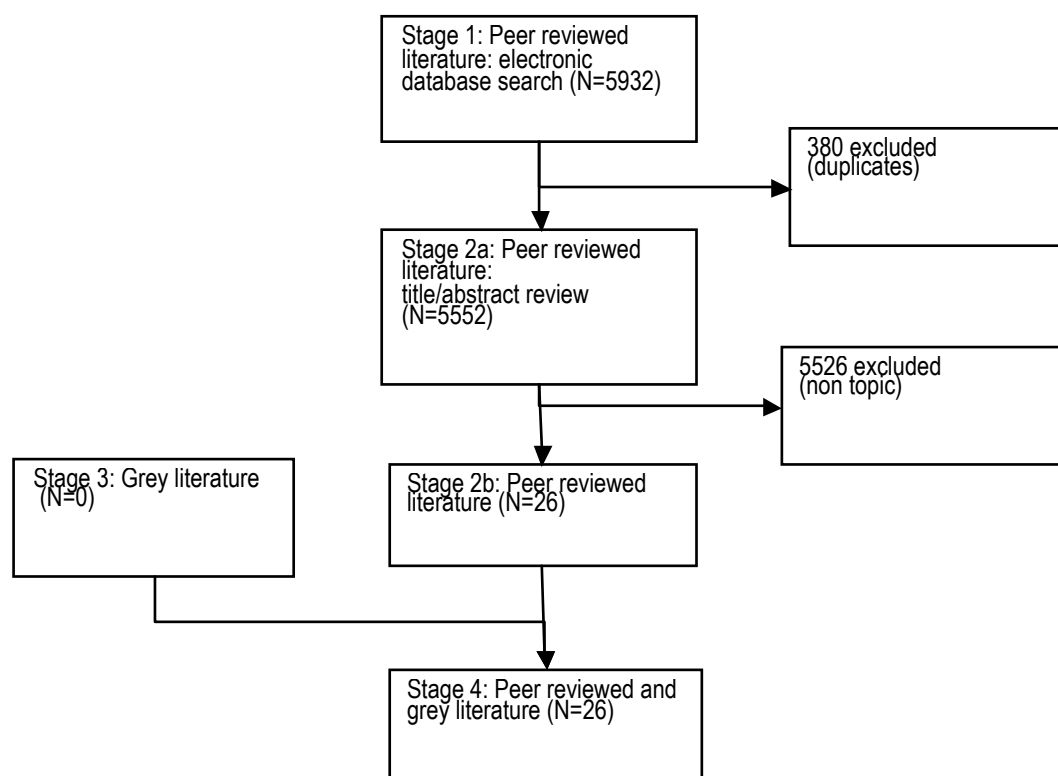
Grey literature: ReliefWeb, Eldis, ALNAP, NCD Alliance, MSF Field Research,

World Diabetes Foundation, UN High Commission for Refugees (UNHCR), WHOLIS

NY Academy of Medicine Grey Literature, CRED, International Society of Nephrology.

Health topic specific search terms:

Non-communicable disease* or NCD* or chronic disease* or chronic condition* or long term condition* or autoimmune disease* or Lupus or heart disease or cardiovascular or cerebrovascular or stroke or hypertens* or \$cholesterolaemia or heart failure or arrhythmia* or aneurysm* or cardiac or angina or myocardial infarction or coronary heart disease or CHD or ischaem\$ or cholesterol or blood pressure or blood sugar or blood glucose or diabetes or obesity or circulatory disorder* or \$carditis or cardiomyopathy or anaemi* or cancer* or neoplasm* or asthma* or respiratory or COPD or chronic obstructive pulmonary disease* or pulmonary or bronchitis or lung function or lung disease* or liver function or diabetes or chronic kidney disease* or CKD or liver disease* or renal failure or cirrho* or osteoporosis or fibromyalgia or musculoskeletal or chronic pain or \$arthritis or cystic fibrosis or thyroid disorder or neurological condition or Parkinson* or colitis or multiple sclerosis or MS or Alzheimer*



Study authors (year)	Study country	Setting	Population type	Humanitarian crisis type	Crisis stage	Health topic	Specific outcome(s)	Type(s) of health interventions	Study design	Target age group	Evidence category
Amini(2010)	Iran	Urban & rural	General	Natural disaster	Acute	Renal	Detection of haeme pigment in people at risk of acute renal failure	diagnostic tool (dipstick urinalysis)	Cross-sectional	All	A
Atef(1994)	Iran	Urban & rural	General	Natural disaster	Stabilised	Renal	ARF mortality	diagnostic protocol / prophylactic fluid therapy / cautious approach to fasciotomy	Cohort	All	A
Bolt(2010)	Afghanistan	Rural	General	Armed conflict	Stabilised	Thalassaemia	clinical measures, complications	splenectomy	Cohort	<5 years; school children	B
Brook(1995)	Israel	Urban & rural	General	Armed conflict	Stabilised	Asthma	Spirometry, anxiety score	Speilberger' STAI	Controlled before/after	Adolescents	A
Chan(2009)	Pakistan	Urban & rural	General & IDP	Natural disaster	Early recovery	NCDs	new diagnoses, uptake of services	health service utilisation	Cross-sectional	Older people	C
el-Reshaid(1993)	Kuwait	Urban	Refugee & entrapped	Armed conflict	Acute	renal	mortality, complications	dialysis (2 per week)	Cohort	All	B
Kantarc(2002)	Turkey	Urban	General	Natural disaster	Early recovery	Renal	number of dialysis sessions needed	RRT, conservative treatment	Cross-sectional	All	A
Kazancioglu(2001)	Turkey	Urban	General	Natural disaster	Acute	Renal	clinical measures	dialysis	Cross-sectional	All	B
Khader(2012)	Jordan	Urban	Refugee	Armed conflict	Stabilised	Hypertension	clinical measures, complications	Primary care hypertension clinic	Cross-sectional	All	A
Khader(2012)	Jordan	Urban	Refugee	Armed conflict	Stabilised	Diabetes	clinical measures, complications	Primary care diabetes clinic	Cross-sectional	All	A
Metelko(1992)	Croatia	Urban	IDP & general	Armed conflict	Acute	Diabetes	blood glucose, stress intensity	impact of war on service delivery	Case control	Adults	C
Mousa(2010)	Jordan, Syrian, Lebanon, Gaza Strip and West	Camp	Refugee	Armed conflict	Stabilised	Tuberculosis	DOTS	Cohort	All ages	A	
Bank	Urban & rural	Refugee	Armed conflict	Stabilised	Diabetes and CVD	clinical measures, new diagnoses	screening for NCDs	Cross-sectional	Adults, older people	A	
Nadjaf(1997)	Iran	Urban & rural	General	Natural disaster	Acute	Renal	Fasciotomy, ARF, mortality	protocol for rapid diagnosis and hydration	Case control	All	A
Ogunbodede(2000)	Ghana	Camp	Refugee	Armed conflict	Stabilised			Oral health promotion programme			C
Ozturk(2009)	Turkey	Urban	General	Natural disaster	Early recovery	Renal	clinical measures, complications, mortality	hemodialyzers: hemophan, polysulfone, and combined	Non random trial	All	A
Safari(2011)	Iran	Urban	General	Natural disaster	Acute	Renal	complications, dialysis sessions, mortality	fasciotomy	Cross-sectional	All	A
Sagheb(2008)	Iran	Urban	General	Natural disaster	Acute	Renal	clinical measures, duration of acute renal failure	standard v variable fluid therapy	Case control	All	A

Sengul(2004)	Turkey	Urban	IDP & General	Natural disaster	Acute	Diabetes	clinical measures, QOL	impact of earthquake on disease management	Cohort	All	A
Sever(2004)_features	Turkey	Urban & rural	General	Natural disaster	Early recovery	renal	weight loss, BP	restricted access to haemodialysis	Cohort	All	A
Sever(2004)_lessons	Turkey	Urban & rural	General	Natural disaster	Early recovery	Renal	survival probability	antibiotics, transfusions, ventilation	Cross-sectional	All	A
Sever(2002)	Turkey	Urban & rural	General	Natural disaster	Acute	renal	mortality, duration of treatment	RRT	Cross-sectional	All	A
Slim(1993)	Lebanon	Urban	General	Armed conflict		CVD		cardio-vascular surgery	Cross-sectional	-	C
Somer(2010)	Israel	Urban & rural	General	Armed conflict	Early recovery	MS	relapse	direct coping and planning	Cross-sectional	All	A
Vanholder(2011)	Haiti, Chile	Urban & rural	Refugee & general	Natural disaster	Acute	Renal		dialysis, screening, fluid administration	Cross-sectional	-	C
Vanholder(2001)	Turkey	Urban	General	Natural disaster		Renal		dialysis	Cross-sectional	-	C
Yuruger(2001)	Turkey	Urban & rural	General	Natural disaster	Acute	Renal	hypotension, thrombosis, complications of vascular access, mortality	dialysis	Cross-sectional	All	b

Note: Empty cells are for C grade papers (low evidences category) as these were not evaluated in detail

ANNEX 10:

DETAILS FOR SYSTEMATIC REVIEW ON INJURY AND PHYSICAL REHABILITATION

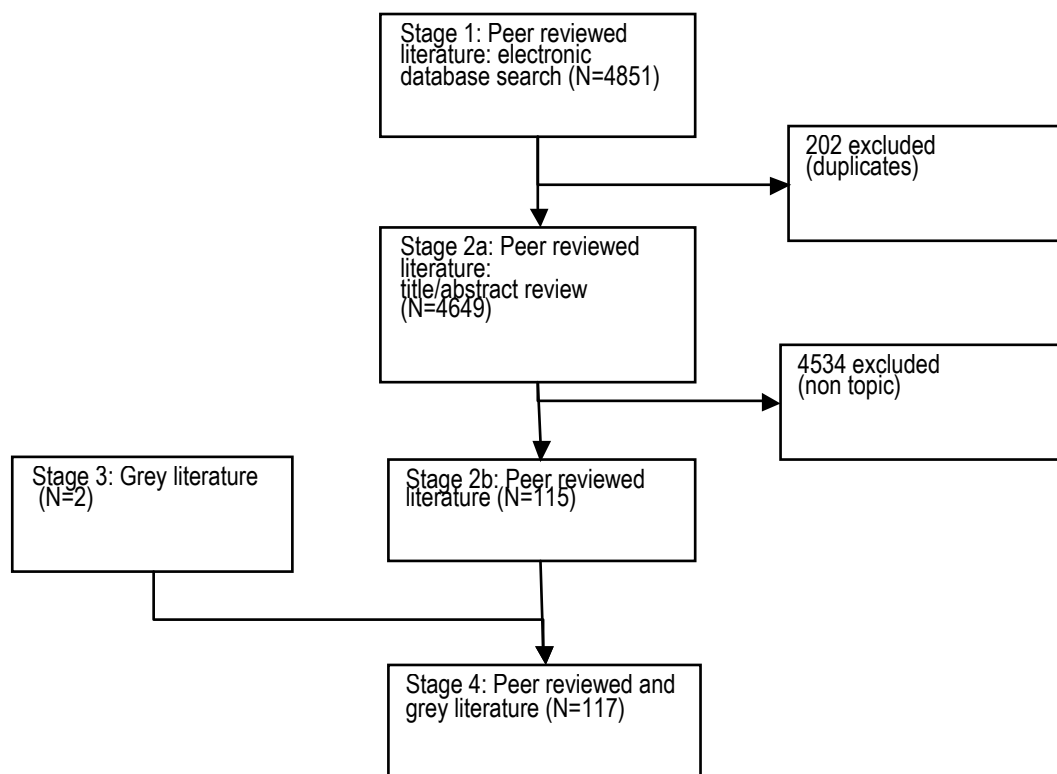
Sources:

Published: Embase, Global Health, Medline, PsychInfo, IBSS.

Grey: SourceInfo, LCD, IDDC, Eldis, EDF, CBM, CIRRIE, R4D, MSF (France and Belgium), ALNAP, WHOLIS, CRED, International Society of Physical and Rehabilitation Medicine

Health topic specific search terms:

Rehabilit* or physiotherapy* or prosthes* or orthes* or prosthetic* or orthotic* or crutch* or wheelchair* or orthopaedic* or disabled or physical* impair* or deficienc* or disabilit* or handicap* or cerebral pals* or spina bifida cystica or spina bifida occulta or muscular dystroph* or musculoskeletal abnormalit* or brain injur* or amputat* or clubfoot or poliomyelitis or paraplegia or hemiplegia or hearing loss or deaf* or blind* or vis* loss or intellectual disabilit* or learning disabilit* or developmental disabilit* or child development* disorder* or Communication disorder*



Study author	Year	Study country	Setting	Humanitarian crisis type	Crisis stage	Health outcome(s)	Type(s) of health intervention	Study design	Evidence category
Ahlberg	1994	Saudi Arabia	Urban	Armed Conflict		Orthopaedic injuries	Triage, open wound treatment with secondary suture, fracture stabilisation, antibiotics	Cross-Sectional	C
Ahsan-ul-Haq	2010	Pakistan	Urban & rural	Armed Conflict		Range of physical injuries	Triage, resuscitation and surgical procedures	Cross-Sectional	C
Alkhatgh	1997	Iran	Urban & rural	Armed Conflict		Maxillofacial injury	Surgical procedures (cheiloplasty, saliva shields)	Cross-Sectional	C
Almassi	2010	Iran	Urban & rural	Armed Conflict		Skin lesions in lower limb amputees	Surgical, medical and rehabilitative care	Cross-Sectional	C
Ameen	1984	Iraq	Urban & rural	Armed Conflict		Cranio cerebral injury	Immediate surgical treatment in hospital	Cross-Sectional	C
Amirjamshidi	2003	Iran	Urban & rural	Armed Conflict	Acute crisis	Low velocity penetrating head injuries	Minimal wound debridement (suture, referral)	Cohort	B
Asim	2010	Pakistan	Urban & rural	Natural Disaster		Limb injuries	Surgery, examinations, plastic procedures	Cross-Sectional	C
Atef	1993	Iran	Urban & rural	Natural Disaster	Acute crisis	Range of physical injuries, acute renal failure	Intensive medical management (hydration, regular review, haemodialysis)	Non-Random Trial	A
Atesalp	1999	Turkey	Urban & rural	Armed Conflict	Stabilisation	Bilateral lower limb amputations	Amputation, prostheses, rehabilitation	Cohort	B
Athar	2011	Pakistan	Urban & rural	Natural Disaster		Range of physical injuries	Pre-hospital medical care	Cross-Sectional	C
Awais	2012	Pakistan	Urban & rural	Natural Disaster		Orthopaedic trauma & amputation	Amputation & orthopaedic surgery	Cross-Sectional	C
Bajec	1993	Kuwait	Urban & rural	Armed Conflict		Explosive and penetrating injuries (soft tissue damage, fractures, multiple sites)	Orthopaedic surgery	Cross-Sectional	C
Bar-On	2011	Haiti	Urban & rural	Natural Disaster		Range of musculoskeletal injuries	Orthopaedic treatment	Cross-Sectional	C
Bazardzanovic	1998	Bosnia and Herzegovina	Rural	Armed Conflict	Acute crisis	Cranio cerebral injuries	Application of first aid and medical care (exploration of wounds, treatment, antibiotic)	Cross-Sectional	B
Bhatnagar	1989	Pakistan	Rural	Armed Conflict		Range of physical injuries	Early surgical management, evacuation	Cross-Sectional	C
Bowyer	1996	Pakistan	Urban & rural	Armed Conflict	Acute crisis	Small fragment wounds	Conservative medical and surgical treatment	Cross-Sectional	B
Bozkurt	2007	Pakistan	Urban & rural	Natural Disaster		Range of physical trauma	Acute medical and surgical care	Cross-Sectional	C
Brown	2009	Iraq & Afghanistan	Urban & rural	Armed Conflict		Ballistic lower limb open fractures	Amputation, Mangled Extremity Severity Score (MESS) guidelines	Cross-Sectional	C
Bumbasievic	2010	Serbia	Urban & rural	Armed Conflict	Acute crisis	Infected tibial nonunion after open fractures (refracture, infection, need for amputation)	Radical bony and soft tissue resection and bone transport - Iliza technique	Cohort	B
Chambers	2006	Indonesia	Urban & rural	Natural Disaster		Range of physical injuries	Surgery	Cross-Sectional	C
Chen	2010	China	Urban & rural	Natural Disaster		Orthopaedic limb trauma	Amputation	Cross-Sectional	C
Chen	2011	China	Urban & rural	Natural Disaster	Acute crisis	Gas gangrene infection	Surgical treatment, quarantine antibiotics	Cohort	B
Cheng	2010	China	Urban	Natural Disaster	Acute crisis	Crush syndrome	Continuous renal replacement therapy (CRRT)	Cross-Sectional	B
Coupland	1988	Pakistan	Urban & rural	Armed Conflict	Acute crisis	War-related physical injuries	Surgery, anaesthesia, transfusion, amputation	Cross-Sectional	C
Coupland	1992	Pakistan & Thailand	Urban & rural	Armed Conflict	Acute crisis	Cranio cerebral injuries	Surgery, anaesthesia, rehabilitation	Cross-Sectional	B
Covey	2000	Croatia	Rural	Armed Conflict	Acute crisis	Musculoskeletal injury	Reconstructive surgery	Cross-Sectional	C
Cutting	1992	Lebanon	Camp	Armed Conflict	Acute crisis	Range of physical injuries (recovery, further treatment, disability)	Surgery (with limited access to supplies)	Cross-Sectional	B

De Wind	1987	Uganda	Urban	Armed Conflict	Acute crisis	Missile injuries (healing, disability, union of fractures)	Surgical procedures in a resource limited setting	Cohort	B
Dediae	1998	Bosnia & Herzegovina	Urban & rural	Armed Conflict	Acute crisis	Penetrating chest injuries (infection, mortality)	Thoracotomy, conservative treatment (thoracostomy and/or thoracocentesis)	Cross-Sectional	A
Dediae	1999	Bosnia & Herzegovina	Urban & rural	Armed Conflict	Acute crisis	Heart and great vessel injuries (mortality, infection)	Surgical procedures	Cross-Sectional	B
Dhar	2008	India	Urban & rural	Natural Disaster		Lower limb fractures in polytrauma patients	Orthopaedic surgery (external fixator to ilizarov method in osteosynthesis conversion)	Cross-Sectional	C
Dubravko	1994	Croatia	Urban & rural	Armed Conflict	Acute crisis	Fracture of the extremities (complications, healing)	External fixation	Cross-Sectional	B
Ebrahimzadeh	2007	Iran	Urban & rural	Armed Conflict	Stabilisation	Lower extremity injuries (pain, employment, psychological problems)	Foot / ankle amputation	Cohort	B
Emami	2005	Iran	Urban	Natural Disaster		Range of physical injuries	Triage tunnel and orthopaedic surgery	Cross-Sectional	C
Fakri	2012	Jordan	Urban & rural	Armed Conflict	Acute crisis	Infected and non-infected tibial non-union (recurrence of infection, readmission, non-union, mortality)	Amputation and / or reconstruction	Cohort	A
Fasol	1989	Thailand	Urban & rural	Armed Conflict		Vascular injuries	Emergency surgical treatment with limited facilities	Cross-Sectional	C
Gosselin	2011	Haiti & Dominican Republic	Urban & rural	Natural Disaster	Acute crisis	Orthopaedic trauma (DALYs averted)	Orthopaedic surgery	Economic Study	B
Gosselin	1993	Pakistan	Rural	Armed Conflict	Acute crisis	Acute arterial injury - revascularisation	Amputation and / or revascularisation procedures	Cohort	A
Gousheh	1995	Iran	Urban & rural	Armed Conflict	Acute crisis	Brachial plexus injuries	Surgery (nerve grafts etc)	Cohort	B
Gu	2010	China	Urban & rural	Natural Disaster	Acute crisis	Traumatic brain injury	First aid and emergency surgery	Cross-Sectional	C
Guner	2013	Turkey	Urban & rural	Natural Disaster		Musculoskeletal trauma	Surgery (fracture braces, reduction & fixation, external fixators, fasciotomy, amputation, debridement)	Cross-Sectional	C
Hadzismajlovic	2007	Bosnia & Herzegovina	Urban & rural	Armed Conflict	Acute crisis	Isolated penetrating chest injury	Pleural drain / thoracotomy	Cross-Sectional	B
Hammer	1996	Somalia	Urban	Armed Conflict	Acute crisis	Musculoskeletal injury of extremities	Unilateral external fixation device - hammer external fixation system (HEFS)	Cohort	B
Has	2001	Croatia	Urban & rural	Armed Conflict	Acute crisis	Open fractures of the hands and feet	Minimal fixation method with Kirschner's wires	Cross-Sectional	B
Herald	2012	Haiti	Urban & rural	Natural Disaster		Range of physical injuries	Surgical and medical protocols, equipment (complete kits)	Cross-Sectional	C
Hotz	2010	Haiti	Urban	Natural Disaster		Range of physical injuries	Medical, surgical and rehabilitation care	Cross-Sectional	C
Hudolin	2005	Bosnia & Herzegovina	Urban & rural	Armed Conflict	Acute crisis	Penetrating colonic injury (complications, mortality)	Primary repair, colostomy	Cross-Sectional	B
Hudolin	2003	Bosnia & Herzegovina	Rural	Armed Conflict		Urogenital injuries	Surgical management (nephrectomy)	Cross-Sectional	C
Hussain	2001	Pakistan	Urban & rural	Armed Conflict	Acute crisis	Vascular injuries	Mode and time of presentation to hospital (rapid arrival / quality of transportation)	Cross-Sectional	B
Jaber	2006	Palestine (West Bank)	Urban	Armed Conflict	Acute crisis	Vascular injuries	Emergency surgical treatment	Cross-Sectional	B

Jevtic	1996	Bosnia & Herzegovina	Urban & rural	Armed Conflict	Acute crisis	Range of physical injuries	First aid and evacuation	Cross-Sectional	B
Jiang	2012	China	Urban & rural	Natural Disaster	Acute crisis	Range of physical injuries	Medical, surgical and rehabilitation care	Cross-Sectional	B
Jiang	2010	China	Rural	Natural Disaster	Acute crisis	Range of physical injuries	Emergency operations under anaesthesia (general and regional)	Cross-Sectional	B
Karamouzian	2010	Iran	Urban	Natural Disaster	Acute crisis	Spinal cord injury	Rehabilitation	Cohort	B
Kummoona	2011	Iraq	Urban & rural	Armed Conflict	Acute crisis	Facial injuries	Craniofacial surgery (bone graft reconstruction)	Cross-Sectional	B
Labeeu	1996	Rwanda	Urban & rural	Armed Conflict	Acute crisis	Limb fracture	External fixation (FESSA & Hoffmann)	Cross-Sectional	B
Lacoux	2003	Sierra Leone	Urban & rural	Armed Conflict	Stabilisation	Neuropathic pain	Pharmaceutical treatment	Non-Random Trial	A
Leininger	2006	Iraq	Urban & rural	Armed Conflict	Acute crisis	Range of physical injuries	Surgery, vacuum-assisted surgical dressings	Cross-Sectional	B
Li	2012	China	Rural	Natural Disaster	Early recovery	Spinal cord injuries	Institutional rehabilitative programme	Cohort	A
Li	2009	China	Urban & rural	Natural Disaster	Acute crisis	Crush injuries	Intensive care unit (haemodialysis, prompt medical treatment)	Cross-Sectional	A
Li	2009	China	Urban & rural	Natural Disaster		Range of physical injuries	Rehabilitation	Cross-Sectional	C
Li	2011	China	Urban & rural	Natural Disaster	Acute crisis	Crush injuries	Renal replacement therapy and blood transfusion	Cross-Sectional	A
Liu	2010	China	Urban & rural	Natural Disaster	Acute crisis	Lower leg fracture	Orthopaedic surgery	Cross-Sectional	B
Liu	2012	China	Urban & rural	Natural Disaster	Acute crisis	Tibial and fibular fractures	External fixation and vacuum sealing	Cohort	B
Lovric	1994	Croatia	Urban & rural	Armed Conflict	Acute crisis	Injury of major blood vessels of the extremities	Emergency surgical treatment (fasciotomy, antibiotics)	Cross-Sectional	B
Mallick	2005	Pakistan	Urban & rural	Natural Disaster	Early recovery	Major disabilities	Rehabilitation (post-spinal fixation / amputation)	Cross-Sectional	B
Marcic	1998	Croatia	Urban & rural	Armed Conflict	Acute crisis	Penetrating craniocerebral injury	Surgery and management	Cohort	B
Mohebbi	2008	Iran	Urban & rural	Natural Disaster		Range of physical injuries	Surgical intervention (fixation etc)	Cross-Sectional	C
Morells	1994	Cambodia	Rural	Armed Conflict	Acute crisis	Penetrating intraperitoneal colon injuries	Primary repair, colostomy	Non-Random Trial	A
Motamedi	1999	Iran	Urban & rural	Armed Conflict	Early recovery	Maxillofacial injuries	Branemark implant system	Cohort	B
Mujkic	2002	Croatia	Urban & rural	Armed Conflict	Acute crisis	Unintentional small arms / explosive injuries (exposure - secondary outcome)	Community based intervention (lectures, exhibitions, leaflets, public messages)	Non-Random Trial	A
Mustafa	2012	Pakistan	Rural	Natural Disaster		Musculoskeletal injury	Orthopaedic surgery, plaster casts	Cross-Sectional	C
Nadjafi	1997	Iran	Urban & rural	Natural Disaster	Acute crisis	Acute renal failure	Comprehensive diagnostic and treatment protocol	Cross-Sectional	A
Nie	2011	China	Urban & rural	Natural Disaster		Range of physical injuries	Triage	Cross-Sectional	C
Nikolic	1999	Former Yugoslavia	Urban & rural	Armed Conflict		Injury of major joints of limbs	Orthopaedic surgery, plaster cast, external fixation	Cross-Sectional	C
Nikolic & Draskovic	2000	Serbia	Urban & rural	Armed Conflict	Acute crisis	Missile injuries of the knee (complications, mortality)	Orthopaedic surgery, plaster cast, external fixation	Cohort	B
Nikolic	2000	Former Yugoslavia	Urban & rural	Armed Conflict		Injuries of the foot	orthopaedic surgery, plaster cast, external fixation	Cross-Sectional	C
Nikolic	2002	Former Yugoslavia	Urban & rural	Armed Conflict		Supracondylar missile fractures of the femur	orthopaedic surgery, external fixation, plaster cast, amputation	Cross-Sectional	C

Ostojic	2001	Croatia	Urban & rural	Armed Conflict	Acute crisis	War-related (and ischaemic) below the knee amputations	Rehabilitation	Case-Control Study	A
Pang	2011	Indonesia	Rural	Natural Disaster		Musculoskeletal injury	Anaesthesia, orthopaedic surgery	Cross-Sectional	C
Patricevic	1998	Croatia	Urban & rural	Armed Conflict		Range of physical injuries	Medical, surgical and rehabilitation care	Cross-Sectional	C
Pedirini	2011	Afghanistan	Urban & rural	Armed Conflict	Acute crisis	Open ankle-foot fractures	Surgery	Cohort	B
Peric	1995	Croatia	Urban & rural	Armed Conflict	Acute crisis	Range of severe physical injuries	ICU treatment, field treatment	Cross-Sectional	B
Petricevic	1997	Bosnia and Herzegovina	Urban	Armed Conflict		Lung wounds	Emergency surgical treatment	Cross-Sectional	C
Qadiri	2006	Pakistan	Rural	Natural Disaster	Acute crisis	Range of physical injuries	Anaesthesia - ketamine	Cross-Sectional	B
Qiu	2010	China	Urban & rural	Natural Disaster		Range of physical injuries	Surgical treatment	Cross-Sectional	C
Rashid	2010	India	Rural	Armed Conflict	Acute crisis	Cranio cerebral injuries	Triage, resuscitation, surgery	Cross-Sectional	B
Rautio	1987	Afghanistan	Rural	Armed Conflict	Acute crisis	Complicated fracture	External fixation, plaster cast, amputation	Cross-Sectional	B
Rautio	1988	Pakistan	Rural	Armed Conflict	Acute crisis	Range of physical injuries	Medical, surgical and rehabilitation care	Cross-Sectional	B
Redmond	2011	Haiti	Urban & rural	Natural Disaster		Range of physical injuries	Surgery, rehabilitation	Cohort	C
Roostar	1995	Afghanistan	Urban & rural	Armed Conflict	Acute crisis	Salvageable vascular injuries	Amputation, reconstruction	Cross-Sectional	B
Rowley	1996	Afghanistan & Kenya	Rural	Armed Conflict	Acute crisis	Femoral, tibial, humeral fracture	Traction versus external fixation	Cross-Sectional	B
Roy	2005	India	Rural	Natural Disaster	Stabilisation	Injury	Field medical care and rehabilitation	Cohort	B
Safari	2011	Iran	Urban & rural	Natural Disaster	Acute crisis	Crush injuries	Fasciotomy	Cross-Sectional	A
Sagheb	2008	Iran	Urban & rural	Natural Disaster	Acute crisis	Acute renal failure	Standard fluid therapy / variable volume treatment - dialysis	Cross-Sectional	A
Sarani	2011	Haiti	Urban & rural	Natural Disaster		Range of physical injuries	Range of surgical operations	Cross-Sectional	C
Sever	2002	Turkey	Urban & rural	Natural Disaster	Acute crisis	Acute renal problems	Renal replacement therapy	Cross-Sectional	A
Splavski	1996	Croatia	Urban & rural	Armed Conflict	Acute crisis	Spinal cord injury	Reconstructive surgery - laminectomy and dural repair	Cross-Sectional	B
Sprem	2001	Croatia	Urban & rural	Armed Conflict	Acute crisis	Blast injury affecting the eardrum	Tympanoplasty	Cross-Sectional	A
Stanec	1993	Croatia	Urban	Armed Conflict	Acute crisis	High-energy injuries	Radical primary treatment, and microvascular flaps	Cross-Sectional	B
Stanec	1994	Croatia	Urban & rural	Armed Conflict	Acute crisis	Physical injury	Microvascular flap (local / free) reconstruction	Cross-Sectional	B
Strada	1993	Afghanistan	Rural	Armed Conflict	Acute crisis	Large bowel injury	Surgical intervention with limited facilities	Cross-Sectional	A
Sundin	1995	Rwanda	Rural	Armed Conflict		Range of physical injuries	Medical, surgical and rehabilitation care	Cross-Sectional	C
Tajsic	2008	Balkan country (unspecified)	Rural	Armed Conflict	Early recovery	Landmine and blast injuries	Microsurgical post-injury reconstructive surgery (flap transfers)	Cohort	B
Tauqir	2007	Pakistan	Rural	Natural Disaster	Acute crisis	Spinal cord injury	Hospitalisation-related complications	Cross-Sectional	B
Vanholder	2007	Pakistan	Urban & rural	Natural Disaster	Acute crisis	Acute kidney injuries	Dialysis	Cross-Sectional	A
Vuckovic	1995	Croatia	Urban & rural	Armed Conflict		Urogenital injuries	Surgical management (laparotomy, cystostomy, uretrotomy)	Cross-Sectional	C
Xiang	2009	China	Urban & rural	Natural Disaster	Acute crisis	Paediatric injuries	Modified triage strategy	Cross-Sectional	A
Xiang	2009	China	Urban & rural	Natural Disaster	Acute crisis	Range of physical injuries	Triage	Cross-Sectional	A
Xiao	2011	China	Urban	Natural Disaster	Stabilisation	Tibial shaft fractures	Rehabilitation intervention	Cohort	A

Xu	2011	China	Urban & rural	Natural Disaster	Acute crisis	Head injuries	Hospital care (local, regional, territory) (debridement, craniotomy)	Cohort	A
Zakharía	1985	Lebanon	Urban	Armed Conflict		Thoracic injury	Thoracic surgery	Cross-Sectional	C
Zakharía	1987	Lebanon	Urban	Armed Conflict		Cardiac injury	Emergency surgical treatment	Cross-Sectional	C
Zangana	2007	Iraq	Urban & rural	Armed Conflict	Acute crisis	Penetrating liver injury	Emergency liver surgery	Cross-Sectional	B
Zhang	2011	China	Urban & rural	Natural Disaster	Stabilisation	Bone fracture	Rehabilitation service programme (NGO-Health Sector-Volunteer)	Non-Random Trial	A
Zhang	2013	China	Urban & rural	Natural Disaster	Early recovery	Physical disability	Rehabilitation service programme (NGO-Health Sector-Volunteer)	Non-Random Trial	A
Zhao	2009	China	Urban & rural	Natural Disaster	Acute crisis	Multiple physical injuries	Medical & surgical intervention	Cross-Sectional	B

ANNEX 11:

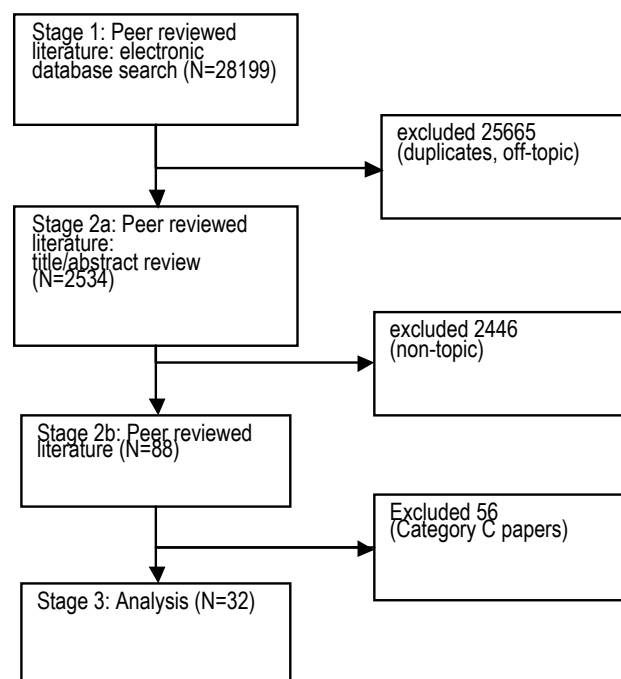
DETAILS FOR SYSTEMATIC REVIEW ON HEALTH SERVICE DELIVERY

Sources:

Medline, Embase, Global Health

Health topic specific search terms:

Rehabilit* or physiotherapy* or prosthes* or orthes* or prosthetic* or orthotic* or crutch* or wheelchair* or (Quality improvement OR quality management system* OR total quality management OR continuous quality improvement OR quality assurance OR health care OR quality of health care OR quality collaborative OR quality indicator comparison* OR benchmark* OR balanced scorecard OR quality strategy OR patient safety OR patient risk management OR community based service* OR community driven service* OR community mobile\$ation OR community based organi\$ation* OR non\$governmental organi\$ation* OR peer support OR community scorecard* OR service agreement* OR public\$private partnership* OR stewardship OR ambulatory care OR CBO OR community health practitioners OR community health service* OR community health OR volunteer* OR community health worker* OR district health system OR district hospital OR doctor* OR faith-based organi\$ation* OR FBO OR health care organi\$ation* OR health centre OR health facility OR mobile health OR health personnel OR health post* OR health service organi\$ation* OR health service* OR health service delivery OR health delivery OR health worker* OR clinic* OR hospital OR managed care OR nurse practitioner* OR paramedical OR pharmaceutical service* OR pharmacy OR physician* OR primary health care OR primary health centre* OR primary care OR voluntary organi\$ation* OR health provider* OR registered nurse* OR traditional health worker* OR alternative health delivery OR case management map OR certificate of need OR client provider interaction OR patient provider interaction OR patient satisfaction OR client satisfaction OR clinical decision support system OR clinical guidelines OR clinical pathways OR clinical peer review OR clinical practice OR communication OR community capacity for care OR community driven service* OR health education OR health improvement OR community partnership OR secondary care OR secondary health care OR tertiary care OR tertiary health care OR access* OR health care coverage OR equity OR essential kit* OR health care provision OR standard treatment guideline* OR standardi\$ed medical technology list* OR standardi\$ed pharmaceutical list* OR continuity of care OR coordination of care OR diagnos* OR patient experience OR treatment OR therapy OR health care intervention OR prevention OR assessment).mp



Author (year)	Country	Setting	Population type	Humanitarian crisis type	Crisis stage	Health topic	Health outcome(s)	Intervention	Health service level of intervention	Study design	Evidence category
Bar-Dayan(2005)	Turkey	Urban & rural	General	Natural disaster	Early recovery	All	assessments, hospitalisations, operations	Israeli Defence Force Field Hospital	secondary	cross-sectional	C
Beckett(2012)	Afghanistan	Urban & rural	General	Armed conflict	Acute	casualty management	admissions transfusions, operations	Multidisciplinary trauma care system at a combat hospital	secondary	cross-sectional	C
Chane(2010)	Pakistan	Rural	General	Natural disaster	Early recovery	All	equity of use	Relief services in static and outreach clinics	primary	cross-sectional	C
Chapin(2009)	Peru	Urban & rural	General	Natural disaster	Early recovery	Tuberculosis, HIV, Family Planning	patients seen before and after earthquake	primary, secondary and tertiary in 4 districts	primary, secondary, tertiary	cross-sectional	C
Chen_Admin(2009)	China	Urban	General	Natural disaster	Acute	infection, orthopaedic casualties	mortality, cross-infection, amputation, depression score	Nursing services in traumatic infection ward	secondary	cross-sectional	B
Chen_Trans(2009)	China	Urban & rural	General	Natural disaster	Acute	casualty management	patient transfers	Patient transfer protocol	Ambulatory - all	cross-sectional	C
Cutting(1992)	Lebanon	camp	Refugee	Armed conflict	Acute	casualty management	operations performed	Refugee Camp Hospital	secondary	cross-sectional	C
Ebling(2000)	Croatia	Urban & rural	General & refugee	Armed conflict	Acute	All	Trends in volume of visits to health centres, mortality, vaccination uptake	Medical crisis headquarters formed, new locations for health units, back up facilities in inpatient units, war reserves of drugs, training courses for GPs and first aid courses for civilian defence	Primary	cross-sectional	C
Fernald(2007)	Pakistan	Rural	General	Natural disaster	Early recovery	All	patient encounters, prescriptions, inpatient capability	Mobile Army Surgical Hospital - with primary care department	Primary, secondary	cross-sectional	C
Fosse(1992)	Afghanistan	Rural	General	Armed conflict	Acute	casualty management	operations, complications	Mobile medical team	Primary	cross-sectional	B
Fosse(1988)	Lebanon	camp	General & refugee	Armed conflict	Acute	Casualty management	Primary and secondary surgical operations performed	Triage and Surgical operations performed in the camp clinic with limited resource	Secondary	cross-sectional	C
Giangucco(2012)	Palestinian Territories	Urban	General	Armed conflict	Acute	All	Quality measure	Existing hospital services / performance appraisal system	Secondary	cross-sectional	C
Halpern(2003)	Turkey	Urban	General	Natural disaster	Acute	casualty management	treatment and operations	Intensive care in field hospital	secondary	cross-sectional	C

Kang(2012)	China	Rural	General	Natural disaster	Acute	casualty management	patient transfers	medical evacuation	ambulatory	cross-sectional	C
Kwak(2006)	Sri Lanka	Rural	General	Natural disaster	Early recovery	All	output following management of cases	Korean Disaster Medical Assistance Team	primary	cross-sectional	C
Loghmani(2008)	-	Urban & rural	General	Natural disaster	Acute	Casualty measurement	appropriateness of measures in a field hospital	RAND/UCLA appropriateness method for determining field hospital setting in an earthquake	secondary	cross-sectional	C
Misc(2005)	Bosnia and Herzegovina	Urban & rural	General & IDP	Armed conflict	Acute, Early recovery	All	Equity - treatment of different ethnic groups	Civilian health service - outpatients and surgery	Secondary	cross-sectional	C
Missair(2010)	Haiti	Urban & rural	General	Natural disaster	Acute	Casualty management	Procedures performed	Surgery and anaesthetic emergency team	secondary	cross-sectional	C
Muawwad-Jarawan(1987)	Lebanon	Urban	General	Armed conflict	Acute	All	Incidence of self care	Self-care	pre-primary	cross-sectional	C
Nia(2008)	Iran	Urban & rural	General	Natural disaster	Acute	Casualty management	Patient satisfactions	emergency medical response	primary, secondary	cross-sectional	C
Petricevic(1995)	Bosnia and Herzegovina	Rural	General	Armed conflict	Acute	Casualty management	operations performed	Abdominal operations, blood vessel operations and management of upper and lower extremities	Secondary	cross-sectional	C
Porignon(1998)	DR Congo	Rural, camp	Refugee	Armed conflict	Acute	All	consultation rate	Health district services and specific services in camps	Primary, secondary	cross-sectional	C
Riddez(2005)	Indonesia	Rural	General	Natural disaster	Acute	Surgery	Surgical procedure	Surgery in a field hospital	Secondary	cross-sectional	C
Rukavina(1995)	Croatia	Urban	Entrapped, refugee, IDP	Armed conflict	Acute	Casualty management	mortality	Change from peacetime to wartime hospital conditions of medical centre removed from warzone	Secondary	cross-sectional	C
Schreeb(2008)	Iran, Haiti, Indonesia, Pakistan	Rural	General	Natural disaster	Acute	All	Deployment of field hospitals, Consultations, Bed occupancy	Foreign Field Hospitals	secondary	cross-sectional	C
Sheng(1987)	China	Urban	General	Natural disaster	Acute	Casualty management	survival rates, recovery	Triage, rescue times from wreckage, laminectomy, anterior decompression	Primary and secondary	cross-sectional	C
Sowa(1997)	India	Rural	Refugee	Armed conflict	Stabilised	All	volume of outpatients annually, number of inpatients annually, number of tests performed annually - volume trends	Outpatient and inpatient clinics	secondary	cross-sectional	C
VanRooyen(1995)	Somalia	Urban & rural	Refugee & general	Armed conflict	Acute	All	consultations, security rating	Mobile Medical Relief and Military assistance	Primary	cross-sectional	C

vonSaint(2011)	Haiti	Urban	General & IDP	Natural disaster	Early recovery	Paediatric	mortality	US field hospital staffed by short-term volunteers	Secondary	cohort	B
Walk(2012)	Haiti	Urban	General	Natural disaster	Acute	casualty management	patients, length of stay	USNS Comfort	Primary and secondary	cross-sectional	C
Wickramasinghe(2007)	Sri Lanka	camp	IDP	Natural disaster	Acute, Early recovery	All	patient satisfaction	Health care services in relief camps	Primary	cross-sectional	B
Zic(2001)	Bosnia and Herzegovina	Urban & rural	General & refugee	Armed conflict	Acute	All	number of examinations each year, number of operations	establishment of war hospital in advance of war, prior training of local professionals, medical technicians in armoured vehicles, triage	secondary	cross-sectional	C

ANNEX 12:

DETAILS FOR SYSTEMATIC REVIEW ON HEALTH SYSTEMS

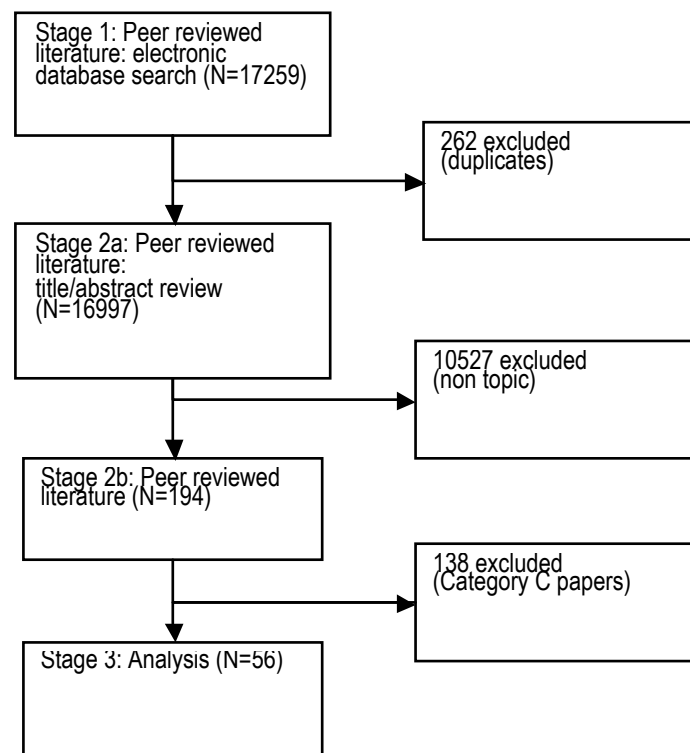
Sources:

PubMed, Medline, Embase, Global Health and PsychInfo.

Health topic specific search terms:

Health system* or Health system design or Healthcare polic* or Healthcare strateg* or National guideline* or National standard* or Health service delivery or Human resources or Health workforce or Medical staffing or Drug suppl* or Medical suppl* or Medical equipment or Supply chain or Health financing or User fees or Healthcare costs or Health information management or Health information system or Health management information system* or HMIS or Health surveillance system* or Medical data security or

Leadership or Governance or Leadership in healthcare or Leadership in medical assistance or Leadership in medical operation* or Lead health agency or Ministry of health or MOH or Government* or Support of local system or Support of national system or Health system strengthening or Sustainability or System collapse or System failure.



Summary data extraction table:

Study author	Year	Study country	Population type	Humanitarian crisis type	Humanitarian crisis stage	Study design	Focus
Adams, P.	2010	Haiti	General population	Natural disaster	Acute crisis - early recovery	Case study	L&G
Alonso, A. and R. Brughia	2006	East Timor	General population	Conflict	Early recovery	Case study	General health system, L&G
Barnabas, G. A. B. and A. Zwi	1997	Ethiopia	General population	Conflict	Acute crisis	Case study	General health system, L&G
Batley, N. J., et al.	2008	Lebanon	Health workers	Conflict	Acute crisis - stabilised crisis	Case study	L&G
Betsi, N. A., et al.	2006	Cote d'Ivoire	General population	Conflict	Acute crisis	Case study	General health system, HR
Bile, K. M., et al.	2010	Pakistan	IDP	Natural disaster & conflict	Acute crisis	Comparative case studies	L&G, HIS
Bisika, T.	2010	Africa	General population	Conflict	Acute crisis - early recovery	Descriptive	General health system
Bissell, R. A., et al.	2004	Armenia	General population	Natural disaster	Preparedness	Case studies	
Bornemisza, O., et al.	2010	N/A	General population	Conflict	Acute crisis	Descriptive	
Bradt, D. A., et al.	2001	Indonesia	General population	Conflict	Acute crisis to early recovery	Case study	
Braveman P. and D. Siegel	1987	Nicaragua	General population	Conflict	Early recovery	Case study	
Brennan, R. J., et al.	2001	Kosovo	General population	Conflict	Early recovery	Case study	HIS
Bukhari, S. K. S., et al.	2010	Pakistan	General population	Natural disaster	Acute crisis	Case study	Medicines
Bulbulia, S. and F. Alvarez-Castillo	2004	Sri Lanka	General population	Conflict	Preparedness	Case study	
Buwa, D. and H. Vuori	2007	Kosovo	General population	Conflict	Early recovery	Case study	General health system, L&G
Cometto, G., et al.	2010	South Sudan	General population	Conflict	Early recovery	Case study	
Curic, I., et al.	2010	Bosnia	General population	Conflict	Acute crisis	Case study	L&G
Dodge, C. P.	1990	Uganda and Sudan	General population, refugees and IDPs	Conflict	Acute crisis	Comparative case studies	
Garfield R. M.	1989	Nicaragua	General population	Conflict	Early recovery	Case study	General health system
Giacaman, R., et al.	2003	OPT	General population	Conflict	All levels	Case study	
Goyens, P., et al.	1996	Zaire	Refugee	Conflict	Acute crisis	Case study	General health system
Hill, P.	2004	N/A	General population	Conflict	Post conflict (exception)	Descriptive	
Ihyayyar, D. A. and L. O. Ogba	1989	Africa	General population and refugees	Conflict	Acute crisis	Descriptive	General health system, L&G
Jones, L. M., et al.	2007	Indonesia	General population	Natural disaster	Early recovery	Case study	General health system
Kapucu, N.	2011	Myanmar	General population	Natural disaster	Acute crisis	Case study	
Khankeh, H. R., et al.	2011	Iran	General population	Natural disaster	Acute crisis	Descriptive	L&G
Kohan, I., et al.	2011	Peru	General population	Natural disaster	Early recovery and stabilised crisis	Case study	
Lanjouw, S., et al.	1999	Cambodia	General population	Conflict	Early recovery	Case study	
Lopez Tagle, E. and P. Santana Nazarit	2011	Chile	General population	Natural disaster	Acute crisis	Case study	

Macrae, J., et al.	1996	Uganda	General population	Conflict	Early recovery	Case study	General health system, L&G
Marfin, A. A., et al.	1994	Nepal	Refugee	Political crisis	Acute crisis	Case study	HIS
Melgaard, B., et al.	2005	Tsunami	General population	Natural disaster	Preparedness and acute crisis	Descriptive	General health system
Morikawa, M. J.	2003	Kosovo	General population	Conflict	Acute crisis and early recovery	Case study	L&G
Morton, M. and J. L. Levy	2011	Haiti and Indonesia	General population	Natural disaster	Acute crisis	Case studies	HIS
Newbrander, W., et al.	2011	Afghanistan, DRC, Liberia, South Sudan	General population	Conflict	Early recovery	Descriptive	General health system
Okunzi, S. A.	1998	Uganda	General population	Conflict	Early recovery	Case study	
Patel, P. P., et al.	2011	Lebanon, Sierra Leone, Indonesia, Gaza, Sri Lanka	General population	Any crisis	Acute crisis	Literature review	General health system, HR
Pavignani, E.	2011	Mozambique, Angola, Somalia, South Sudan	General population	Conflict	Acute crisis to early recovery	Case studies	HR
Peltz, R., et al.	2006	Thailand	General population	Natural disaster	Acute crisis	Case study	L&G
Porignon, D., et al.	1995	Zaire	Refugee	Conflict	Acute crisis	Case study	
Porignon, D., et al.	1998	DRC	General population	Conflict	Throughout	Case study	
Procacci, P., et al.	2005	Tsunami	General population	Natural disaster	Preparedness and acute crisis	Descriptive	L&G
Rahim, M., et al. S114-121.	2010	Pakistan	General population	Conflict and natural disaster	Preparedness	Case study	HIS
Raminashvili, D., et al.	2009	Georgia	General population	Conflict	Early recovery	Case study	L&G
Raviola, G., et al.	2012	Haiti	General population	Natural disaster	Early recovery	Case study	
Sabes-Figuera, R., et al.	2012	Bosnia, Croatia, Kosovo, F R Yugoslavia, Macedonia, Serbia	General population	Conflict	Acute crisis	Statistical analysis	Health Financing
Seyedin, S. H., et al.	2009	Iran	Health workers	Natural disaster	Early recovery	Case study	
Shuey, D. A., et al.	2003	Kosovo	General population	Conflict	Early recovery	Case study	L&G
Simunovic, V. J.	2007	Bosnia	General population	Conflict	Acute crisis and early recovery	Personal testimony	L&G
Thieren, M.	2005	N/A	General population	N/A	Acute crisis and early recovery	Descriptive	HIS
Tiembre, I., et al.	2011	Cote d'Ivoire	General population	Conflict	Acute crisis	Case study	
Ugalde, A., et al.	2000	El Salvador	General population	Conflict	Throughout	Case study	L&G
Val D'Espaux, S. d., et al.	2011	OPT	General population	Conflict	Early recovery	Case study	General health system
Western, K. A.	1982	N/A	General population	Natural disaster	Acute crisis to early recovery	Descriptive	HIS
	2005	Iran	General population	Natural disaster	Acute crisis	Case study	General health system
	2012	Pakistan	General population	Natural disaster	Acute crisis	Case study	HIS

ANNEX 13:

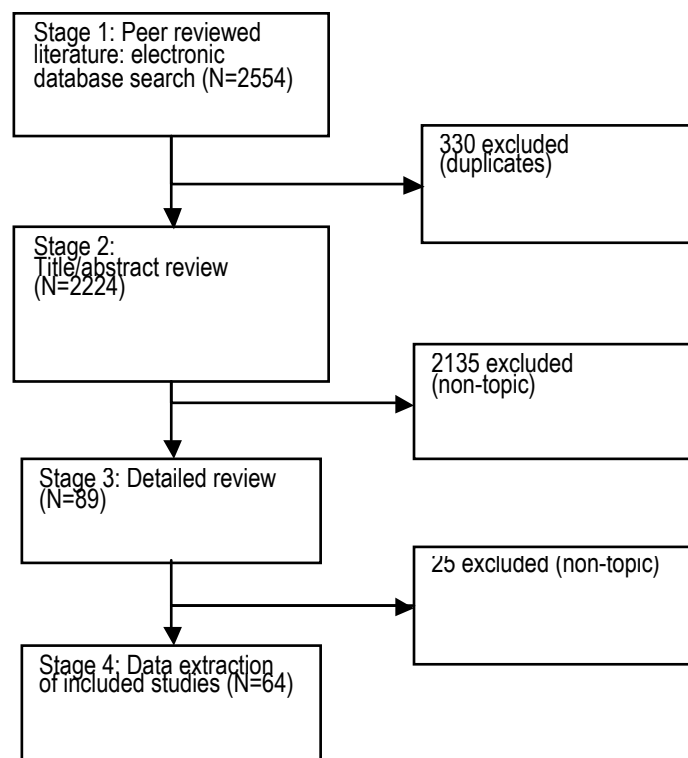
DETAILS FOR SYSTEMATIC REVIEW ON ACCESS TO HEALTH CARE

Sources:

Medline, Embase, Global Health, International Bibliography of Social Sciences, Web of Science.

Health topic specific search terms:

"Health Services Accessibility"/ OR "Architectural Accessibility"/ OR exp "health care costs"/ OR "health expenditures"/ OR "healthcare disparities"/ OR (((access OR accessibility OR affordability OR cost OR costs) adj2 (health OR healthcare OR doctor\$ OR patient\$ OR beneficiaries OR hospital\$ OR clinic\$ OR medication\$ OR drug\$ OR surgery OR treatment)) OR ((discrimination OR disparit\$) adj2 (health OR healthcare))).tw



Fu (2009)	China	Urban	General	Natural (earthquake)	Acute	Domestic supplementing of medical supplies	Physical access, end-users	Comparative, descriptive	All	A	Medical supplies
Furst (2009)	Côte d'Ivoire	Rural	General	Conflict	Acute	Use of existing services	All aspects of access, end-users	Comparative, before/after	All	B	Neglected tropical diseases; malaria
Gustafson (2001)	Guinea-Bissau	Urban	General	Conflict	Acute	Use of existing services	Physical access, end-users	Retrospective cohort	Adults	B	TB
Haththotuwa (2012)	Sri Lanka	Urban & rural	General	Conflict	Chronic	Use of existing services	All aspects of access, end-users	Descriptive	Women; children	C	Maternal child health
Heldal (1997)	Nicaragua	Urban & rural	General	Conflict	Chronic	Use of existing services	All aspects of access, end-users	Comparative, before/after	All	B	TB
Hirose (2011)	Afghanistan	Urban	General	Conflict	Chronic	Use of existing services	All aspects of access, end-users	Cross-sectional	Pregnant women	A	Emergency obstetric care (EmOC)
Howard (2010)	Afghanistan	Urban & rural	General	Conflict	Chronic	Scaling up insecticide-treated mosquito nets	All aspects of access, end-users	Cross-sectional	Adult	B	Malaria control
Jordans (2010)	Multiple (Burundi, Indonesia, Sri Lanka, Sudan)	Urban & rural	General	Conflict	Chronic	International medical aid	All aspects of access, end-users; Economic access, workers	Cross-sectional	Children	A	Mental health & psychosocial support (MHPSS)
Khan (2002)	Afghanistan	Urban & rural	General	Conflict	Chronic	Use of existing services	All aspects of access, end-users	Cross-sectional	All	A	TB
Kim (2007)	Sudan	Urban & rural	IDP	Conflict	Chronic	International medical aid	Physical; economic access, end-users	Cross-sectional	All	B	Basic health; mental health; women's health
Kim (2012)	Afghanistan	Urban & rural	General	Conflict	Chronic	Use of existing services	All aspects of access, end-users	Cross-sectional	Women; children	B	Emergency obstetric and neonatal care (EmONC)
Krause (2006)	Multiple	Urban & rural	General	Conflict	Chronic	International medical aid; use of existing services	All aspects of access, end-users	Cross-sectional	Pregnant women	B	Emergency obstetric care (EmOC)
Lee (2009)	Burma	Rural	IDP	Conflict	Chronic	Use of existing services	All aspects of access, end-users	Comparative, before/after	All	B	Malaria control
Lee (2008)	Philippines	Rural	General	Conflict	Chronic	NGO medical aid; use of existing services	All aspects of access, end-users; physical, political access, workers	Descriptive	Pregnant women	C	Maternal health care
Liu (2011)	China	Urban & rural	General	Natural (earthquake)	Chronic	Use of existing services	Physical, informational access, end-users	Cross-sectional	All	B	Mental health & psychosocial support (MHPSS)

Mahn (2008)	Burma	Urban & rural	IDP	Conflict	Chronic	International medical aid; use of existing services	Physical access, end-users	Descriptive	All	C	All
Mateen (2012)	Jordan	Urban & rural	Refugees (Iraqi)	Conflict	Chronic	International medical aid; use of existing services	Physical access, end-users	Cross-sectional	All	B	Primary health care
McIntyre (2011)	Haiti	Urban & rural	General	Natural (earthquake)	Acute	International medical aid; use of existing services	Physical access, end-users	Cross-sectional	All	A	Essential surgery
Mills (2009)	Africa (multiple)	Urban & rural	General	Conflict	Chronic	International medical aid; domestic medical aid	All aspects of access, end-users	Cross-sectional	All	C	HIV/AIDS (combination ART)
Mogollon-Perez (2008)	Colombia	Urban & rural	IDP	Conflict	Chronic	Use of existing medical services	Economic access, workers	Descriptive	All	C	Primary care
Monikawa (2008)	Afghanistan	Rural	General	Conflict	Chronic	Use of existing medical services	Physical access, end-users	Comparative, before/after	All	B	Primary care
Mullany (2008)	Burma	Rural	IDP	Conflict	Chronic	International medical aid; use of existing services	Physical access, end-users	Comparative, before/after	Women	A	Reproductive health services
Mullany (2008)	Burma	Rural	General	Conflict	Chronic	Use of existing services	All aspects of access, end-users	Cross-sectional	Women	B	Maternal health
Oucho (2009)	Botswana	Urban & rural	Refugees, immigrants	Conflict	Chronic	Use of existing services	Physical, economic access, end-users	Cross-sectional	Adults	A	Reproductive health services
Partap (2012)	Nepal	Urban & rural	General	Conflict	Chronic	Use of existing services	Physical access, end-users; physical, political access, workers	Comparative, before/after	Children	A	Child health
Pike (2010)	Kenya	Rural	General	Conflict	Chronic	Use of existing services	Physical access, end-users	Descriptive	All	C	Primary care
Ponsar (2009)	Haiti	Urban	General	Conflict	Acute	International medical aid; use of existing services	Physical, economic access, end-users	Cross-sectional	All	B	All
Qayum (2011)	Pakistan	Rural	IDP	Conflict	Chronic	International medical aid; use of existing services	All aspects of access, end-users	Cross-sectional	All	A	Primary care
Qayum (2012)	Pakistan	Rural	IDP	Conflict	Chronic	International medical aid; use of existing services	Physical, informational access, end-users	Cross-sectional	All	A	Malaria control
Raheel (2012)	Pakistan	Urban	Refugees (Afghan)	Conflict	Chronic	International medical aid; use of existing services	Economic access, end-users	Cross-sectional	Women	B	Contraception
Rajabali (2009)	Multiple	Urban & rural	Refugees (Afghan)	Conflict	Chronic	Use of existing services	Physical access, end-users	Descriptive	All	C	Infectious diseases

Rassekh (2007)	Indonesia	Urban & rural	General	Natural (tsunami)	Acute	International medical aid; use of existing services	Physical, economic access, end-users	Cross-sectional	Under 5s	B	Child health
Roberts (2008)	Afghanistan	Urban & rural	General	Conflict	Early recovery	International medical aid; use of existing services	All aspects of access, end-users	Descriptive	All	C	Basic Package of Health Services
Ruiz-Rodriguez (2012)	Colombia	Urban	IDP	Conflict	Chronic	Use of existing health services	Physical, economic access, end-users	Comparative, descriptive	All	B	Access to medicines
Saadi (2012)	Multiple	Urban & rural	Refugees (Iraqi)	Conflict	Chronic	Use of existing health services	Informational/psychosocial access, end-users	Descriptive	Women	C	Breast cancer screening
Sarani (2012)	Haiti	Urban & rural	General	Natural (earthquake)	Acute	NGO medical aid; use of existing health services	Physical access, workers	Descriptive	All	C	All
Saxena (2006)	Multiple	Urban & rural	General	Natural	Early recovery	WHO intervention; use of existing medical services	All aspects of access, end-users and workers	Descriptive	All	C	Mental health
Simetka (2002)	Sri Lanka	Rural	IDP	Conflict	Chronic	Use of existing services	Physical access, end-users	Descriptive	All	C	All
Tienbre (2011)	Côte d'Ivoire	Rural	General	Conflict	Chronic	Use of existing services	Physical access, end-users	Cross-sectional	All	B	All
Tiwari (2007)	Nepal	Urban & rural	General	Conflict	Chronic	Use of existing services	Discrimination (gender) of access, end-users	Cross-sectional	Adult	A	TB
Van der Hoek (1997)	Sri Lanka	Rural	IDP	Conflict	Chronic	Health volunteers; field laboratory	Physical access, end-users; economic access; workers	Comparative, descriptive	All	B	Malaria control
Van Herp (2003)	DRC	Urban & rural	General	Conflict	Chronic	Use of existing services	Physical access, end-users	Cross-sectional	All	A	All
Varley (2010)	Pakistan	Rural	General	Conflict	Chronic	Use of existing services	Discrimination (sectarian) of access, end-users	Descriptive	Pregnant women	C	Obstetric services
Ventevogel (2012)	Afghanistan	Urban & rural	General	Conflict	Chronic	Use of existing services	All aspects of access, end-user	Descriptive	Adult	B	Mental health
Whelan (2007)	(Multiple) DRC; Yemen; Uganda	Urban & rural	Refugees	Conflict	Chronic	Use of existing services	All aspects of access, end-users	Descriptive	Women	B	Reproductive health services
Wickramasinghe	Sri Lanka	Urban & rural	IDP	Conflict	Acute	NGO medical aid	All aspects of access, end-users	Cross-sectional	All	B	All
Williams (2005)	Afghanistan	Urban	General	Conflict	Chronic	Use of existing services	All aspects of access, end-users	Descriptive	Pregnant women; children	C	Maternal and child health
Zhang (2008)	China	Urban & rural	General	Natural (earthquake)	Acute	Pharmaceutical treatment	Physical access, end-users	Descriptive	All	C	Access to medicines

ANNEX 14:

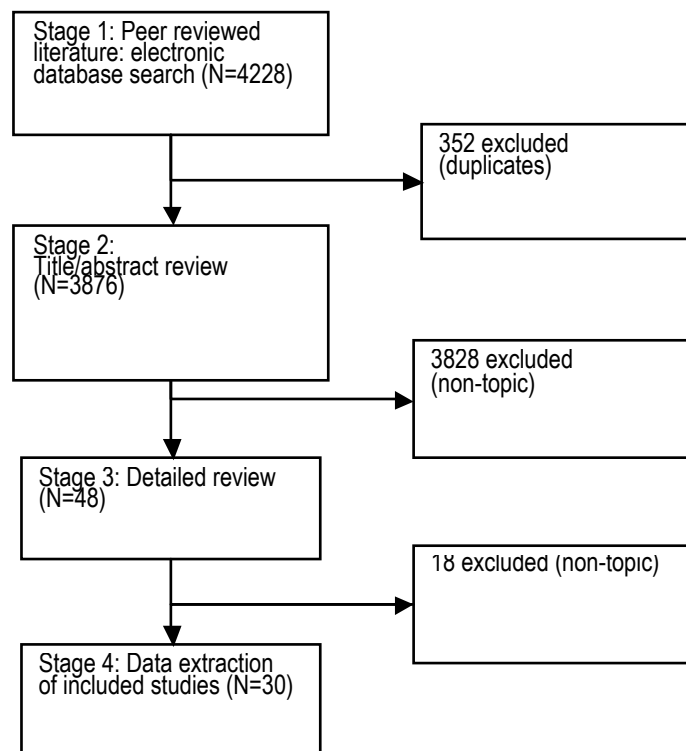
DETAILS FOR SYSTEMATIC REVIEW ON ACCOUNTABILITY TO END-USERS

Sources:

Embase, Global Health, International Bibliography of Social Sciences, Medline, PsychINFO, Web of Science

Health topic specific search terms:

exp "Social Responsibility"/ OR exp "Ethics, Medical"/ OR exp "Patient Rights" OR exp "culture"/ OR "quality of health care"/ OR exp "Guidelines as Topic"/ OR exp "Guideline"/ OR exp "patient safety"/ OR exp "Standard of Care"/ OR exp "Clinical Competence"/ OR exp "Guideline Adherence"/ OR exp "Quality Indicators, Health Care"/ OR (((("end users" OR "end user" OR beneficiar\$ OR patient\$) adj2 (accountability OR obligation OR duty OR right\$)) OR "right to health" OR "right to healthcare" OR ((availability OR acceptability) adj2 (healthcare OR "health care")) OR ((ethical OR ethics) adj2 (medical OR healthcare OR "health care")) OR "informed consent" OR (patient\$ adj2 (privacy OR confidentiality)) OR (cultur\$ adj2 (sensitiv\$ OR appropriat\$ OR acceptab\$)) OR (quality adj2 (healthcare OR "health care" OR medicine\$ OR drug\$ OR surgery OR procedure\$ OR "health worker" OR "health workers" OR "healthcare worker" OR "healthcare workers" OR "health professional" OR "health professionals" OR "healthcare professional" OR "healthcare professionals" OR doctor\$ OR nurse\$ OR "medical staff" OR "medical training" OR "medical skills")) OR (((professional OR gold OR national OR care OR practice OR medical) adj2 (standard\$ OR guideline\$ OR protocol\$)) OR (patient adj2 safety) OR ("professional expectations" OR "standard of care" OR incompeten\$ OR negligent\$ OR irresponsible)).tw



Study authors/year	Study country	Setting	Population type	Humanitarian crisis type	Crisis stage	Type(s) of health interventions	Character of factor influence	Study design	Target age group	Evidence category	Health topic
Beitler (2006)	Afghanistan	Rural	General	Conflict	Chronic	Military support hospital	Quality of care and cure rates	Cross-sectional	All	A	All
Black (2003)	Liberia	Urban & rural	General	Conflict	Chronic	International NGO; UN agencies	Acceptability of care (ethical guidelines)	Descriptive	All	C	All
Bohler (2005)	Sudan	Rural	IDP	Conflict	Chronic	Use of existing services	Availability, quality of care	Cross-sectional, comparative	All	A	TB treatment
Brenman (1992)	Kuwait	Urban & rural	General	Conflict	Early recovery	Use of existing services	Acceptability of care (human rights violations)	Cross-sectional	All	A	All
Chan (2010)	Indonesia	Rural	IDP	Natural (tsunami)	Early recovery	International medical aid	Availability, quality of care	Cross-sectional, comparative	All	A	Primary health care
Chevalier (2002)	Multiple	Urban & rural	General	Conflict; natural	Chronic	International medical aid	Quality of care (appropriate staff training)	Descriptive	All	C	All
Christensen Rand (2011)	Indonesia	Rural	IDP	Natural (tsunami)	Early recovery	Temporary housing	Acceptability, quality of care	Descriptive	All	B	Shelter
Du Mortier (2005)	DRC	Urban & rural	General	Conflict	Chronic	International medical aid; use of existing services	Quality of care (development of indicators)	Cross-sectional, comparative	All	A	Primary care; hospital care
Guthmann	Multiple	Urban & rural	General	Conflict; natural	Acute	MSF malaria program	Quality of care	Cross-sectional	All	B	Malaria control
Harries (2011)	Multiple	Urban & rural	General	Conflict; natural	Chronic	MSF and The International Union Against TB and Lung Disease	Acceptability, quality of care (operational research)	Descriptive	All	B	TB control
Hunt (2008)	Multiple	Urban & rural	General	Conflict; natural	Chronic	International medical aid	Acceptability of care (ethical training)	Descriptive	All	C	All
Hunt (2011)	Multiple	Urban & rural	General	Conflict; natural	Chronic	International medical aid	Acceptability of care (ethical training)	Descriptive	All	C	All
Hussein (2001)	Malawi	Urban & rural	General	Conflict	Chronic	International medical aid; Malawi Safe Motherhood Project	All aspects of accountability	Cross-sectional, comparative	Pregnant women	A	Obstetric services
Kim (2012)	Afghanistan	Urban & rural	General	Conflict	Chronic	Use of existing services	All aspects of accountability	Cross-sectional	Pregnant women, children	A	Emergency obstetric and neonatal care (EmONC)
Kirsch (2012)	Pakistan	Rural	General	Natural (flood)	Acute	International medical aid	Availability of care	Cross-sectional	All	B	All
MacKenzie (2007)	Multiple	Rural	Refugees	Conflict; natural	Chronic	International medical aid	Acceptability of care (informed consent to research)	Descriptive	All	C	All

Mills (2009)	Multiple	Urban & rural	General	Conflict	Chronic	International medical aid; use of existing services	Availability of care	Descriptive	All	B	HIV/AIDS treatment (cART)
Mogollon Perez	Bogota	Urban & rural	IDP	Conflict	Acute	Use of existing services	Availability of care	Descriptive	Adults	C	Basic health needs; mental health
O'Mathuna (2012)	Multiple	Urban & rural	General	Natural	Chronic	International aid; use of existing services	Acceptability of care (informed consent to research)	Descriptive	All	C	All
Partamin (2012)	Afghanistan	Rural	General	Conflict	Chronic	Use of existing services	Availability, quality of care	Cross-sectional	Pregnant women; children	A	Emergency obstetric and neonatal care (EmONC)
Qayum (2011)	Pakistan	Rural	IDP	Natural (flood)	Chronic	International aid; use of existing services	Availability, quality of care	Cross-sectional	All	A	Sanitation and hygiene practices
Qayum (2011)	Pakistan	Rural	IDP	Natural (flood)	Chronic	International medical aid; use of existing services	Availability, acceptability of care	Cross-sectional	All	A	Primary health care
Rutta (2005)	Tanzania	Rural	Refugees (Burundian; Rwandan)	Conflict	Chronic	International medical aid	Acceptability of care	Cross-sectional	All	B	All
Schwartz (2012)	Multiple	Urban & rural	General	Conflict; natural	Chronic	International medical aid	Acceptability of care (ethical training)	Descriptive	All	C	All
Sheather (2011)	Multiple	Urban & rural	General	Conflict; natural	Chronic	International medical aid; MSF	Acceptability of care (ethical training)	Descriptive	All	C	All
Siddique (1995)	DRC (Zaire)	Urban	Refugees (Rwandan)	Conflict	Acute	International medical aid; use of existing services	Quality of care	Descriptive	All	C	Cholera treatment
Sullivan (2004)	Burma; Thailand	Rural	Refugees (Burmese); IDP	Conflict	Chronic	Use of existing services	Quality of care	Cross-sectional; comparative	Adults	A	Reproductive services
Wall (2011)	Multiple	Urban & rural	General	Conflict; natural	Chronic	International medical aid	Acceptability of care (ethical training)	Descriptive	All	C	All
Wang (2012)	China	Rural	General	Natural (earthquake)	Early recovery	Domestic medical aid	Availability, acceptability of care	Cross-sectional; comparative	All	B	Primary care
Zwi (2006)	Multiple	Urban & rural	General	Conflict; natural	Chronic	International medical aid; use of existing services	Acceptability of care (informed consent to research)	Descriptive	All	C	All

ANNEX 15:

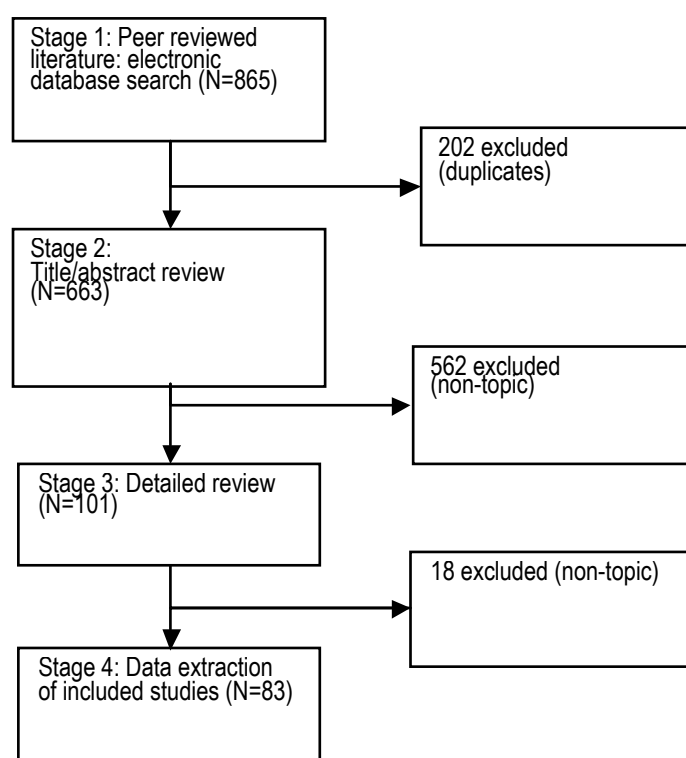
DETAILS FOR SYSTEMATIC REVIEW ON HEALTH ASSESSMENT METHODS

Sources:

Embase, Global Health, International Bibliography of Social Sciences, Medline, PsychINFO, Web of Science

Health topic specific search terms:

("Rapid assessment" OR ((morbidity OR mortality OR population OR nutrition? OR fertility OR "birth rates" OR "birth rates") adj2 (estimat? OR assess?)) OR ((health OR weight OR height OR sanitation OR security OR shelter OR "health needs" OR "security needs" OR "shelter needs" OR water OR hygiene OR threat? OR protection? OR settlement? OR "food security") adj2 assess?)).tw



Study authors/ year	Study country	Setting	Population type	Humanitarian crisis type	Crisis stage	Type(s) of health interventions	Character of factor influence	Study design	Target age group	Evidence category	Health topic
Ager (2011)	Georgia; Gaza; Haiti; Yemen	Both	General	Conflict	Early recovery	International health aid; use of existing services	Inter-agency child protection assessment tool	Descriptive	Children	B	Child protection
Ahoua (2006)	DRC	Urban & rural	IDP	Conflict	Chronic	International health aid; use of existing services	MSF rapid assessment tool	Cross-sectional	All	A	Mortality; living conditions
AlDoori (1994)	Iraq	Urban	General	Conflict	Early recovery	Use of existing services	Nutritional assessment	Cross-sectional	Under 5s	C	Child nutrition
Amowitz (2003)	Afghanistan; Pakistan	Urban & rural	IDP; Refugees (Afghan)	Conflict	Chronic	Use of existing services	Structured interview assessment	Cross-sectional	Adults	C	Mental health
Andersson (2011)	Bosnia	Urban & rural	General	Conflict	Acute	International food aid; use of existing services	Mantel Haenszel procedure; Generalised Mixed Linear Model	Descriptive, comparative	All	A	Food security
Atuyambe (2011)	Uganda	Rural	General	Natural (landslide)	Acute	Use of existing services	Qualitative and quantitative sampling	Cross-sectional	All	A	Water sanitation and hygiene
Barath (2002)	Kosovo	Urban & rural	General	Conflict	Early recovery	Care planning	Ryan-Wegner Coping Style Inventory	Cross-sectional	Children	B	Psychosocial needs of children
Bengtsson (2011)	Haiti	Urban & rural	IDP	Natural (earthquake)	Acute	Care planning	Positional data from mobile SIM cards	Cross-sectional	All	A	Mass population movement
Benner (2010)	Thailand	Urban & rural	Refugees (Burmese)	Conflict	Chronic	Use of existing services	Stratified two-stage sample survey	Cross-sectional	Youth 15 – 24 years	B	Reproductive health services
Bern (1993)	Bangladesh	Urban & rural	General	Natural (cyclone)	Acute	Disaster preparedness	Rapid epidemiological assessment	Cross-sectional	All	B	Excess mortality prevention
Betancourt (2009)	Uganda	Urban & rural	General	Conflict	Chronic	Care planning	Rapid ethnographic assessment	Cross-sectional	Children	B	Mental health
Bisimwa (2009)	DRC	Rural	General	Conflict	Acute	Care planning	Community volunteer census	Cross-sectional	All	A	Food security
Boss (1994)	Somalia	Urban & rural	General	Conflict	Acute	Care planning	Governmental and NGO surveys	Descriptive, comparative	All	A	Morbidity; mortality; nutritional status
Brown (2001)	Multiple	Urban & rural	General	Conflict; natural	Acute	Care planning	Rapid assessment of population size by area sampling	Descriptive, comparative	All	A	Population estimation
Cardozo (2004)	Thailand	Urban & rural	Refugees (Burmese)	Conflict	Chronic	Care planning	Hopkins Symptoms Checklist-25; Harvard Trauma Questionnaire; SF-36 Health Survey	Descriptive, comparative	Adults	B	Mental health and psychosocial support
Cheung (2003)	Afghanistan	Rural	General	Conflict	Acute	Vitamin C supplements	Rapid health assessment	Descriptive, comparative	All	C	Scavy prevention

Cronin (2009)	Multiple (Africa)	Urban & rural	Refugees	Conflict	Chronic	Care planning	WHO methodology	Descriptive, comparative	All	A	Excess mortality from diarrhoeal disease
Degomme (2010)	Sudan	Urban & rural	IDP	Conflict	Chronic	Care planning	Quasi-Poisson statistically modelling of surveys	Cross-sectional	All	B	Excess mortality associated with displacement
Ertl (2010)	Uganda	Urban & rural	General	Conflict	Acute	Care planning	Posttraumatic Diagnostic Scale; Depression section of Hopkins Symptom Checklist	Cross-sectional, comparative	Adolescents; young adults	A	Depression; PTSD
Ezard (2011)	Multiple	Urban & rural	IDP; refugees	Conflict	Chronic	Use of existing services	Intervention-orientated qualitative rapid assessment and response methods	Descriptive	All	B	Substance abuse
Fernando (2008)	Sri Lanka	Rural	General	Conflict	Chronic	Care planning	Sri Lankan Index of Psychosocial Status-Adult Version (SLIPPS-A)	Cross-sectional, comparative	Adults	A	Psychosocial health
Field (1992)	Iraq	Urban & rural	General	Conflict	Acute	Care planning	Nutritional assessment	Cross-sectional	Under 5s	B	Child nutrition
Galway (2012)	Iraq	Urban & rural	General	Conflict	Acute	Care planning	Two-stage cluster sampling method using gridded population data and GIS	Cross-sectional	All	A	Mortality estimation
Garfield (2000)	Iraq	Urban & rural	General	Conflict	Early recovery	Care planning	Logistic regression modelling using health and social indicators	Cross-sectional	Under 5s	A	Mortality estimation
Glass (1980)	Thailand	Urban & rural	Refugees (Cambodian)	Conflict	Acute	Care planning	Rapid health assessment using epidemiology-cal techniques	Cross-sectional	All	B	Mortality estimation
Grays (2006)	Mozambique	Urban & rural	General	Conflict	Acute	Care planning	Quadrat method; T-square method	Descriptive, comparative	All	A	Population estimation
Grandesso (2005)	Sudan	Urban & rural	IDP	Conflict	Acute	Care planning	Rapid assessment of mortality by survey; nutritional status assessment by survey and weight-for-height in <5s	Cross-sectional	All; under 5s	B	Mortality estimation; child nutrition
Grein (2003)	Angola	Urban & rural	General	Conflict	Early recovery	Care planning	Three-stage cluster sampling for interviews	Cross-sectional	All	B	Mortality estimation
Guerena-Burgueno (2006)	Thailand	Urban & rural	General	Natural (tsunami)	Acute	Care planning	Rapid health and needs assessment	Cross-sectional	All	C	All
Guerrier (2009)	Chad	Urban & rural	IDP	Conflict	Chronic	Care planning	Two-stage, 30-cluster household surveys	Cross-sectional, comparative	All	B	Mortality estimation; child nutrition
Guha-Sapir (2003)	Afghanistan; DRC; Somalia; Sudan	Urban & rural	General	Conflict	Acute	International aid for vulnerability reduction	Assessment of relative risk of death during conflict	Descriptive	All	B	Mortality estimation
Hennrich (2005)	Somalia	Urban & rural	General	Conflict	Chronic	Care planning	Somalia Food Security Assessment Unit assessment	Cross-sectional	All	B	Food security

Holt (2003)	Ethiopia	Urban & rural	Refugees (Sudanese)	Conflict	Chronic	Care planning	Focus group discussions and blood tests	Cross-sectional	Adults	B	HIV/STI prevention
Hossain (2003)	Bangladesh	Urban & rural	General	Natural (flood)	Acute	Care planning in acute vs. recovery phase	Weight-for-height anthropometric measurements	Cross-sectional comparative	Children	B	Child nutrition
Hu (2008)	China	Rural	General	Natural (earthquake)	Acute	Screening	Self-reporting questionnaire (SRQ-20) tested by split-half and Cronbach's alpha coefficient	Cross-sectional	Adults	A	Mental health
Jarrah (2006)	Jordan	Rural	Refugees (Iraqi)	Conflict	Chronic	Care planning	Tailored health assessment tool	Cross-sectional	All	B	All
Kaiser (2006)	Multiple	Urban & rural	General	Conflict	Acute	Care planning	Estimate of design effect of cluster-based surveys	Descriptive	All	A	Mortality estimation; child nutrition
Khatib (2010)	Jordan	Rural	Refugees (Iraqi)	Conflict	Acute	Care planning	Dietary, anthropometric and lab indicators	Descriptive	Children; women	C	Nutritional status
Khawaja (2006)	Jordan	Rural	Refugees (Palestinian)	Conflict	Chronic	Civic engagement	Sample survey with logistic regression	Cross-sectional	Adults	A	All
Kim (2009)	DRC	Rural	IDP	Conflict	Chronic	Care planning	Questionnaire and blood tests	Cross-sectional	Women 15–49 years	A	HIV prevention and treatment
Kim (2007)	Sudan	Rural	IDP	Conflict	Chronic	Care planning	Systematic random sampling with surveys	Cross-sectional	All	B	Basic health; mental health; women's health
Kolbe (2010)	Haiti	Urban	General	Natural (earthquake)	Acute	Care planning	Household surveys	Cross-sectional	All	B	Mortality; injury; sexual assault; food security; shelter needs
Laude (1999)	Costa Rica	Rural	Refugees (Nicaraguan)	Conflict	Chronic	Care planning	Weight-for-height; Bayley Scale of Mental Development; Nursing Child Assessment Teaching Scale; Caldwell's Inventory	Cross-sectional	Children; mothers	A	Child nutrition and cognitive development
Lee (2006)	Burma	Rural	General	Conflict	Acute	Care planning	Cluster sampling surveys	Cross-sectional	All	B	Mortality estimation
Mayaud (1997)	Tanzania	Rural	Refugees (Rwandan)	Conflict	Acute	Care planning	Rapid assessment for STD using survey and lab tests	Cross-sectional	Adults	A	STD control
McGrath (2002)	Kosovo	Urban & rural	IDP	Conflict	Acute	Care planning	Infant nutrition and health assessment with international indicators	Cross-sectional	Infants	B	Infant nutritional status
McVicar (2001)	Papua New Guinea	Rural	General	Natural (drought)	Acute	Care planning	Advanced Very High Resolution Radiometer (AVHRR) technology	Cross-sectional	All	B	Food security

Miller (1996)	Mexico	Rural	Refugees (Guatemalan)	Conflict	Chronic	Care planning	Mental health and psychosocial assessment	Cross-sectional	Children	C	Mental health and psychosocial support
Miller (2006)	Afghanistan	Urban & rural	General	Conflict	Early recovery	Care planning	22-item Afghan Symptom Checklist (ASCL)	Cross-sectional	Adults	A	Mental health
Miller (1994)	Pakistan	Urban & rural	Refugees (Afghan)	Conflict	Chronic	Care planning	Health and socioeconomic assessment	Descriptive	Women; children	C	Basic health; child nutrition
Moore (1993)	Somalia	Rural	IDP	Conflict (and famine)	Acute	Care planning	Mortality rate and risk assessment	Cross-sectional	All	B	Mortality estimation
Movaghgar (2005)	Iran	Urban & rural	General	Natural (earthquake)	Acute	Care planning	Opium use and withdrawal assessment	Cross-sectional	Adults	B	Substance abuse management
Mukalay (2012)	DRC	Urban	General	Conflict	Early recovery	Care planning	Logistic regression of survey and anthropometric data	Cross-sectional	Under 5s	A	Child nutrition
Orach (1999)	Uganda	Rural	Refugees (Sudanese)	Conflict	Chronic	Care planning	Review of treatment records; nutritional survey	Cross-sectional	Adults; under 5s	B	Morbidity and mortality estimation; child nutrition
Osborne Daponte (2007)	Iraq	Urban & rural	General	Conflict	Acute	Care planning	Civilian casualty assessment and statistical modelling	Cross-sectional	All	A	Mortality estimation
Panter-Brick (2009)	Afghanistan	Urban & rural	General	Conflict	Chronic	Care planning	Surveys in schools; ASCL; Depression Self-Rating Scale	Cross-sectional	Children 11 – 16 years	A	Mental health
Pawar (2008)	India	Rural	General	Natural (flood)	Acute	Care planning	Rapid assessment of vector breeding and control; treatment seeking behaviour	Descriptive	All	C	Malaria control
Pawar (2005)	India	Rural	General	Natural (earthquake)	Acute	Use of existing services	Village surveys with statistical analysis	Cross-sectional	All	C	Mortality estimation; water, sanitation and hygiene
Pinto (2005)	Sudan	Rural	IDP	Conflict	Acute	Disease outbreak early warning system	WHO, UN, NGO and local authority collaboration	Cross-sectional	All	B	Infection disease control
Potts (2011)	Central African Republic	Urban & rural	General	Conflict	Chronic	Detection of human rights violations; care planning	"Neighbour-hood Method" survey	Cross-sectional	All	B	Primary care; child protection
Prasad (2006)	Afghanistan	Urban	General	Conflict	Chronic	Care planning	Tertiary care hospital ED morbidity and mortality assessment	Cross-sectional	Children	A	Child morbidity and mortality
Qayum (2011)	Pakistan	Rural	IDP	Natural (flood)	Early recovery	Care planning	Health survey	Cross-sectional	All	B	Primary care
Rasekh (1998)	Afghanistan; Pakistan	Urban & rural	General; Refugees	Conflict	Chronic	Care planning	Health and human rights survey assessment	Cross-sectional, comparative	Women	B	Women's health

Roberts (2010)	Afghanistan, Malawi, Tanzania; Thailand	Urban & rural	Refugees	Conflict	Chronic	Care planning	The "Informant Method" and next-of-kin interview assessment	Cross-sectional, comparative	All	A	Mortality estimation
Rossi (2005)	Armenia	Urban & rural	General	Conflict	Chronic	Care planning	Nutritional assessment by questionnaire and anthropometric data	Cross-sectional, comparative	Women; children	A	Nutritional status
Safran (2011)	Haiti	Urban & rural	General	Natural (earthquake)	Acute	Care planning	Mental health survey	Cross-sectional	Adults	C	Mental health
Salama (2001)	Ethiopia	Urban & rural	General	Conflict (famine)	Acute	Care planning	Assessment survey and anthropometric data	Cross-sectional	All	B	Morbidity and mortality estimation; child nutrition
Shears (1987)	Sudan	Rural	Refugees (Ethiopian)	Conflict (famine)	Acute	Care planning	Analysis of health and nutritional epidemiological data	Cross-sectional	All	C	Morbidity and mortality estimation; child nutrition
Singh (2006)	India	Rural	General	Natural (drought)	Acute	Care planning	Nutritional assessment by survey, anthropometric data and clinical signs	Cross-sectional	Under 5s	B	Food security
Sollom (2011)	Burma	Rural	General	Conflict	Chronic	Detection of human rights violations; care planning	Multistage household cluster sampling with interviews	Cross-sectional	All	B	Basic health; food security
Souza (2007)	Indonesia	Urban & rural	General	Natural (tsunami)	Early recovery	Care planning	Hopkins Symptoms Checklist-25 (HSCL)	Cross-sectional	Adults	B	Mental health
Spiegel (2004)	Ethiopia	Urban & rural	General	Conflict (famine)	Chronic	Care planning	Validation of 125 nutritional surveys	Descriptive, comparative	All	A	Food security; nutrition
Spiegel (2001)	Multiple	Urban & rural	IDP	Conflict; natural	Early recovery	Care planning	Validation of 45 mortality assessments	Descriptive, comparative	All	A	Mortality estimation
Stark (2010)	Uganda	Rural	IDP	Conflict	Early recovery	Detection of human rights violations; care planning	Assessment with "Neighbourhood method"	Cross-sectional, comparative	Women	A	Sexual health; gender-based violence
Sullivan (2010)	Multiple	Urban & rural	General	Conflict; natural	Acute	Care planning	Three methods of confidence interval analysis of mortality surveys	Cross-sectional, comparative	All	A	Mortality estimation
Sullivan (2010)	Pakistan	Rural	General; IDP	Natural (earthquake)	Acute	Care planning	Mortality assessment	Cross-sectional	All	B	Mortality estimation
Swain (2005)	India	Rural	General	Natural (super cyclone)	Acute	Care planning	Field survey	Cross-sectional	Women	C	Basic health; nutrition; water, sanitation and hygiene
Thapa (2012)	Nepal	Rural	IDP	Conflict	Acute	Care planning	WHO Disability Assessment Schedule-II; Hopkins Symptom Checklist-25; PTSD Checklist Civilian Version.	Cross-sectional, comparative	Adults	A	Basic health; mental health

Thienkrua (2006)	Thailand	Rural	IDP, general	Natural (tsunami)	Early recovery	Care planning	PsySTART Rapid Triage System; OCLA PTSD Reaction Index; Birlisson Depression Self-Rating Scale; 9-month follow-up	Cross-sectional, comparative	Children 7 – 14 years	A	Mental health of children
Van Griensven	Thailand	Rural	IDP, general	Natural (tsunami)	Early recovery	Care planning	SF-36 Health Survey; Harvard Trauma Questionnaire; Hopkins Symptoms Checklist-25; 9-month follow-up	Cross-sectional, comparative	Adults	A	Mental health
Yamout (2011)	Lebanon	Rural	IDP	Conflict	Acute	Care planning	Hamilton Anxiety Rate Scale	Cross-sectional	Adults	B	Mental health
Yamout (2010)	Lebanon	Rural	IDP	Conflict	Acute	Care planning	Epidemiological survey	Cross-sectional	Adults	C	Mental health
Zhao (2009)	China	Rural	General	Natural (earthquake)	Acute	Screening; care planning	Children's Impact of Event Scale (CRIES-13) vs. clinical diagnosis	Cross-sectional, comparative	Children	A	Mental health

ANNEX 16:

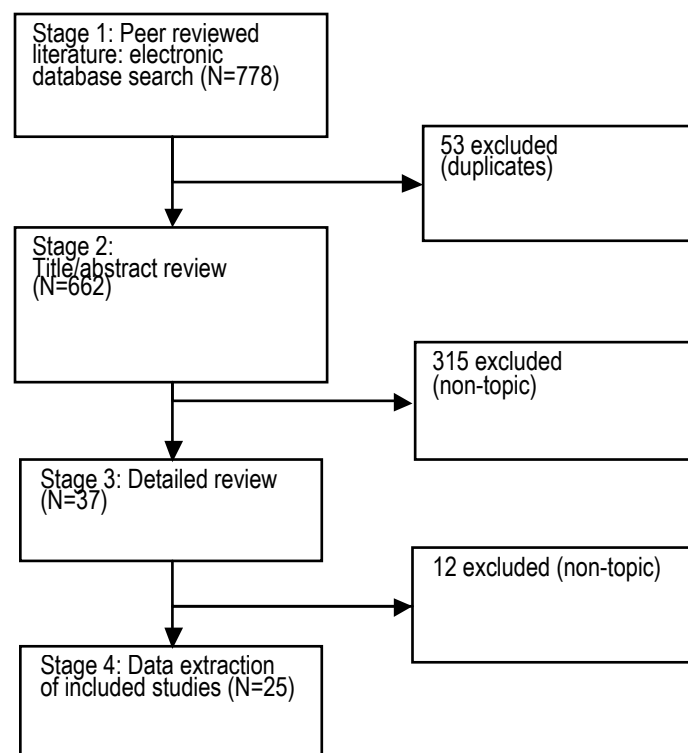
DETAILS FOR SYSTEMATIC REVIEW ON COORDINATION

Sources:

Medline, Embase, Global Health, International Bibliography of Social Sciences, Web of Science.

Health topic specific search terms:

((humanitarian adj2 (coordination OR reform\$)) OR ("cluster system" OR "cluster approach" OR "transformative agenda") OR (ocha adj2 (coordination OR mechanism\$)) OR (("united nations" OR "un" OR agency) adj1 partnership\$) OR ((competition OR rivalry) adj2 (agencies OR funding OR recognition OR data OR interagency)) OR ((leadership OR coordination) adj2 ("health care" OR healthcare OR "medical assistance" OR "medical operations")) OR ("lead health agency" OR "ministry of health" OR "primary health intervention" OR "subsidiary health intervention" OR "primary health interventions" OR "subsidiary health interventions") OR (support adj2 ("local health system" OR "national health system" OR "local health systems" OR "national health systems")))).



Summary data extraction table:

Study authors/ year	Study country	Setting	Population type	Humanitarian crisis type	Crisis stage	Type(s) of health interventions	Character of factor influence	Study design	Target age group	Evidence category	Health topic
Alkashi (2006)	Afghanistan; Cambodia	Urban & rural	General	Conflict	Chronic	NGO medical aid; use of existing services	Coordination of MoH; donors; NGOs	Descriptive	All	C	All
Bile (2011)	Pakistan	Urban & rural	IDP	Conflict	Chronic	NGO medical aid; use of existing services	Application of the UN OCHA "Cluster Approach" through MoH; hosting populations; NGOs	Descriptive	All	B	All
Bile (2010)	Pakistan	Urban & rural	General	Conflict	Chronic	UN agencies; use of existing services	"Delivering as One" initiative coordinating five programs, including health	Descriptive	All	A	All
Bollettino (2008)	Multiple	Urban & rural	General	Conflict	Chronic	NGO medical aid; use of existing services	Security coordination	Descriptive	All	C	All
Chen (2009)	China	Rural	Entrapped	Natural (earthquake)	Acute	Medical transfer	MoH; airline department; railway department	Descriptive	All	A	Patient transfer
Cheng (2009)	China	Rural	Entrapped	Natural (earthquake)	Acute	Up-scaling of existing services	MoH; provincial government; provincial medical security team	Descriptive	All	A	Medical material distribution
Coles (2012)	Haiti	Urban & rural	General	Natural (earthquake)	Early recovery	Local and international medical aid	Building disaster relief networks	Descriptive	All	C	All
Dar (2011)	Pakistan	Urban & rural	General	Natural (flood)	Acute	Local and international medical aid; use of existing services	Global Health UN OCHA Cluster System; non-cluster members	Descriptive	All	B	All
Harmer (2008)	Multiple	Urban & rural	General	Conflict	Acute	NGO medical aid; use of existing services	Integrated missions	Descriptive	All	B	All
Joyce (2006)	Indonesia	Urban & rural	General	Natural (tsunami)	Acute	Military, local and international medical aid	Civilian-military coordination	Descriptive	All	C	All
Laan (2009)	Multiple	Urban & rural	General	Conflict; natural	Chronic	International medical aid	Logistics information management	Descriptive	All	C	All
Landegger (2011)	Uganda	Rural	General	Conflict	Chronic	Local and international medical aid; UN agencies	Cluster Approach	Descriptive	Adults	A	Sexual and reproductive health services
Macalister-Smith (1997)	Multiple	Urban & rural	General	Conflict; natural	Acute	NGOs	NGO coordination; role of UN	Descriptive	All	C	All
McCann (2011)	Haiti; Pakistan	Urban & rural	General	Natural (earthquake; flood)	Acute	International medical aid	Coordination of disaster preparedness and response	Descriptive	All	C	All
Moore (2003)	Mozambi-que	Urban & rural	General	Natural (flood)	Acute	International medical aid	Network analysis and centrality scores	Descriptive	All	B	All
Øverland (2005)		Rural	IDP; refugees	Conflict	Chronic	International medical aid	OCHA coordination of UN and non-UN agencies	Descriptive	All	B	All

Périsser (1996)	Angola	Urban & rural	General	Conflict	Chronic	International medical aid	Role of UN Department of Humanitarian Affairs (DHA)	Descriptive	All	C	All
Sommaruga (1993)	Multiple	Urban & rural	General	Conflict; natural	Acute	International medical aid	Coordinating role of the UN	Descriptive	All	C	All
Stephenson (2005)	Multiple	Urban & rural	General	Conflict; natural	Acute	Local and international medical aid	Role of institutional networks and trust in coordination	Descriptive	All	C	All
Stephenson (2006)	Multiple	Urban & rural	General	Conflict; natural	Acute	Local and international medical aid	Interorganisational social networking in coordination	Descriptive	All	C	All
Stephenson (2006)	Multiple	Urban & rural	General	Conflict; natural	Acute	Local and international medical aid	Interorganisational trust coordination	Descriptive	All	C	All
Stumpenhorst (2011)	Haiti	Urban & rural	General	Natural (earthquake)	Acute	International medical aid	UN OCHA Cluster Approach	Descriptive	All	B	All
Tapia (2012)	Multiple	Urban & rural	General	Conflict; natural	Acute	International medical aid	Two humanitarian information coordination bodies	Descriptive, comparative	All	B	All
Tarantino (2006)	Multiple	Urban & rural	General	Natural (tsunami)	Acute	International medical aid	Civilian-military coordination	Descriptive	All	B	All
Walk (2012)	Haiti	Urban & rural	General	Natural (earthquake)	Acute	USNS Comfort medical aid	MoH; US military; NGOs	Descriptive	All	C	Inpatient care; surgery

ANNEX 17:

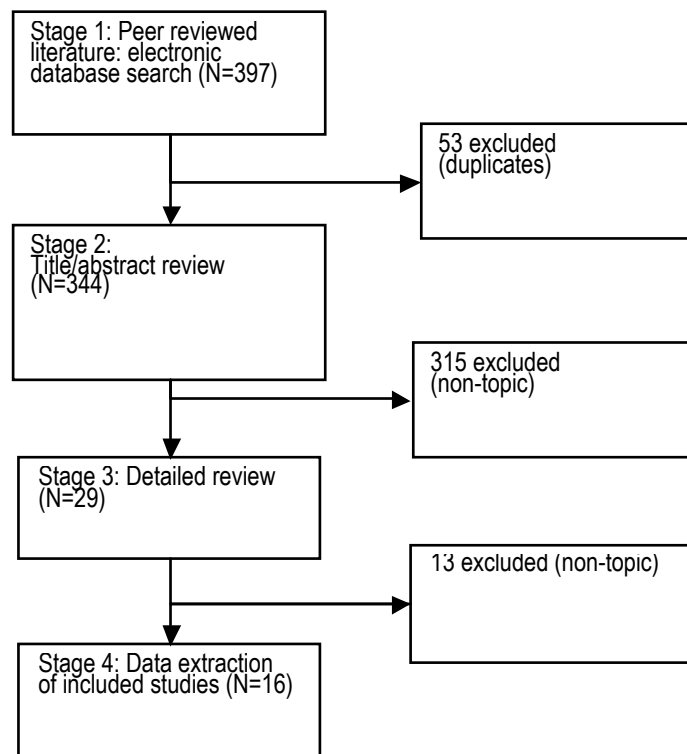
DETAILS FOR SYSTEMATIC REVIEW ON SECURITY OF HEALTHCARE WORKERS

Sources:

Medline, Embase, Global Health, International Bibliography of Social Sciences, Web of Science.

Health topic specific search terms:

(violence/ AND exp Health Personnel/) OR ((security OR safety OR attack? OR death? OR danger? OR threat? OR violence) adj4 ("healthcare worker" OR "healthcare workers" OR "health professional" OR "health professionals" OR "health care worker" OR "health care workers" OR "healthcare professional" OR "healthcare professionals" OR "health worker" OR "health workers" OR doctor? OR nurse? OR "medical operations" OR "aid worker" OR "aid workers"))).tw



Summary data extraction table:

Study authors/ year	Study country	Setting	Population type	Humanitarian crisis type	Crisis stage	Type(s) of health interventions	Character of factor influence	Study design	Target age group	Evidence category	Health topic
Burnham (2012)	Jordan	Both	Refugees (Iraqi doctors)	Conflict	Chronic	Use of existing services	Assassination of doctors	Descriptive	All	C	All
Donaldson (2012)	Iraq	Both	General	Conflict	Chronic	Use of existing services	Assault and gun threat of doctors by patients and family	Cross-sectional	All	C	Emergency department services
Doocy (2010)	Jordan	Both	Refugees (Iraqi doctors)	Conflict	Chronic	Use of existing services	Kidnapping, violence, assassination attempts	Cross-sectional	All	B	All
Faiz (1997)	Afghanistan	Both	General	Conflict	Chronic	Use of existing services	Violence and humiliation of doctors by Taliban	Descriptive	All	C	All
Fast (2010)	Multiple	Both	General	Conflict	Chronic	International medical aid; use of existing services	Murder of and security threat to aid workers	Descriptive	All	B	All
Harmer (2008)	Multiple	Both	General	Conflict	Chronic	International medical aid; use of existing services	Security to aid workers during integrated missions	Descriptive	All	C	All
Hawkes (2012)	Multiple	Both	General	Conflict	Chronic	International medical aid; use of existing services	Security of doctors in changing nature of conflict	Descriptive	All	C	All
Kett (2010)	Multiple	Both	General	Conflict	Chronic	International medical aid; use of existing services	Security of doctors in changing nature of conflict	Descriptive	All	C	All
Rogers (2001)	Multiple	Both	General	Conflict; natural	Chronic	International medical aid; use of existing services	Security of aid workers in changing nature of conflict	Descriptive	All	C	All
Rowley (2008)	Multiple	Both	General	Conflict; natural	Acute	International medical aid; use of existing services	Measuring rate of violence-related mortality and morbidity of aid workers	Descriptive	All	A	All
Schulte (1998)	Multiple	Both	General	Conflict; natural	Chronic	International medical aid; use of existing services	Measuring rate of violence and threats in public health field workers	Descriptive	All	A	All
Van Brabant (1998)	Multiple	Both	General	Conflict	Acute	International medical aid; use of existing services	Security management; deterring violence; seeking increased acceptance	Descriptive	All	C	All
Varley (2010)	Pakistan	Rural	General	Conflict	Chronic	Use of existing obstetric services	Physician targeting reducing medical coverage	Descriptive	Pregnant women	C	Obstetric care
Vastag (2001)	Afghanistan	Rural	General	Conflict	Chronic	International medical aid	Aid worker targeting reducing medical coverage	Descriptive	All	C	All
Webster (2009)	Iraq	Both	General	Conflict	Acute	Use of existing services	Targeting of medical schools, physicians and hospitals decimated health system	Descriptive	All	C	All
Webster (2011)	Multiple	Both	General	Conflict	Acute	International medical aid; use of existing services	Violence against health workers decimated health systems	Descriptive	All	C	All

ANNEX 18:

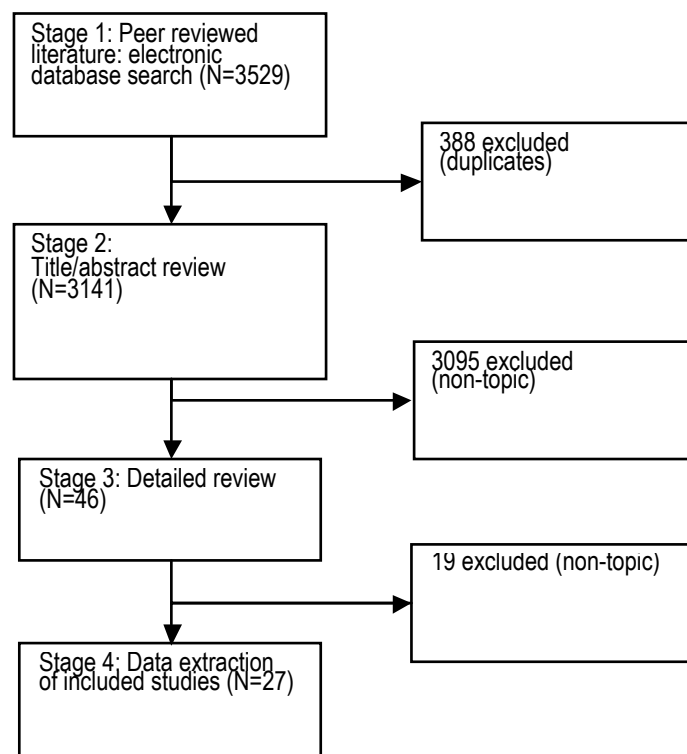
DETAILS FOR SYSTEMATIC REVIEW ON URBANISATION

Sources:

Medline, Embase, Global Health, International Bibliography of Social Sciences, Web of Science.

Topic specific search terms:

"Urban Population"/ OR "Urbanization"/ OR "Urban Health"/ OR "Cities"/ OR "Poverty Areas"/ OR (urban OR urbaniz?
OR urbanis? OR slum OR slums? OR city OR cities).tw



Study authors/ year	Study country	Setting	Population type	Humanitarian crisis type	Crisis stage	Type(s) of health interventions	Character of factor influence	Study design	Target age group	Evidence category	Health topic
Blood (1994)	Multiple	Urban	General	Conflict	Acute	Care planning	Urban warfare morbidity and mortality rates higher	Descriptive	All	C	Mortality estimation
Brown (2012)	Multiple (Asian)	Urban	General	Natural	Chronic	Disaster preparedness	Climate change threat to urban environments	Descriptive	All	C	Health access; food security; shelter security; water, sanitation and hygiene
Chan (2009)	Pakistan	Rural; urban	General	Natural (earthquake)	Early recovery	Care planning	Health availability, access and NCD higher in urban vs rural setting	Descriptive, comparative	Older people	A	Primary care; NCD
Doocy (2011)	Jordan; Syria	Urban	Refugees (Iraqi)	Conflict	Chronic	Care planning	Improved cash-based programs may be more effective use of funding	Cross-sectional	All	A	Food security
Furusawa (2011)	Solomon Islands	Rural; Urban	General	Natural (earthquake)	Early recovery	Care planning	Urban environment at risk of communicable disease as well as NCD needs during crisis	Cross-sectional, comparative	All	B	Infectious disease; NCD
Godoy-Paiz (2011)	Guatemala	Urban	General (Mayan indigenous)	Conflict	Chronic	Care planning	Indigenous women affect by war have particular rehabilitative needs	Cross-sectional	Women	B	Mental health
Goudet (2011)	Bangladesh	Urban (slums)	General	Natural (flooding)	Chronic	Disaster preparedness	Flooding is a major cause of malnutrition in slums	Cross-sectional	All; Pregnant women	A	Food security; nutrition
Goudet (2011)	Bangladesh	Urban (slums)	General	Natural (flooding)	Chronic	Disaster preparedness	Mothers compromise their nutritional intake to protect infants and young children	Cross-sectional	Infants and young children	A	Food security; nutrition
Gutierrez (2012)	Multiple	Urban	Refugees	Conflict; natural	Chronic	Care planning	NCD and collapse of health systems greatest threats; health insurance for refugees	Descriptive	All	C	All
Hadley (2011)	Ethiopia	Rural; Urban	General	Conflict (famine)	Chronic	Use of existing services	Poverty, not urban/rural differences per se, is the risk for food insecurity	Cross-sectional, comparative	All	B	Food security
Harroff-Tavel (2010)	Multiple	Urban	General	Urban violence	Chronic	Care planning	Innovations to mitigate urban violence	Descriptive	All	B	Health-promotion programs
Hosseini (2009)	Iran	Urban	General	Natural (earthquake)	Chronic	Disaster preparedness	Emergency medical response; evacuation; transportation	Descriptive	All	B	Medical evacuation
Houghton (2011)	Multiple	Urban	General	Natural	Chronic	Disaster preparedness	Climate change threat to urban environments: flooding heatwaves; Health Impact Assessment (HIA) of urban planning	Descriptive	All	C	Preventive care

Hurford (2010)	Indonesia	Urban	General	Natural (flooding)	Chronic	Disaster preparedness	1D vs 2D computer modelling to predict flood extent	Descriptive, comparative	All	A	Preventive care
Kirsch (2012)	Pakistan	Rural; Urban	General	Natural (flooding)	Early recovery	Care planning	Urban environments more resilient in disaster recovery	Descriptive, comparative	All	A	Health access; nutrition; water, sanitation, hygiene
Liu (2011)	China	Urban	General	Natural (earthquake)	Acute	Disaster preparedness	Urban health facilities and shelter must take account of seismic faults and threats	Descriptive	All	B	Health access
Liu (2010)	China	Rural; Urban	General	Natural (earthquake)	Early recovery	Care planning	Girls, older age groups and those from rural areas suffer more PTSD than those from urban areas	Cross-sectional, comparative	Children 11 – 17 years	A	Mental health
Lucchi (2010)	Brazil; Haiti; Guatemala	Urban	General	Urban violence	Chronic	Care planning	Health provision strategies outside traditional conflict setting	Descriptive	All	B	Health access
Lucchi (2012)	Multiple	Urban	General	Urban violence	Chronic	Care planning	Health provision strategies outside traditional conflict setting	Descriptive	All	A	Health access
Mullen (2008)	Burundi	Rural; Urban	General	Conflict	Chronic	Use of existing services	Lower socioeconomic status and greater distance from health facility reduces mental health and increases mortality in urban but not rural settings	Cross-sectional	All	A	Health access; mental health
Munslow (2010)	Multiple (Asia)	Urban	General	Natural	Chronic	Disaster preparedness	Climate change threat to urban environments: flooding, drought	Descriptive	All	B	Health access
Najarian (2001)	Armenia	Urban	General; IDP	Natural (earthquake)	Early recovery	Care planning	Urban relocation associated with more mental health problems than non-relocation	Descriptive, comparative	Women	B	Mental health
Ochoa (2007)	Multiple	Urban	General	Natural	Chronic	Disaster preparedness; coordination	Extreme events affect urban areas more, necessitating more efficient decision-making and coordination	Descriptive	All	C	All
Puertas (2006)	Colombia	Urban (slums)	IDP	Conflict	Chronic	Use of existing services; care planning	IDP with health care cards had less mental health issues than those without	Cross-sectional	Adults	A	Health access; mental health
Rashid (2000)	Pakistan	Urban	General	Natural (flooding)	Acute	International medical aid; use of existing services; care planning	Major health challenges: water, sanitation, hygiene; diarrhoeal disease; domestic violence	Descriptive	All	C	Water, sanitation, hygiene; diarrhoeal disease
Ruiz-Rodriguez (2012)	Colombia	Urban	IDP; General	Conflict	Chronic	Use of existing services	IDP and non-IDP have similar access to medicines	Cross-sectional, comparative	All	A	Access to medicines
Suriya (2012)	India	Urban	General	Natural (flooding)	Acute	Care planning	Urban environments flood-prone	Descriptive	All	C	Health access



LONDON
SCHOOL *of*
HYGIENE
& TROPICAL
MEDICINE



HARVARD
SCHOOL OF PUBLIC HEALTH

