



Identifying and tackling the social determinants of child malnutrition in urban informal settlements and slums: a cross national review of the evidence for action

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Pathways to better nutrition Series 1



NICK

Nutritional Improvement for
children in urban Chile and Kenya

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Urbanisation can bring many benefits but in many cities the rate of change has been so fast and so dramatic that local and national governments have been unable to cope. Urban growth has outpaced their ability to build essential infrastructures leading to widespread social inequity and social stratification environmental degradation, heavy migrant inflows, and a breakdown of the social support systems and networks. In these poor urban areas there is a strong and well established link between the various dimensions of disadvantage and child malnutrition (both undernutrition and overnutrition).

NICK (Nutritional Improvement for children in urban Chile and Kenya) is a three year study that started in October 2010 with funding from the UK Government Department for International Development (DFID) through the Economic and Social Research Council. This study helps the cities of Mombasa in Kenya and Valparaíso in Chile reduce child malnutrition using participatory action research to broaden stakeholder participation at municipal level to change the social determinants. These determinants control the everyday conditions in which people are living and include education, income, working conditions, housing, neighbourhood and community conditions, and social inclusion. It is envisaged that this study will contribute to existing knowledge and also serve as a useful guide for action not only in Kenya and Chile but also in other countries with high levels of child malnutrition.

The partners

The research team is led from the Department of Humanities and Social Science, Institute of Education, University of London and the research is being developed collaboratively with partners in Chile and Kenya.

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Disclaimer

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**Nutritional improvement for children in
poor urban areas of developing countries:
A cross national review of the evidence for
action on the social determinants**

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Pathways to better nutrition Series No 1

Abstract

This primary aim of this structured literature review is to identify the social determinants of child malnutrition in the informal urban settlements and slums of developing countries and to synthesise evidence on the effectiveness of interventions to reduce malnutrition through changing these determinants. A secondary aim is to draw out the implications of the findings for the further development of a three year research study known as the NICK Project (**N**utritional **I**mprovement for children in urban **C**hile and **K**enya).

The review showed that the ability of children in poor urban families to access and utilize adequate nutritious food and maintain a healthy energy balance is influenced by a wide range of social determinants. These determinants control the social, economic and environmental conditions in which these children are born, grow and live, including the health and social systems; they are multisectoral and operate at multiple levels. At the household level they include: material circumstances, social cohesion/support networks, cultural and psychosocial factors influencing behaviours and child care practices, and access to healthy food and to public services. At the municipal level they include local governance, legal and political structures, employment opportunities, control of markets and willingness of food companies to support social health and nutrition goals, capacity of civil society, women's status in society and capacity of local government to implement macro-economic pro-poor policies.

Interventions to change the social determinants to create a more enabling environment for good child nutrition therefore need to go beyond targeting individual beliefs and behaviours and seek to change the social, economic and environmental factors at the household and municipal level that lead to child malnutrition. These interventions are difficult to evaluate because they need to be complex and multisectoral and are often diffuse and community-based. It is not surprising, therefore that the review found that evidence for the effectiveness of these interventions is ambiguous and, in the studies examined, always context specific. Nevertheless, there is some evidence to support a range of actions, pathways and mechanisms through which broadening community and stakeholder participation has been shown to change the social determinants and reduce child malnutrition in a sustainable way.

The findings from the review present a number of challenges for the further development of the NICK Project. The NICK research team will need to overcome the difficulties that have been experienced in the past in bringing together multisectoral groups to design, implement and evaluate multisectoral actions. This will require developing a participatory educational process that build leadership and advocacy skills and create a space for participants to share and use their local knowledge and so develop new ways of thinking about child malnutrition that can lead to more effective solutions. The new thinking needs to acknowledge the value of multisectoral actions to create a more enabling environment with effective national and municipal governance structures and institutions in place to support local actions. The research team will also need to ensure that the actions designed can lead to a measurable change in child nutritional status after only 18 months of intervention. The challenges are many and every opportunity must be grasped to improve the nutrition and the lives of the millions of children living in informal settlements and urban slums.

Acknowledgement

The author wishes to acknowledge that some of the evidence for action on child undernutrition presented in this review draws on an earlier review commissioned by the Danish Ministry of Foreign Affairs (DANIDA) (see Pridmore and Carr-Hill 2009).

Table of Contents

Abstract	4
Acknowledgement	5
List of figures	7
List of Acronyms	8
Glossary of working definitions	9
1 Introduction	11
1.1 Problem statement and rationale	11
1.2 Objectives and methods	15
1.3 Overview of relevant terms and concepts	17
1.4 Nutrition and HIV/AIDS	19
1.5 Costing challenges	19
1.6 Organisation of the review	20
2. The social determinants of child malnutrition in poor urban areas	22
2.1 Frameworks to understand the nature of social determinants	22
2.2 Framework to understand urban health	24
2.3 The social determinants of child nutrition in poor urban areas	25
2.4 The nutrition transition	27
2.4 Child obesity as a market failure	28
2.6 Summary	29
3. Evidence for the effectiveness of interventions to change social determinants	31
3.1 School-based promotion of individual lifestyle changes	31
3.2 Increasing food security	32
3.3 Maternal education to improve the quality of child care	33
3.4 Increasing access to and use of health and social services	34
3.5 Using government regulation and fiscal levers	34
3.6 Strengthening democratic governance	36
3.6 Broadening community participation	38
3.7 Raising woman's social position in society	41
3.8 Reforming macro-economic and social policies	42
3.9 Synthesis	42
4. Discussion and conclusion	43
4.1 Making multidisciplinary interventions work	43
4.2 Facilitating the participatory action research groups	44
4.3 Entry points and meaningful community participation	44
4.4 Key issues and challenges of assessment	45

4.3 Concluding comments	46
References	48
Appendix 1 Search strategy	56
Appendix 2 Cost effectiveness	62
Appendix 3 Actions needed to address HIV, food security and nutrition	68
Appendix 4 Lessons learned from successful community-based food and nutrition programmes	70
Appendix 5 Examples of public policy that has successfully improved women's status	71

List of figures

Figure 1 Indicators of child malnutrition	18
Figure 2 Conceptual framework for child nutrition, health and survival	22
Figure 3 Conceptual framework for the Commission on Social Determinants of health	23
Figure 4 A conceptual framework for urban health	24
Figure 5 Stages of the nutrition transition	28
Figure 6 Key strategies to reduce childhood obesity in cities.....	40

List of Acronyms

ACC/SCN	Administrative Committee on Coordination Sub-Committee on Nutrition
AIDS	Acquired Immune Deficiency Syndrome
BMI	Body Mass Index
CBNP	Commission on the Social Determinants of Health Community Based Nutrition Programme
CCT	Conditional Cash Transfer
CE	Community Engagement
CSDH	Commission on the Social Determinants of Health
CSR	Corporate Social Responsibility
DANIDA	Danish Ministry of Foreign Affairs
DFID	Department for International Development
DHS	Demographic Health Survey
EMBASE	Excerpta Medica Database
FAO	Food and Agriculture Organisation of the United Nations
GTZ	GIZ - Deutsche Gesellschaft für Internationale Zusammenarbeit
HIV	Human Immunodeficiency virus
HMIC	Health Management Information Consortium
HMIC	Health Management Information Consortium
HUP	Healthy Urbanisation Project
ICO	Information Commissioner's Office
IFPRI	International Food Policy Research Institute
ISI	Social Science Citation Index
JUNJI	National Board of Day Care Centres in Santiago, Chile
KNUS	Knowledge Network on Urban Settings
MCH	Maternal and Child Health
MDG	Millennium Development Goals
MEDLINE	Medical Literature Analysis and Retrieval System Online
MOH	Ministry of Health
MOST	Multiphase Optimization Strategy
MUAC	Middle Upper Arm Circumference
NGO	Non-Governmental Organization
NHS	Economic Evaluation Database
NICHE	National Institute of Health and Clinical Excellence
NICK	Nutritional Improvement for children in urban Chile and Kenya

NR-NCD	Nutrition-Related Non-Communicable Diseases
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
PANS	Participatory Nutritional Surveillance
PLA	Participatory Learning and Action
SES	Socio-Economic Status
SSA	Sub-Saharan Africa
SSB	Sugar-Sweetened Beverages
UDHR	Universal Declaration of Human Rights
UNCRC	The United Nations Convention on the Rights of the Child
UN-HABITAT	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WFP	World Food Programme
WHO	World Health Organisation
WHO CSDH	Commission on Social Determinants of Health
WHOLIS	(World Health Organization)
WKC	WHO Centre for Health Development in Kobe, Japan

Glossary of working definitions

Accountability: This involves measures to ensure that the person or organisation with the authority to provide a service actually delivers that service to the best of their ability. Mechanisms need to be in place for providers and policy-makers to be answerable for their actions, in other words, obliged to justify their stance or approach and to be transparent i.e. demonstrate that they have delivered. Also important is the ability to enforce a response and to use sanctions if one is not provided.

Public Accountability for nutrition is defined as the public sector being responsive to undernutrition problems by not only raising awareness to create knowledge and public demand, but also taking action to address the problem and providing information on how, why, what, and for whom, to the population at large, and the poorest in particular.

Food and nutrition security - food security exists in a nation or a household 'when all people, at all times, have access to sufficient, safe and nutritious food to meet their food preferences for an active and healthy life'. Nutrition security differs from food security in being concerned not only with access to food but also with the utilization of food within the home.

Governance in the urban setting refers to the sum of the many ways in which individuals and institutions (private and public) plan and manage the common affairs of the city. The dimensions of good governance are participation, rule of law, transparency, responsiveness, equity, effectiveness and efficiency, accountability and strategic vision.

Nutritional status is the physiological condition of an individual that results from the balance between nutrient requirements and intake and the ability of the body to use these nutrients. Undernutrition is a condition in which the body does not have enough of the right

kind of food to meet its energy, macronutrient (proteins, carbohydrates and fats) and micronutrient (vitamins and minerals) needs. Overnutrition is a condition in which the body has too much food, especially fats and sugars. **Both under- and overnutrition are forms of malnutrition.**

WHO indicators of child malnutrition

Overweight: Proportion of under-fives falling above 2 standard deviations (overweight and obese) and above 3 standard deviations (obese) from the median weight-for-height of the reference population.

Underweight (overall measure): Proportion of under-fives falling below minus 2 standard deviations (moderate and severe) and minus 3 standard deviations (severe) from the median weight-for-age of the reference population.

Stunting (too short): Proportion of under-fives falling below minus 2 standard deviations (moderate and severe) and minus 3 standard deviations from the median height-for-age of the reference populations.

Wasting (too thin): Proportion of under-fives falling below minus 2 standard deviations (moderate and severe) and minus 3 standard deviations from the median weight-for-height of the reference population.

Social determinants of child malnutrition - are a broad range of social, economic and environmental factors operating at multiple levels of social organizations that can lead to inequities in the level and distribution of nutrition in a population. They operate through controlling the human, economic and organizational resources available at the household level and are affected by the degree of social justice in society and the status and autonomy of women.

Responsiveness: The degree to which health providers and policy makers respond to the concerns and suggestions of clients and communities by changing the way business is done in the health sector. This may involve a change in attitude, organisational culture, systems, procedures or policies.

Voice: The ways in which citizens place pressure on health providers and policy makers to improve health services. This could be by complaining, seeking redress, protesting, lobbying or participating in decision-making forums.

1 Introduction

The primary aim of this structured literature review is to synthesize what is known about the effectiveness of interventions to reduce child malnutrition through changing the social determinants in poor urban areas of developing countries. The review focuses on child malnutrition because studies have shown that the early childhood years are the most critical. The importance of nutrition intervention throughout the lifecycle is also acknowledged.

A secondary aim is to draw out the implications of the findings for the further development of a three year research study known as the NICK Project (**N**utritional **I**mprovement for children in urban **C**hile and **K**enya)¹. This project aims to help two cities, Mombasa and Valparaiso, reduce child malnutrition in children less than five years of age living in poor urban areas of these cities by intervening at the municipal level to broaden community and stakeholder participation and provide exemplars of successful small-scale interventions that can change the social determinants. If successful, the innovative approach used in this study could serve as a useful guide for action in the cities of other high burden countries.

1.1 Problem statement and rationale

The rapid increase in the urban population is one of the most important global health issues of the 21st century. For the first time in history more than half the world's population now lives in urban settings and more than half of the urban residents in many low-income countries live in informal settlements and slums (World Bank, 2009 p.1). Urbanisation can bring many benefits the rate of change but in many developing countries the rate of change has been so fast and so dramatic that many cities have been unable to cope. Rapid, unplanned urbanisation has led to widespread social inequity and stratification, the rapid growth of informal settlements and slums, environmental degradation, heavy migrant inflows, and breakdown of the social support systems and networks (Martin-Prevel et al., 2000).

It is not surprising, therefore, that there is a strong and well established link between child malnutrition and various dimensions of disadvantage in the urban setting. Child undernutrition has become an endemic problem in many poor urban areas of developing countries, jeopardizing the physical and mental development of growing children. At the same time, social conditions and globalisation create the emerging risk of child overweight and obesity due to consumption of inappropriate foods, promoted as a part of the processes of globalization of food production systems, and lack of physical activity linked to changes in occupational and leisure activities. Many cities in the developing world are therefore facing a double burden of child under-nutrition and obesity and municipal governments are uniquely positioned to play a leading role in addressing these problems (Libman et al., 2010, KNUS, 2008).

The neglected crisis of child undernutrition

Access to food is a basic human right, supported by an international human rights framework that makes governments legally accountable for the nutritional status of their people². Nevertheless, recent estimates for 2004 suggest that undernutrition was responsible for about 35% of child deaths and 11% of the total global disease burden (Black et al., 2008); and subsequent analyses, using the new WHO (2006), standards show that

¹ This review complements those by Beatriz Salgado Diez and by Daniel Lang'o which focus on Chile and Kenya respectively and are published at www.nick.ioe.ac.uk

² The 1990 United Nations Convention on the Rights of the Child states that every government has a responsibility to combat disease and undernutrition through the provision of adequate nutritious food.

growth faltering in early childhood is even more pronounced than previously suggested. These estimates give serious cause for concern because the consequences of child malnutrition, especially during the first two years of life, are both long-term and irreversible, reducing educational achievement and negatively impacting human capital development (Grantham-McGregor et al., 2007, Victora et al., 2008). For these reasons undernutrition and micronutrient deficiencies were identified as the biggest development challenge facing the world today by the panel of economists at Copenhagen Consensus 2008³.

Furthermore, the situation is increasing in gravity as many developing countries suffer multiple structural assaults from the current food fuel and financial crises coming on top of climate changes, all of which threaten the livelihoods of millions of families who are poor. As a result of these crises, large numbers of vulnerable households have reduced the quality and quantity of foods they consume and are at risk of increased malnutrition. Recent simulations by Brinkman de Pee et al. (2010) suggest that energy consumption declined between 2006 and 2010 in nearly all developing regions, resulting potentially in an additional 457 million people at risk of being hungry, and many more unable to afford the dietary quality required to perform, develop, and grow well. The population groups most affected are those with the highest requirements, including young children, pregnant and lactating women, and the chronically ill (particularly people with HIV/AIDS and tuberculosis).

It has been widely acknowledged that the urban poor are disproportionately vulnerable to the recent food and fuel price crises which bring higher unemployment and underemployment. A recent review by Ruel et al. (2010) shows that it is the poorest of the poor who will be most affected and that the magnitude and severity of their suffering depends on their ability to adapt and on the specific nature, extent, and duration of the coping strategies they adopt. Ruel et al. conclude that a better understanding of how these coping strategies are used and staggered is critical to help design triggers for action that can prevent households from moving to more desperate measures. Using early coping strategies as early warning indicators could help prevent dramatic losses in welfare.

It is clear from this description of the problem of child undernutrition that measures to mitigate the impact of the nutrition crisis in poor urban areas are urgently required. Despite this need, the problem is of low national priority in nearly all high burden countries (Bryce et al., 2008) and child undernutrition is being viewed as a silent emergency by advocacy organizations.

The situation in Mombasa, Kenya – one of the two study sites for the NICK Project: Kenya is a low income country that is moving into the nutrition transition. Urban food insecurity has been increased by post-election and political violence (2007-2008) followed by disrupted rains (2008-2009) coming on top of a reduction in disposable income throughout the country. Consequently, Mombasa is experiencing high levels of child undernutrition and social problems amongst the urban poor. A recent study noted a precipitous decline in food consumption in informal settlements in this city⁴ and rising rates of acute malnutrition, previously not problematic within the informal high density areas, indicative of deteriorating food security. In these areas the composition and frequency of meals has declined precipitously, with 37 percent of households reporting only one meal per day, including restricted food consumption for adults. Coping strategies common in low-income urban areas and especially within the Coast Province include increased indebtedness, migration of household members in search of alternative income opportunities, the sale of household goods for cash hungry households or worse, increased sexual exploitation of children forced into transactional sex.

³ See: <http://www.copenhagenconsensus.com/CCC%20Home%20Page.aspx>

⁴ See (http://www.kenyafoodsecurity.org/monthly_bulletins/2009/march.pdf)

The growing pandemic of child obesity

Alongside the crisis caused by child undernutrition, the growing pandemic of child overweight and obesity is also recognised to be a major public health problem and economic threat worldwide (Medina-Blanco et al., 2010). Childhood obesity predisposes to adult obesity with increased risk of morbidity and mortality from chronic diseases such as diabetes mellitus, coronary heart disease and certain cancers. Being obese can also cause psychological and social problems for children (Summerbell et al., 2005, Mulder et al., 2009). Children who are obese are more likely to have weight and health problems as adults⁵.

There is evidence to suggest that most childhood obesity is established during the preschool years (when long-term dietary and physical activity habits are being established) leading to lifelong effects on health (Lanigan et al., 2010). For example, a review of observational studies and follow-up of randomized feeding trials by Gillman (2010) found mounting consistency of results to suggest that rapid weight gain in the first half of infancy predicts later obesity and higher blood pressure. Gilman called for more interventions to modify the determinants of this rapid weight gain and for any interventions that prove to be efficacious to be incorporated into clinical and public health practice in a cost-effective manner.

Although child obesity was rare in developing countries thirty years ago, available estimates for the period between the 1980s and 1990s show the prevalence of overweight and obesity in children increased up to almost four times in developing countries. In Brazil, for example, child overweight and obesity increased from 4% to 14% (Flynn et al., 2006). Childhood obesity is particularly prevalent in areas that have seen rapid economic growth, urbanisation and cultural transition. Amongst developing countries, the highest prevalence of child obesity is found in countries in Latin America, the Middle East and North Africa, which are undergoing, or have recently undergone the nutrition transition from low to high fat and sugar diets⁶ (de Onis and Blossner, 2000). Recent figures for Chile, for example, show that almost one in five children are now obese (Kain et al., 2009b). There is also a growing body of literature to suggest that whilst the relationship between socio-economic status (SES) and obesity is positive in lower-income contexts, it is inverse in higher-income contexts, particularly in females (Dahly et al., 2010).

The situation in Valparaíso, Chile – the second study site for the NICK Project. Chile is a middle income country that has recently emerged from the nutrition transition due to social and economic progress. However, the city of Valparaíso is still experiencing problems of poverty and exclusion, which have been overlooked in part because of the city's strong economic performance and impressive aggregate social indicators. In Valparaíso there is spiralling child malnutrition, in the form of over-weight and obesity (Kain et al. 2002), especially in low income families, and the Ministry of Health has recognised the need to control the social determinants of this problem (MOH 2005). The national prevalence of over-weight increases with age being 6% in children 2-3 years old, 11% in children 3-4 years old, and 14% in children 4-5 years old (Vio del Rio et al. 2006). The Regional Health Office of Valparaíso has found that 9% of pre-school children attending primary health clinics are over-weight, and that school children in grade 1 show higher prevalence of obesity rates (20,6%) than the national prevalence (19,4%). High levels of obesity in adult members of low income families linked to increases in diabetes and hypertension are also a cause for serious concern. Educational interventions to encourage healthy eating and

⁵ A more comprehensive analysis of the consequences of childhood obesity is given by WHO (2000) Obesity: Preventing and managing the global epidemic. Geneva, The World Health Organisation..

⁶ The nutrition transition is examined further in Section 2.

physical activity have not been sufficient to reduce obesity rates and there is a need to further address the problem.

The coexistence of child over- and undernutrition in the same household

In the urban areas of many developing countries undergoing the nutrition transition, the transition is taking place so rapidly that child undernutrition and micronutrient deficiencies have been reported to widely coexist with child overnutrition - even within the same families - creating a 'double burden' of disease. (Angeles-Agdeppa et al., 2003, Khan and Khoi, 2008, Villamor et al., 2006, Mvo et al., 1999, Felisbino-Mendes et al., 2010). This 'double burden' is a relatively new phenomenon but it is reported to affect as many as 60% of households in these areas (Caballero, 2005). Child undernutrition has also been shown to predispose to early onset adult chronic diseases (Singhal, 2007).

The time is right to address child malnutrition

Despite the well-documented crisis of child malnutrition there are few examples of at-scale urban responses and very few systematic assessments of 'urban responses'. However, there is currently a window of opportunity to address child malnutrition because political interest has been heightened by the need to take further action to achieve the MDGs⁷ and mitigate the impact of the food crises on families living in poverty. At the same time, awareness of the need to address social determinants has been raised by the report from the WHO Commission on the Social Determinants of Health (CSDH) (WHO, 2008). This report challenged policy makers and planners to develop a more nuanced understanding of the social factors operating within communities and to know when and how these new strategies can be used at different levels to help build collective experiences for social transformation. The report concluded that 'Social inequities are killing people on a grand scale' (p.248) and identified nutrition as a critical governance issue. It also made three key recommendations to guide action on the social determinates to improve health and nutrition: (i) improve daily living conditions (ii) tackle the inequitable distribution of power, money and resources and (3) measure and understand the problem and assess the impact of action.

The need for actions to go beyond individual lifestyle changes and be part of broader, holistic, social development processes that address up-stream structural determinants was also identified by Pridmore et al. (2007). The authors highlighted the need to strengthen linkages between the community and other stakeholders and called for research to further clarify the pathways and processes involved. There have been further calls for studies in low and middle-income countries to evaluate what works in intervening to change the social determinants (Pridmore and Carr-Hill, 2010, Ruel, 2008, Poskitt, 2009, Khan and Khoi, 2008) including a call by Lanigan and Barber (2010) for more studies on what works in the pivotal pre-school age-group where evidence is limited and few studies aiming to improve diet, increase physical activity and achieve behavioural have been successful.

This literature review responds to these calls by seeking to determine what is already known about the social determinants of child malnutrition in urban slums and informal settlements and about effective interventions to change them through broadening stakeholder participation.

⁷ Adequate nutrition is a crucial input to the first six Millennium Development Goals (MDGs) (Save the Children 2009) and improving nutrition can therefore help to move the MDGs back on track.

1.2 Objectives and methods

The objectives of this literature review are;

- (i) To synthesise the available evidence on what works and how interventions need to be designed to reduce child malnutrition in informal settlements and urban slums by changing the social determinants through broadening community and stakeholder participation.
- (ii) To identify the implications of the findings for the further development of the NICK Project.

Searching the literature

A structured electronic search was conducted from 20-26th October 2010 to identify evaluations and studies that could inform the evidence base on effective interventions to address the social determinants of child nutritional status in urban, informal settlements and slums and identify key entry points⁸. The following data bases and internet sites were searched: MEDLINE and MEDLINE in Process, EMBASE, HMIC, NHS Economic Evaluation Database, Social Science Citation Index, WHOLIS (World Health Organization); the British Library catalogue and the Library of Congress Catalogue and the website of the World Health Organization on nutrition. All databases were searched from 2000 to the most recent date available. No language or study design limits were applied. Reference lists were then checked manually and experts were also contacted. Full details of the search strategy and the string of search terms that were tested and found to be most effective in identifying the relevant literature are given in Appendix 2. The references from the electronic searches were subjected to a title and abstract scan to remove those that did not address the social determinants. Significant efforts were then made to identify further documents in the “grey literature” through searching the websites of more development agencies and also Google Scholar. This search identified 200+ reports and documents. A number of experts from various international organizations and universities were contacted through e-mail to ask for copies of reports documenting their experiences. Further publications were obtained by going through the references of the retained publications to identify those that were relevant.

All the papers, articles, reports, reviews, books etc. (totaling 2249) were placed in a Master Endnote library. They were then subjected to further scrutiny and a total of 49 evaluations and studies of relevant interventions selected for critical appraisal in Section 3 (The evidence base for interventions to change the social determinants of child malnutrition in poor urban areas), based on high appraisal scores using the selection criteria listed below.

Selection criteria

- Up-to-date (2000-2010);
- Offering a representative aspect of a range of different interventions to influence the social determinants of child nutrition: (sector-based) agricultural, broad-based, community-based; (approach-based) mother and child programmes (maternal education); gender equality etc.;
- Offering a range of different donors/NGO e.g. World Bank; Save the Children and UNICEF; Country-led, partnership of two or more of the above etc.;
- Methodologically sound programme evaluations, including programmes deemed unsuccessful as well as successful, where the reasons for success or lack thereof were identified and analysed;

⁸ An entry point is a particular setting for the application of activities that aim to improve nutritional status.

- Methodologically sound studies (surveys, reviews etc) of a particular aspect of nutrition and especially the underlying causes of this;
- Addressing broader policy or strategic objectives, such as the planning/prioritising of a national governmental programme of aid.

Sixty seven further readings were selected to inform the Section 1 (Introduction), Section 2 (The social determinants of child undernutrition in poor urban areas) and Section 4 (The discussion).

Framework for analysis of selected evaluations and studies

The framework for analysis together with the criteria used to identify methodologically sound evaluations and studies is shown below:

1. Macro-economic environment and the constraints/ opportunities - adequately described; other macro policy issues.
2. Type of intervention and its implementation - adequately described.
3. Aims and objectives.
4. Intersectoral collaboration - described in terms of urban/rural, production systems, main occupation, etc.
5. Geographical location.
6. Methodology/design - methodologically sound – to include:
 - General Criteria*
 - Appropriate design– given the nature of the intervention;
 - Plausibility - alternative explanations for the results considered;
 - Peer reviewed;
 - Selection has been ruled out or minimized by design or analytical strategy;
 - External Evaluation of impact on nutritional status.
 - Specific criteria for Qualitative Studies*
 - Intervention and its implementation adequately described;
 - Methods presented in sufficient detail.
 - Specific criteria for Quantitative studies*
 - Adequate sample size;
 - Outcome measures appropriate for statistical treatment;
 - Appropriate statistical methods used.
 - Evaluation of impact on child nutritional status: external or internal; mostly qualitative or mostly quantitative, believability.
7. Results/outcomes.
8. Cost data
9. Level of participation - assessed at community/district level.
10. Level of institutionalization/ sustainability.

1.3 Overview of relevant terms and concepts

Nutritional status and how to measure it in children⁹

Nutritional status can be defined as the physiological condition of an individual that results from the balance between nutrient requirements and intake and the ability of the body to use these nutrients.

Undernutrition is a condition in which the body does not have enough of the right kind of food to meet its energy, macronutrient (proteins, carbohydrates and fats) and micronutrient (vitamins and minerals) needs. Children can still be undernourished even if they have enough food to meet their energy requirements if that food lacks essential micronutrients. Overnutrition is a condition in which the body has too much food, especially fats and sugars.

Both under- and overnutrition are forms of malnutrition. However, the term malnutrition is still widely used in the development literature and amongst the international development community to refer to undernutrition and micronutrient deficiency. This is confusing because the number of malnourished children who are overweight and obese is rising sharply in developed countries and in some middle income developing countries such as Brazil, there are now more over- than under-nourished children.

Undernutrition leads to children being overall undernourished (low weight for age), too thin/wasted (low weight for height) or too short/stunted (low height for age). Wasting usually results from an acute, significant food shortage and/or disease; it is a strong predictor of mortality among children under five years. Stunting usually results from mild chronic undernutrition; it is increasingly used as the key measure of nutritional status in under two year olds because it can lead to irreversible cognitive damage.

Measuring nutritional status

Prevalence of underweight, stunting and wasting, overweight and obesity in children under five years is estimated by comparing actual measurements to an international standard reference population provided by the new WHO Child Growth Standards¹⁰. These standards have been well accepted¹¹ and confirm that children born anywhere in the world who are given the optimum start in life have the potential to develop to within the same range of height and weight. Differences in children's growth to age five years are therefore more influenced by nutrition, feeding practices, environment, and health care. The WHO indicators of undernutrition among these children are given in Figure 1.

The new WHO Child Growth Standards also include Body Mass Index (BMI) charts for infants and young children up to age 5 years. BMI is a simple index of weight-for-height that is most commonly used in classifying overweight and obesity in adult populations and individuals. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m²). The World Health Organization (WHO) defines 'overweight' as a BMI equal to or more than 25 and 'obesity' as a BMI equal to or more than 30.

⁹ This section has been adapted from Pridmore and Carr-Hill , 2009 pages 12-16.

¹⁰ These standards were released in 2006 and are available at <http://www.who.int/childgrowth/en/>

¹¹ With some researchers suggesting minor amendments to the cut the MUAC cut-off points. (See Fernandes, M.A.L.P, Delshevalerie, et al. (2010) Accuracy of MUAC in the detection of severe wasting with the new WHO growth standards.

Measuring overweight and obesity in children aged 5 to 14 years is especially challenging because there is no standard definition of childhood obesity applied worldwide. WHO is currently developing an international growth reference for school-age children and adolescents (see Butte et al. 2007) but there is ongoing debate about using standard recommendations (Onis, 2010).

Overweight: Proportion of under-fives falling above plus 2 standard deviations (overweight and obese) and plus 3 standard deviations (obese) from the median **weight-for-height** of the reference population.

Underweight (overall measure): Proportion of under-fives falling below minus 2 standard deviations (moderate and severe) and minus 3 standard deviations (severe) from the median **weight-for-age** of the reference population.

Stunting (too short): Proportion of under-fives falling below minus 2 standard deviations (moderate and severe) and minus 3 standard deviations from the median **height-for-age** of the reference populations.

Wasting (too thin): Proportion of under-fives falling below minus 2 standard deviations (moderate and severe) and minus 3 standard deviations from the median **weight-for-height** of the reference population.

Figure 1 Indicators of child malnutrition

Food and nutrition security

Food and nutrition security are crucial to the achievement of adequate child nutrition. Food security exists in a nation or a household 'when all people, at all times, have access to sufficient, safe and nutritious food to meet their food preferences for an active and healthy life'¹². Food production per se does not enhance food security. Families must also be able to access the food, either through their own food production or their ability to purchase it, to get support from safety-net programmes or to get food from other households. Households are said to be vulnerable in the presence of factors that place them at risk of becoming food insecure or undernourished. Risk factors include loss of access to food and/or, proper nutritional care, or an inability to physiologically utilize available food because of infection or other disease.

Most undernourished children live in vulnerable households that become food insecure. But children can also be undernourished in a food secure household if, for example, frequent and severe bouts of diarrhoea mean they cannot use the food for growth and development. The rapid escalation of world food prices has transformed food insecurity from a difficult development problem into a crisis (WHO, 2008). A study in Brazil found that urban family food insecurity was associated with having more children under 18 years; precarious housing; overcrowding; lack of sewage system; low income; head-of-household with no schooling; no university graduate in the family; and race (black) (Panigassi et al., 2008).

Nutrition security differs from food security in being concerned not only with access to food but also with the utilization of food within the home. A household achieves nutrition security when it not only has secure access to food but also has a sanitary environment, adequate

¹² 1996 World Food Summit definition

health services, and the knowledge and skills needed to provide adequate care to ensure a healthy life for all household members. Both food and nutrition security are key to achieving good nutritional status.

1.4 Nutrition and HIV/AIDS

HIV impairs the human immune system leading to increased risk of infection and reduced appetite. The immediate cause of undernutrition in people living with HIV and AIDS is therefore insufficient food intake and infection. HIV also decreases absorption and use of nutrients from the food eaten and increases the body's normal energy requirements by 10-30% in adults and 50-100% in children (UNAIDS, 2008a).

At the underlying and basic levels of causation, HIV and AIDS causes food and nutritional insecurity because people are frequently sick, or are caring for the sick, and unable to work. This threatens their livelihoods. Food and nutritional insecurity can in turn increase risk and vulnerability to HIV infection, hasten the onset of AIDS, prevent effective treatment and undermine efforts to provide care and support. This is because lack of food security increases short-term mobility and migration and places people who are away from home and in need of food in risky situations. It exacerbates intra-household gender inequality which can lead to hungry women and girls seeking food elsewhere, which may force them into high risk situations, e.g. transactional or commercial sex.

Food and nutrition insecurity also increases risk of undernutrition, which can increase risk of infection. Intra-household clustering of infection can lead to poor households facing reduced access to information on how to prevent HIV and also reduce their ability to use such information. Several scholarly reviews of the research evidence are available to support these claims (Edström and Samuels, 2007, Friis, 2006, Gillespie and Kadiyala, 2005). Two briefing papers summarise the findings and make suggestions for programming (ODI, 2006, UNAIDS, 2008b). Within HIV-affected households children are especially vulnerable to the combined impact of undernutrition and HIV.

There is evidence from Tanzania that stunting is significantly higher among orphans than other children, even if other factors are controlled for (Ainsworth and Semali, 2000) and there is evidence from Uganda that fostered children have reduced access to health services (Deininger et al., 2003). Even where orphans are not treated inequitably they may be undernourished along with the other members in their family due to the impact of AIDS on family food security. A study in Malawi showed that reduced food production was greatest when the father falls sick because female family members are expected to care for him, which reduces female labour and less food and cash crops are produced (Thangata et al., 2007).

There is evidence from many countries that HIV-affected children, especially maternal orphans, are missing out on schooling, which can further increase their risk of HIV infection. Education appears to exert a protective effect through a combination of delayed sexual debut, higher rates of condom use, lower levels of coercive and transactional sex, and a smaller age difference between partners (Pridmore, 2008, WFP, 2006).

1.5 Costing challenges

¹³In any cost-effectiveness exercise where people are the final beneficiaries, there are potentially the following challenges:

1. Multiple perspectives and time frames.
2. Identifying and costing activities.
3. Identifying and measuring benefits.

¹³ This section is taken from Pridmore and Carr-Hill, 2009, pp.23-24.

4. Identifying comparators.
5. How the intervention interacts with the community.
6. Attribution of any changes in community (health and nutrition).
7. Quantification.

Assumptions/presumptions in applying the cost-effectiveness approach: Estimating the cost-effectiveness of an intervention is complex and can be challenging where accurate costings are difficult to obtain and where confounding factors need to be well controlled for and alternative explanations carefully considered, before any change in child nutritional status can be attributed to the intervention. It will be shown that there are in fact only a few studies that meet rigorous criteria for assessing effectiveness so that the estimation of cost effectiveness is restricted to even fewer studies and therefore cannot be definitive, given the range of interventions considered. Where a project uses participatory approaches to engage the beneficiaries as active participants, the challenges listed above become much more intractable and the standard framework of economic evaluation to assess the cost effectiveness cannot so readily be applied. In participatory projects it can be challenging to cost volunteer time and measure the benefits of participation in terms of empowerment or social cohesion¹⁴; and to identify a comparison community that has a similar base-line level of participation and to measure interaction effects because there will be gainers and losers *within* each community. Difficulties must be overcome in relation to attributing change in empowerment to participation in project activities and also in attributing change in empowerment to change in child nutritional status; and quantification is difficult across different levels of participation.

The issue of using cost effectiveness analysis has recently been considered in a review for the UK National Institute for Clinical and Health Excellence (NICE). To inform this Review a search of the literature from developed countries generated a pool of 60,000 documents of which only 15 were considered to have produced rigorous assessments of effectiveness and only five of those had adequate cost data (Mason, Carr-Hill & Street, 2008). The review concluded that, because liberty of association is one of the building blocks of a democratic society, the presumption has to be that community engagement in a democratic society is universally a good thing. Such a presumption is not subject to economic analysis (see Okun, 1975). Given the paucity of studies for which there is clear evidence of cost-effectiveness, it would not be sensible to make inferences about the relationship between the level of effectiveness and the degree of democratisation in the countries studied. The issue therefore is only whether the additional element of community participation (insofar as it can be separately identified) is increasing the effectiveness of the intervention in improving nutritional status rather than a complete assessment of cost-effectiveness. Further information on applying the cost-effectiveness approach to participatory programmes are given in Appendix 2 and also in a recent publication on 'Obesity and the economics of prevention' by Sassi (2010).

1.6 Organisation of the review

This monograph is organised into three further sections.

Section 2 identifies the social determinants of child malnutrition in informal urban settlements and slums and presents and discusses three conceptual frameworks to develop a more nuanced understanding of their complex, multi-dimensional nature. These frameworks are (i) the UNICEF framework for child nutrition, health and survival (ii) the

¹⁴ Social cohesion refers to the building of interpersonal and intergroup networks, trust, and reciprocity,

framework developed to guide the work of the WHO CSDH and (iii) the framework developed by the Knowledge Network on Urban Settings (KNUS) for the WHO CSDH.

Section 3 presents the evidence for action to change the social determinants of child malnutrition in order to address two key questions: 'What Works?' and 'How should interventions be designed?' The analysis especially seeks to identify the actions, pathways and mechanisms through which broadening community and stakeholder participation can be made most effective in changing the social determinants and thereby reducing child malnutrition in a sustainable way in urban settings.

Section 4 discusses the implications of the findings for the further development and implementation of the NICK Project and identifies the key issues and challenges in relation to (i) establishing multisectoral teams at the municipal level and enabling them to work together successfully (ii) achieving 'real' community participation and (iii) designing interventions that could lead to a measurable change in child nutritional status after only 18 months of intervention. This section ends with some concluding comments.

2. The social determinants of child malnutrition in poor urban areas

In Section 1, the social determinants of child malnutrition were broadly defined as being the social, economic and environmental conditions in which people are born, grow, live, work and age, including the health and social welfare systems. However, a more nuanced understanding these determinants, and of their complexity in the poor urban context is needed to inform effective actions. To develop this understanding three conceptual frameworks are presented and discussed (i) the UNICEF framework for child nutrition, health and survival (ii) the framework developed to guide the work of the WHO CSDH and (iii) the framework developed by the Knowledge Network on Urban Settings (KNUS) for the WHO CSDH.

2.1 Frameworks to understand the nature of social determinants

The conceptual framework to explain the causes of child nutrition, health and survival originally developed by UNICEF in 1990 but now agreed to by most stakeholders is shown in Figure 2. This framework identifies key factors influencing both over- and undernutrition nutrition in at three levels: immediate (individual), underlying (household/community) and basic (societal). The framework has been adapted by Ruel (2008) to link these levels to what the World Bank has called the short and long routes to nutritional improvement.

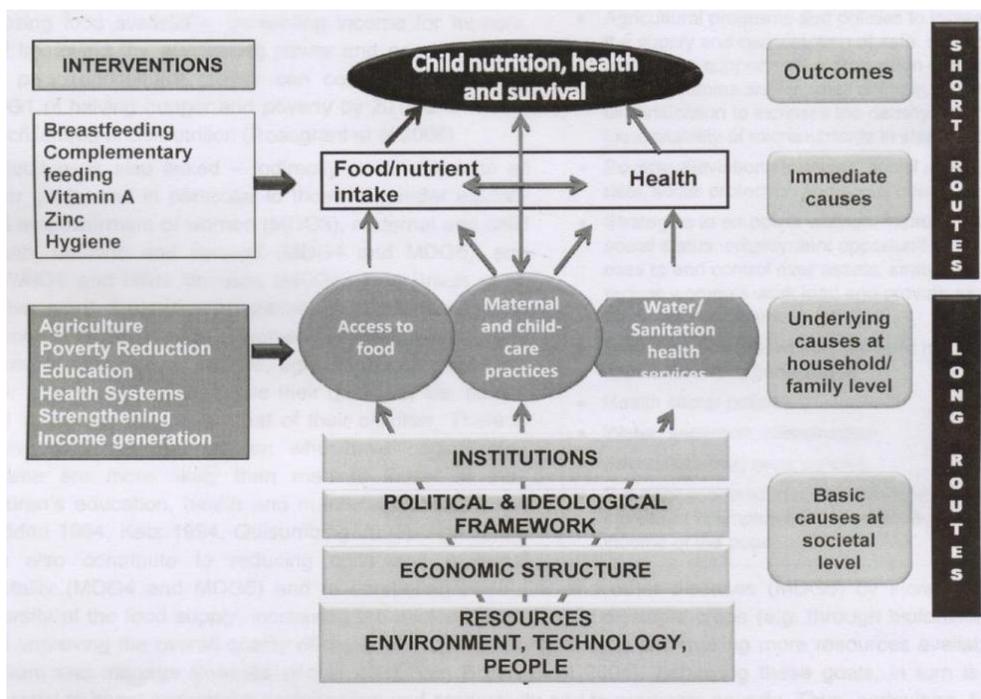


Figure 2 Conceptual framework for child nutrition, health and survival

(Source: Ruel, 2008 p.22)

The short route addresses the immediate causes, which are inadequate dietary intake and infection for under-nutrition and over consumption of energy-rich, nutrient-poor 'junk' food and beverages and lack of physical exercise for overnutrition.

The long route acknowledges that beneath the immediate causes there are three main underlying causes: (i) inadequate access to low-cost nutritious food and or/poor utilisation of available food (ii) inadequate child care practices and (iii) inadequate access to quality health and social welfare services, safe water and sanitation. These underlying causes

frequently interact with each other and emerge from the more basic or root causes. The basic or root causes reach down deep into the political, economic, cultural and religious systems and institutional structures¹⁵ that govern the social fabric of society and control the amount and use of potential human, economic and organizational resources available at the household level. They determine the degree of social stratification and social justice in society and the status and autonomy of women. The intermediate and basic causes are the social determinants of child malnutrition.

The conceptual framework developed to guide the work of the CSDH (WHO, 2008), shown in Figure 3, identifies the social determinants of health and nutritional inequity. It demonstrates that the distribution of health and wellbeing is determined by a range of intermediate social determinants which include material circumstances, social cohesion psychosocial factors and behaviours and determine access to health services. These intermediate determinants are themselves influenced by social position and education, occupation, income, gender and ethnicity/race and are themselves influenced by a range of structural social determinants which include the socioeconomic and political context, governance, macro-economic, social and health policy and cultural and societal norms and values. (WHO, 2008 p.43)

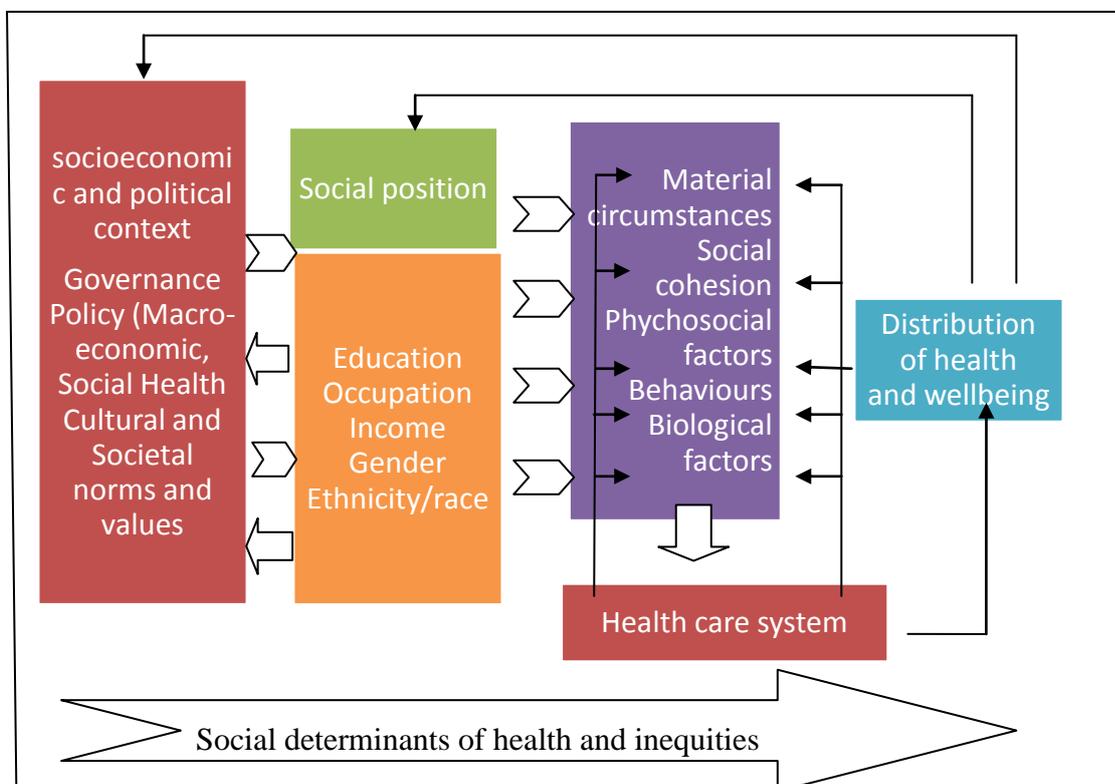


Figure 3 Conceptual framework for the Commission on Social Determinants of health

(Source: WHO, 2007, p.43)

¹⁵ Over the last 20 years the centrality of institutional change in development has become widely acknowledged as has the need for more sensitivity to the country context and the need to build on what is already there. (See Booth, D. (2011) Aid, Institutions and Governance: what have we learned? *Development Policy Review* 29(S1), pp.S5-S26.

These intermediate and structural social determinants of health and nutrition correspond respectively to the underlying and basic/root causes described in the UNICEF conceptual framework presented in Figure 2.

Both conceptual frameworks recognize that social injustice is the driver of child malnutrition and that strengthening health and nutrition equity means addressing the fundamental global and national structures of social hierarchy and the socially determined conditions these create. They also recognize the importance of disadvantaged groups developing the collective experience that can build social capital/cohesion and strengthen group solidarity for action to improve daily living conditions and the inequitable distribution of money, power and resources in the society. (Jensen, 1994, Rowland, 1997, Pridmore et al., 2007).

2.2 Framework to understand urban health

Tackling child malnutrition in the urban environment not only requires a good understanding of the multilevel and multidisciplinary nature of its causes but also understanding of the complexities of the urban environment. The conceptual framework shown in Figure 4 was developed by the Knowledge Network on Urban Settings (KNUS) to inform their report for the WHO CSDH entitled 'Our cities, our health, our future' (KNUS, 2008). In common with the conceptual frameworks presented in Figures 2 and 3 the core concept in this framework is that the physical and social environments that define the urban context are shaped by **multiple factors and multiple players at multiple levels.**

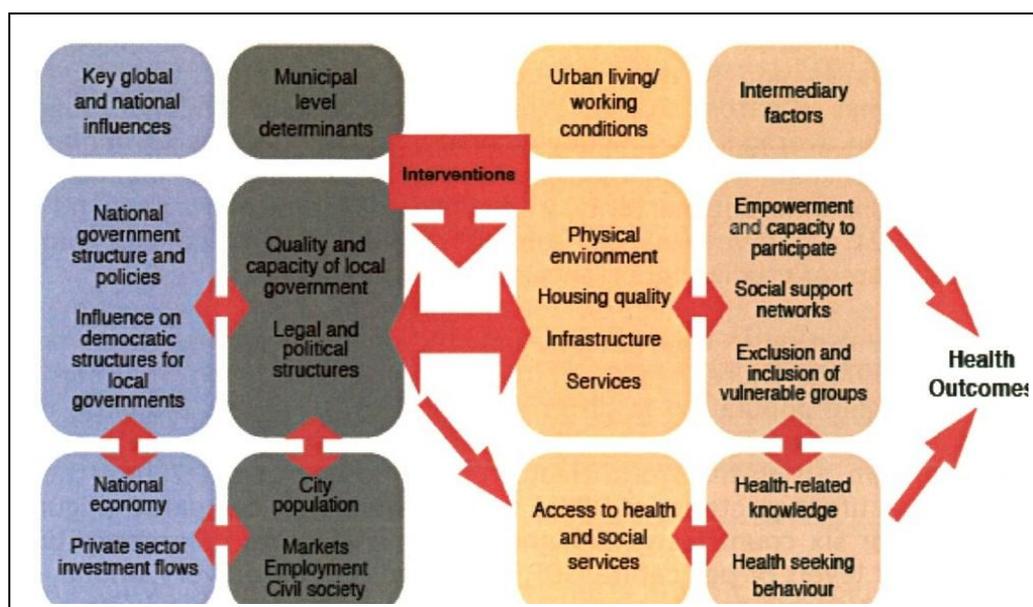


Figure 4 A conceptual framework for urban health

(KNUS, 2008 p.9)

The framework shows that the main stakeholders at the municipal level are civil society, municipal and national level representatives from the nutrition-related sectors (health, education, water and sanitation, agriculture, social development and labour/employment) and the politicians represented by the mayor. The intermediate causes of child malnutrition, shown on the right-hand side of the framework, are the level of community empowerment and capacity to participate, the strength of social support networks and degree of exclusion or inclusion of vulnerable groups, and the level of knowledge and health-seeking behaviours, which are closely linked to the urban living and working conditions and access to health and social services.

The structural causes of poor health and nutrition are shown on the left hand side of the diagram. These causes are related to the global, national and municipal structures. At the municipal level they are the quality and capacity of local government and the legal and political structures/institutions, markets, employment and civil society, which are themselves influenced by the factors shown at the national and global level.

2.3 The social determinants of child nutrition in poor urban areas

In the urban environment the multiple structural and intermediate social determinants converge to bring about marked inequities in nutritional status between children from families living in the poor urban areas and more well-off areas. In poor areas spending on food for the family may be reduced by competing demands from non-food expenditure such as transport to work, rent for housing, and remittances to relatives in the rural areas. The urban poor rarely have access to central markets due to public transport costs and are compelled to buy food in small quantities from local shops at higher prices. They may have little time to prepare food, no suitable space for cooking and no money for cooking fuel. Recent migrants may have difficulties adapting to new staple foods. (KNUS, 2008)

The lack of access to low-cost nutritious foods was explored in a study by Lane et al. (2008) in New York, which confirmed that poor areas were 'food deserts'. Most families only had access to small corner stores which prominently displayed cigarettes, allocated more space to alcohol than dairy products and usually sold flavoured cigars commonly used to wrap marijuana for smoking. Only about one-quarter of the stores sold any fresh fruit or vegetables (and it was sometimes rotten) and the price of milk was over twice the cost charged in more well-off areas. They concluded that several health risks were associated with the location and business practices of retail outlets in these poor urban areas and argued that these practices constitute forms of 'structural violence' (p.421).

A literature review by Ruel et al. (1999) identified additional social determinants of nutritional status in urban environments:

1. Greater dependence on cash income but high levels of unemployment in slum areas leading to increased poverty.
2. Weaker informal social safety nets.
3. Greater labour force participation of women and its consequences for child care.
4. Lifestyle changes, particularly diet and exercise patterns.
5. Greater availability of public services, but questionable access by the poor.
6. Governance by a new, possibly nonexistent, set of property rights.

These findings are corroborated by a more recent study carried out by Galal (2010) who found that factors leading to food insecurity and poor nutrition in low-income urban communities in the Middle East included an overdependence on purchased food commodities, lack of sufficient livelihoods, rapid reductions in peripheral agricultural land, and adverse impacts of climate change. A study by Sanders and Puoane (2010) also highlights the way that poor dietary practices in South African urban townships are influenced by a shortage of healthy, low-fat foods and little fruit and vegetable (with many local vendors selling fatty, salty and sugary food) and also by beliefs regarding body image. In addition, poor recreational amenities and the threat of crime and violence were found to contribute to low levels of physical activity. Lack of safe recreational space in poor urban areas of South Africa was also noted in an analysis by Cutts et al. (2009) which showed that poor urban areas had the largest population of children and youth but the lowest park access and 'walkability' ratings.

A systematic review by Lovasi et al. (2009) identified lack of access to supermarkets (rather than small convenience stores), an unsafe neighbourhood environment and lack of places to play as key social determinants of obesity amongst disadvantaged groups in cities in the USA. There is also evidence from the USA that portion sizes and energy intake from salty snacks, desserts, soft drinks, fruit drinks, french fries, hamburgers, cheeseburgers, and

Mexican food have increased markedly with the greatest increases for food consumed at fast food establishments and in the home (See Nielsen and Popkins, 2003).

Studies have also explored a link between parental attitudes, social norms, child feeding practices child and obesity. A study by Brewis et al. (1998) found a link between child obesity and traditional social attitudes/norms towards body fatness where large body size was associated with power, beauty, and affluence. These norms can lead to parents of overweight or obese children failing to correctly perceive their children as overweight and therefore at risk of disease later in life (Wu et al., 2009, Fitzgibbon and Beech, 2009). A study by Mulder et al.(2009) evaluated the cross-sectional and retrospective relationship between maternal attitudes and child-feeding practices and children's weight status in children aged 5 to 12 years living in the city of Casablanca, Chile, who had been subjects of an obesity prevention intervention for two years. The findings showed that mothers of overweight children were significantly more concerned ($P < 0.01$) about their child's weight than mothers of normal weight children. Mothers of normal weight sons used significantly more pressure to eat ($P < 0.05$). In boys, however, the BMI z score was positively correlated with concern for child's weight ($r = 0.28$, $P < 0.05$) and negatively with pressure to eat ($r = -0.21$, $P < 0.05$). The researchers concluded that mother's concern for their overweight children reflected the Western negative attitude towards childhood overweight and that, probably, the way in which mother and child influenced each others behaviour was bidirectional.

A link between social norms, parenting and child obesity was also explored in a study by Chan et al. (2010) who conducted in-depth ethnographies of six overweight/obese and four non-overweight preschool children in Hong Kong (each of whom were followed for 12-18 months). The findings showed that the network of care giving roles and relationships around the overweight/obese child was typically weak and disjointed, and the primary caregiver appeared confused by mixed messages about what is normal, expected and legitimate behaviour. In particular, external social structures created pressure to shift childcare routines from the logic of nurturing to the logic of consumption. They concluded that threats to what Anthony Giddens called ontological security in the primary caregiver (caused by acting against social norms) may underpin the poor parenting, family stress and weak mealtime routines that mediate the relationship between an obesogenic environment and the development of obesity in a particular child.

Ventura and Birch (2008) also reviewed literature to explore the link between parenting and childhood obesity. They not only found substantial causal evidence that parenting affects child eating but also much correlational evidence that child eating and weight influence parenting. However, they found few studies that have used appropriate mediational designs to provide causal evidence for the indirect effect of parenting on weight status via effects on child eating. They suggested a new approach for evaluating the effectiveness of intervention components and creating optimized intervention programs using a multiphase research design to provide the mechanistic evidence-base needed for the design and implementation of effective childhood obesity prevention programs.

Another feature of the poor urban environment, greater labour force participation of women, has led to the shorter extent and duration of breastfeed and earlier introduction of supplementary feeding in urban areas. This finding has been confirmed by three systematic reviews which point out that these changes in breastfeeding practices are worrying because breastfeeding can protect against the development of later obesity, with a longer duration of breastfeeding having greater protective effects (Singhal, 2007, Popkin, 2002, Gracey, 2002).

Child nutrition can also be affected by domestic violence and family breakdown which are a well recognised feature of the poor urban environment. There is evidence from a study by Ackerson and Subramanian (2008) that exposure to domestic violence may be associated with anaemia and underweight in mothers and their children. In Brazil, a study found that as

many as one in three women in the immediate postpartum period experienced some type of violence during pregnancy. Violence and depression are strongly associated, and exposure to both during pregnancy are associated with increased maternal stress and subsequent harm to the infant (Nunes et al., 2010). There is also a strong link between urbanisation and maternal depression which is a risk factor for poor infant growth (Stewart, 2007). A study by Tomlinson and Landman (2007) highlighted the importance of community interventions nurturing a positive infant/mother (caretaker) relationship to support infant growth and development.

Social determinants of over-and undernutrition in the same family

The coexistence of undernutrition and overnutrition in one household poses enormous challenges and studies have identified a number of possible causes. For example, a population-based cross-sectional study conducted in Pelotas, Southern Brazil, by dos Santos et al.(2010) found that overweight and obesity were common in families living in food insecurity and that many of these families had children who were stunted. Food insecurity is also implicated in the findings from a study in South Africa by Case and Mendez (2007) who found that women who were nutritionally deprived as children were significantly more likely to be obese as adults.

Multiple causes were identified in a study by Angeles-Agdeppa et al. (2003) carried out an in-depth study of 31 under/overweight child-mother pairs in the city of Manila in the Philippines and 30 randomly selected normal/normal pairs. Questionnaires were used to gather socio-economic-demographic data, 3 day 24-h food recall for dietary intake data and 24-h activity recall for data on physical activity. Factors associated with the existence of underweight child/overweight mother or normal child/normal mother were found to be mother's educational level and occupation, number of children in the household, energy intake, the preference of meats, sweets and sugars among children or meats and fried foods among mothers, and mother's perception of body size. Surprisingly, physical activity of both mothers and children was higher in the over-underweight group than in the normal weight group. The researchers concluded there is a need for interventions that will lead to optimal health outcomes at both ends of the spectrum of nutritional status.

2.4 The nutrition transition

The lifestyle changes identified above (particularly diet and exercise patterns) are characteristics of the nutrition transition which has occurred in recent decades. This transition is related to rapid socioeconomic development, urbanisation and rural-urban migration, cultural transition, globalisation and commodification of food systems. As shown in Figure 5, the nutrition transition refers to the changes in diet and lifestyle that populations experience as they move from (i) a low fat monotonous and labour-intensive lifestyle associated with receding famine to (ii) a high fat, high sugar and processed food diet associated with a more sedentary lifestyle associated with degenerative disease and finally to a (iii) to a reduced fat diet high in fruit, vegetables and fibre and a more active lifestyle pattern associated with behavioural change. The nutrition transition is linked to the demographic transition from high fertility/mortality to reduced fertility/mortality and the

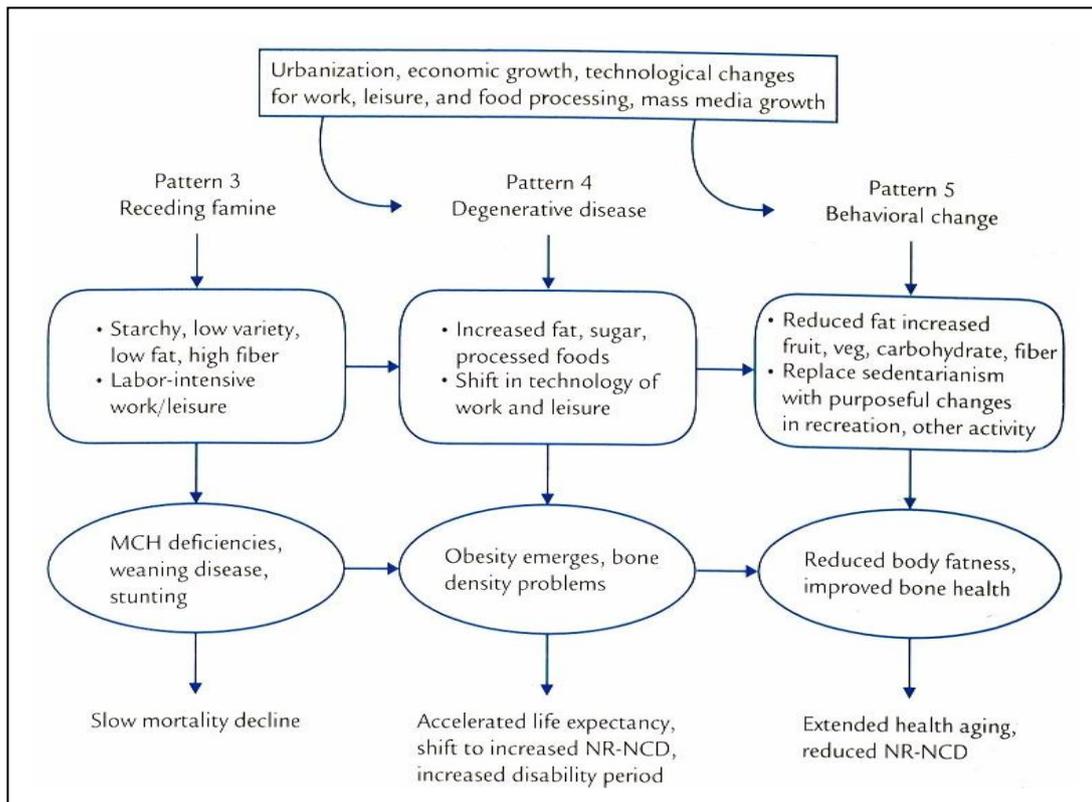


Figure 5 Stages of the nutrition transition

(Source: Caballero and Popkin, 2002 p.3)

epidemiological transition from a high to a low prevalence of communicable diseases and from a high to a low prevalence of chronic diseases. (Caballero and Popkin, 2002).

During the nutrition transition there is an uncoupling of the classic relationship between incomes and fat intakes and the global availability of cheap vegetable oils and fats which results in greatly increased fat consumption among low-income nations. Sugar consumption also increases which together with fat consumption contributes to increases in obesity. During the nutrition transition in Chile, for example, dietary changes were marked by increased consumption of high-energy, nutrient-poor products, including sugar-sweetened beverages (SSBs) and obesity is now the primary nutritional problem in post-transitional Chile (Albala et al., 2008). A study in Saudi Arabia also found a positive correlation between sugar-sweetened carbonated beverage consumption and overweight, waist circumference, and poor dietary choices in school children (Collison et al., 2010).

2.4 Child obesity as a market failure

Prentice (2006 p.93) summarises the key features of the urban environment which have led to the obesity pandemic. He argues that this pandemic is transmitted through the vectors of subsidized agriculture and multinational companies providing cheap, highly refined fats, oils, and carbohydrates, labour-saving mechanized devices, affordable motorized transport, and the seductions of sedentary pastimes such as television.

Moodie, R., B. Swinburn, et al. (2006) concur with this view and claim that childhood obesity is a sign of commercial success, but a market failure. They argue that where so-called 'obesogenic' products (such as energy dense foods, passive entertainment products, cars, and labour-saving devices), are widely available and heavily promoted directly to children they are highly consumed and very profitable; and child obesity becomes the inevitable consequence of their commercial successes. They contend that contemporary market

forces heavily favour behaviours for short-term preferences (i.e. over-consumption and under-activity) over long-term preferences (i.e. healthy weight) and this is especially true for children. Hence, if the market, as the main mechanism for determining choices, results in outcomes which make our children worse off by being obese then the market has failed to sustain and promote social and individual goals. They point out that this is a serious market failure and that in the current obesogenic environment existing in many poor urban areas expecting adults, let alone children, to make food and activity choices in their own best long-term interests is, therefore, demonstrably flawed. The contribution to obesity made by pressures from the marketplace and media (commerce) are also noted by Phelan (2009).

Kumanyika and Grier (2006) summarize differences in childhood obesity prevalence in the USA to show how various environmental factors can have larger effects on disadvantaged and minority children than on their more advantaged white peers and thus contribute to disparities in obesity rates. The authors show, for example, that low-income and minority children watch more television than white, non-poor children and are potentially exposed to more commercials advertising high-calorie, low-nutrient food during an average hour of TV programming. They note that urban neighbourhoods where low-income and minority children live typically have more exposure to fast-food restaurants (because junk food outlets move in where there is consumer demand) and fewer vendors of healthful foods than do wealthier or predominantly white neighbourhoods. They cite such obstacles to physical activity as unsafe streets, dilapidated parks, and lack of facilities. They also identify several aspects of the home environment, such as television viewing and parental behaviours, that may contribute to childhood obesity but be amenable to change through targeted intervention. They argue that ultimately, winning the fight against childhood obesity in minority and low-income communities will depend on the nation's will to change the economic social and physical environments in which these communities exist.

2.6 Summary

The foregoing analysis of the social determinants of child under- and overnutrition in children living in informal settlements and urban slums has illustrated the complex nature of the causes and demonstrated the need for an integrated multisectoral and multilevel approach to address the problem.

It has identified the following social determinants of child malnutrition in poor urban areas.

Intermediate determinants at the household and community level

1. Material circumstances - with greater dependence on cash income but high levels of unemployment leading to poverty, food insecurity and lack of social safety nets.
2. Behaviours - particularly diet and exercise patterns - due to lifestyle changes associated with urbanisation leading to overdependence on low quality purchased food commodities often from small corner stores, street vendors and fast-food outlets due to lack of access to supermarkets, and lack of time and space to cook; an unattractive and unsafe neighbourhood environment and lack of places/facilities for children to play; pervasive advertising of fast-foods and motor vehicles.
3. Child care practices/parenting - for example, greater participation of women in the labour force leading to shorter duration of breastfeeding and earlier supplementation and lack of affordable quality child care.
4. Social cohesion: weak and disjointed social networks to support care-giving roles and relationships around children.
5. Psychosocial factors - including (i) family breakdown, domestic violence and crime leading to stress and maternal depression and (ii) social attitudes towards body fatness leading to parents of overweight or obese children failing to correctly perceive their children as overweight and therefore at risk of disease later in life.
6. Access to quality public services: inadequate access to health and social services, safe water and sanitation.

Basic determinants at the municipal council level

7. Capacity of local government and civil society for advocacy to create meaningful participation.
8. Local government control over urban planning.
9. Legal and political structures and governance by a new, possibly nonexistent, set of property rights.
10. Availability of employment opportunities.
11. Control of markets and willingness of the food companies to support social health and nutrition goals.
12. Capacity of civil society for advocacy and social mobilization.
13. Women's status and autonomy in society.
14. Macro-economic and social policies: the extent to which they are 'pro-poor' to safeguard families with low socioeconomic status.

Two additional literature reviews, by Daniel Lang'o and by Beatriz Solgado Diez, provide an in-depth analysis of the social determinants in the NICK study sites of Mombasa in Kenya and Valparaiso in Chile. These reviews are available to download from the NICK Project website (<http://nick.ioe.ac.uk>).

3. Evidence for the effectiveness of interventions to change social determinants

The analysis presented in section 2, has clear implications for how interventions should be designed to reduce child malnutrition in poor urban areas. The findings from the studies presented show that the driver of child malnutrition in poor urban areas is social inequity resulting from a complex range of social determinants that are multilevel and multisectoral in nature. The findings also show that creating an enabling environment for child nutrition at the municipal level is dependent upon

- the capacity (skills, capacity, consensus etc.) of local government and civil society for advocacy and action;
- the legal and regulatory framework enabled by the market;
- the political and governance structures enabled by the state;
- the socio-cultural characteristics enabled by the state;
- The economic conditions and opportunities for employment.

It follows that interventions need to be complex, multilevel and multisectoral and to be designed and implemented by wide range of stakeholders working collaboratively. For example, interventions may seek to strengthen the capacity of local government officials and civil society groups to advocate for pro-poor policy changes and also seek to use community participation and empowerment approaches to build social capital/cohesion to strengthen social support networks, reduce exclusion of vulnerable groups, increase health knowledge and promote health seeking behaviours. Challenges arise, both conceptually and empirically, in evaluating the effectiveness of such complex social interventions that impact indirectly on child nutrition and a range of programme evaluation measures are needed because processes are as important as outcomes. It is not surprising therefore that the evidence base is ambiguous.

In this section, evaluations and studies of interventions to improve child malnutrition in poor urban areas are critically reviewed to find out what works. The most innovative interventions are highlighted and those that are potentially implementable in the medium term. Some of the more obvious interventions are not dealt with extensively, such as advancing women's formal education, ensuring a clean environment and raising household incomes in real terms because they can only be implemented on a large scale over a long period. But there is an established body of research in this field building on the seminal papers by Mosley and Chen (1984), by Caldwell (1979) and by Hills (2003).

Evidence is firstly reviewed to evaluate the effectiveness of interventions that seek to change 'downstream' social determinants operating at the household/community level. This includes interventions that seek to promote lifestyle changes, improve child care practices and increase access to healthy food and to health and social services. Secondly, evidence is reviewed from interventions that seek to change 'up-stream' structural social determinants. This includes interventions that seek to use government regulation and fiscal levers to control the markets, to promote democratic governance and broaden participation, to increase women's status and autonomy in society and to reform macro-economic and social policies.

3.1 School-based promotion of individual lifestyle changes

Despite the multifactorial aetiology of childhood obesity most preventive interventions to date have focused on individual dietary modification and physical activity in school-aged children in school settings. This is worrying because interventions focusing on individual behaviour change without seeking to change the obesogenic environment reflect a failure to understand the fundamental drivers of the obesity epidemic and such interventions have met with limited success.

An early systematic review of interventions to address childhood obesity through behaviour change, by Herdsman et al. (2000), reported various degrees of effectiveness but was unable to make definitive statements about the elements of the interventions that were associated with increased effect size. A subsequent systematic review by Summer bell et al. (2005) analysed 22 programmes for obese children under 18 years of age living in Asia, South America, Europe or North America also concluded that there was insufficient evidence from trials to prove that any one particular programme can prevent obesity in children. They recommended that future research should assess changes made on behalf of entire populations (rather than individuals), such as improvements in the types of foods available at schools and in the availability of safe places to run and play, and that they should assess health effects and costs over several years.

However, some recent school-based interventions to deliver nutrition education and promote physical activity in Chile are reported to have been more successful. A controlled trial of an intervention with 1760 children attending public schools (grades 1-7) in Casablanca significantly reduced obesity in experimental schools (Kain et al., 2008). A study by Vasquez et al. (2008) found that a similar intervention for 35 overweight and obese 4-5 year olds attending National Board of Day Care Centres (JUNJI) in the eastern area of Santiago. Was effective in reducing energy intakes and early moderation of preschool children's dietary intake. A controlled study by Kain et al. (2009a) in Santiago children in preschool to grade 4 from low socio-economic status (SES) families reduced obesity in younger boys (but not girls) and only during the first year of implementation.

The varied success of interventions focusing on individual behaviour change together with a lack of upstream population-based interventions, identified in a synthesis of research studies by Flynn et al. (2006), has led to calls for more interventions in poor urban areas advocating for reduced food prices, regulation of food outlets (especially around schools), change in food trade policy and controlled urban planning (Lob-Corzilius, 2007, Hughes and Reilly, 2008, Sanders and Puoane, 2010). Livingstone et al. (2006) point out that given the complexity and intricacy of population-based intervention programmes, multiple methods of data collection which combine both qualitative and quantitative approaches need to be fully exploited in order to move towards evidence-based practice in the future.

3.2 Increasing food security

Lack of food security at the household level (caused by increased reliance on cash income together with high unemployment and reduced access to healthy food) has been addressed through interventions to promote urban agriculture. A literature review by Ruel et al. (1999) found as much as 40% of the population of African cities and up to 50% in Latin America are involved in urban agriculture and that many of the producers are women. Most studies concluded that urban farming constitutes a crucial form of food access for the lower income groups, although those who practice urban agriculture may not be amongst the poorest of the poor because farming requires land. The review also found that although low availability of land may lead to households being able to rely on home production for only two or three months of the year, this food is crucially important for child nutrition amongst the poorer families at critical times when incomes fall.

Promoting urban agriculture and home gardening has also been shown to increase the diversity of children's diets and reduce micronutrient deficiencies (Bhattacharjee, Kumar, & Nandi, 2007). These programmes can lead to the empowerment of women (Bushamuka et al., 2005; World Bank & IFPRI, 2007) and be used to integrate agriculture and primary health activities (Faber et al., 2002). Furthermore, in the face of family breakdown and resulting changes in household organisation studies have shown the importance of fostering women's social ties and networks to increase food security and child nutritional status (see for example Lemke et al., 2003).

3.3 Maternal education to improve the quality of child care

A key social determinant of child malnutrition in urban slum areas is the poor quality of child care partly due to greater labour force participation of women and weaker informal social networks and safety nets (Ruel et al., 1999). Working outside the home has led to reduction in the extent and duration of breastfeeding and earlier supplementation. This is of public health concern because of its link to increased risk of early childhood obesity (mentioned in section 2.2) and it has renewed calls for maternal education to promote breastfeeding and improve child nutrition (Singhal, 2007).

Maternal education has traditionally been one of the mainstays of nutrition programming to improve child care. Although it has not always been effective on its own there is good evidence that strengthening mothers social networks for learning and individual health improvement can improve their health and that of their children. For example, a study in Madagascar showed that maternal education can reduce child undernutrition where networks of women's groups are supportive, where participatory educational approaches are used to raise critical awareness of the causes and develop shared understanding of the actions to be taken; and where the quality of the child-care services delivered is also improved by training local community nutrition workers (Galasso and Umaphi, 2007). However, the type of networks and other pathways that support the translation of maternal education into improved child nutrition need to be further clarified. A study by Moestue et al. (2007) in India, found that big and literate social networks of mothers were associated with better child nutrition, especially among the poor. The researchers concluded sharing of health knowledge between network members is a plausible way in which social networks benefit child nutrition in India. They called for further research into the underlying mechanisms to inform the development of interventions that channel health information through word of mouth to the most excluded and vulnerable families.

A randomized controlled trial of a multidisciplinary programme in Iran also showed that maternal education can be effective as part of broad-based multidisciplinary actions that also address 'up-stream' determinants. The study showed that stunting could be significantly reduced by educating mothers about child care, growth and hygiene, strengthening women's literacy, promoting home gardening and consumption of healthy foods, establishing co-operative stores, improving opportunities for employment and income generation and providing inputs to improve water and sanitation. (Sheikholeslam et al., 2004). These actions were implemented through non-governmental organisations (NGOs).

Few studies have been done in the pre-school years which is the pivotal time when long-term dietary and physical activity habits are established, with potential lifelong effects on health and there have been urgent calls to develop an evidence base to guide effective action (Lanigan et al., 2010). However, educational interventions have sometimes targeted mothers with pre-school children. A study by Klohe-Lehman et al. (2007) recruited 91 overweight and obese mothers (who had children aged 1-3yrs old) living in low-income urban areas onto an 8-week weight loss intervention encompassing dietary, physical activity, and behavioural modification. After 24 weeks of intervention the findings showed modest weight loss in mothers and in their children there was an increased level of physical activity and dietary improvement resulting from a decrease in fast food, snacks, deserts and sweetened beverages and increase in home-prepared meals. They concluded that offering weight loss classes was a successful method of enticing low-income women to participate in an educational intervention that benefited their children. Overweight and obese mothers who modified their food choices and fat intake made comparable changes for their child.

Addressing the double burden of under- and overnutrition in the same family.

The co-existence of under- and overweight poses a challenge for intervention because the aims of programmes to reduce undernutrition are generally in conflict with those for obesity prevention. Caballero (2005) acknowledges that until the socioeconomic and health

disparities between rich and poor in the urban areas is narrowed 'we will continue to find malnourished children in the arms of overweight mothers' (p.1516). However, he points out that alongside actions to address this major challenge there is a need to educate health and nutrition workers about the underweight-overweight phenomenon and to develop more for targeted intervention for 'dual burden' households. He identifies maternal education as one intervention that can address both problems through seeking to increase breastfeeding and improve the nutritional status of women of reproductive age (and thereby reduce foetal growth retardation and low birth weight).

3.4 Increasing access to and use of health and social services

Urbanisation can bring greater availability of public services but the ability of families living in informal settlements and urban slums to access them has been questioned (Ruel et al., 1999). Ideally, of course, the health environment (resulting from access to health and social services, water and sanitation) should be dramatically improved for all; but, once again, these are long-term goals and the concern here is with the possibility of more medium-term solutions, the most currently favoured being conditional cash transfers (CCTs). CCT programmes have used to address inequities in access to health and social services and have become increasingly popular, particularly in middle income countries in Latin America. A systematic review by Lagarde, Haines and Palmer (2007) of cash transfers to disadvantaged families conditional upon carers using maternal and child care health (MCH) services found that they significantly reduced stunting in Mexico and Nicaragua where carers had access to quality services. An updated review (Lagarde et al., 2009) again found strong evidence of a positive impact of CCTs on the use of health services, nutritional status and health outcomes. However, as the researchers pointed out their replicability under different conditions - particularly in more deprived settings - is still unclear because they depend on effective primary health care and mechanisms to disburse payments. They called for further rigorous evaluative research is needed, particularly where CCTs are being introduced in low income countries, for example in Sub-Saharan Africa or South Asia.

Furthermore, in Mexico an analysis of census data, mortality registries, the nominal registry of children and national nutrition surveys found that CCT programmes have been most successful as one in a series of cost-effective interventions taken incrementally (together with universal child immunisation, clean water programmes and vitamin A distribution) and when they have been part of comprehensive social and economic policy development strategies (Sepulveda et al., 2007).

CCT programmes have also had unexpected deleterious effect on social cohesion. An analysis of twenty case studies in Sub-Saharan Africa found that attempts to use cash transfers to strengthen social cohesion in poor communities have had varied results. They have sometimes proved to be socially divisive leading to beneficiaries losing previous support from family or community and have also fallen victim to 'elite capture'. However, there was some evidence that old-age pensions can increase the nutritional status of children. (Devereux et al., 2007)

3.5 Using government regulation and fiscal levers

There have been repeated calls in the literature for increased government regulation of commercial markets and the use of fiscal levers to reduce child obesity.

In a review of the research evidence on the determinants of national health differences across countries Kawachi (2006) concluded that we cannot leave it to individuals and markets to solve the obesity problem. He argued for further government intervention for working with the producers of the obesity epidemic (food, television, car reliance) more than with the consumers, and for intervention to begin interventions early in life and intervene on people's social environments.

Moodie et al. (2006) also contend that the laissez-faire approach of leaving solutions for child obesity solely to individuals and families within an unfettered market place is patently failing. They argue that unless the commercial drivers of child obesity are well understood and modified through significant government intervention to correct the market failure (as has been done for other major health problems such tobacco control) then governments are failing to promote and protect the health of children. They suggest that government interventions to redress imbalances in the market place could include restriction of food marketing directed at children and subsidies for healthy foods such as fruit and vegetable. Doane (2004) also points out the limitations of voluntary self-regulation through Corporate Social Responsibility (CSR) as a prescription for ethical business. She argues that business in the end, must be profitable and the aims of social and environmental objectives do not always coincide with the hard-nosed business realities of the competitive marketplace' (p.216). She advocates for Government to provide some form of 'watchdog' to improving business accountability.

James (2008) points out that simply advocating more leisure time for physical activity is ineffective. He calls for substantial changes in urban planning and diet to counter the removal of any everyday need for physical activity and the decades of misdirected food policies which, together with free market forces, have induced what he calls the 'toxic environment'. Cuevas et al. (2009) advocate for global intervention, from both governments and nongovernmental organizations, to play an active role in monitoring the food market and facilitating community-based initiatives that promote a healthy lifestyle.

The need for substantial change at all levels is acknowledged in GAPA (Global Advocacy for Physical Activity) (2011) who have recently reviewed the evidence base and identified the seven 'best investments' to increase population levels of physical activity. They claim that these investments will make a significant contribution to reducing the burden of non-communicable diseases and promote population health if applied at sufficient scale. These investments are:

1. 'Whole of School' Programmes.
2. Transport policies and systems that promote walking, cycling and public transport.
3. Urban design regulations and infrastructure that provide for equitable and safe
4. access for recreational physical activity, and recreational and transport-related walking and cycling across the life course
5. Physical activity and non-communicable disease prevention integrated into primary health care systems
6. Public education, including mass media to raise awareness and change social norms on physical activity
7. Community-wide programs involving multiple settings and sectors and that mobilize and integrate community engagement and resources
8. Sports systems and programs that promote 'sport for all' and encourage participation across the life span.

In relation to government regulation of the food industry, Sassi (2010) points out that governments have been reluctant to use regulation and fiscal levers to address child obesity due to the complexity of the regulatory process, the enforcement costs involved, and the likelihood of sparking a confrontation with key industries. He argues that business organisations have a strong interest in retaining a positive and credible image and considers that the private sector (including employers, the food and beverage industry and others) has made an important contribution to tackling unhealthy diets and sedentary lifestyles often in cooperation with governments and international organisation. As an example, he cites Coca Cola's 'Happy Playtime' initiative in 200 urban schools in China, and the Movimiento Bienestar programmes run in collaboration with government departments in many Latin American countries. He acknowledges, however, that at present there is very little empirical evidence that market-based solutions can contribute significantly to containing child overweight and obesity. Nevertheless, he argues that an active collaboration between the

public and the private sector will enhance the impact of any preventive strategies and spread the costs more widely. He identifies key areas in which governments expect a contribution from the food and beverage industry are food product reformulation, limitation of marketing activities to vulnerable groups such as children, and information about food contents.

The use of fiscal levers to reduce child obesity including small taxes on sugar-sweetened carbonated beverages (known as soft drinks or soda and generally regarded as 'junk' foods). A recent study by Sturm et al. (2010) found that children who are already overweight from low-income families may be more sensitive than others to soda taxes, especially when soda is available at school. They suggest that the revenues generated from taxes on soft drinks should be used to support other obesity prevention efforts. A newspaper article by Bonnefoy (2010) reports that in Chile the Health Minister recently suggested taxing 'junk' food but had to back off in the face of strong reaction from the food industry, restaurants and fast-food joints arguing that no one is being forced to eat unhealthy foods. The President of the Nutritionists Association in Chile is reported to say that taxes would have no effect because it is impossible to determine what is 'junk' food.

There have also been challenges to the use of legislation to reduce obesity in Argentina. Narayan (2010) reports on a landmark bill, known as the 'obesity law' passed by the Argentine Congress in 2008 to address the growing problem of obesity. The proposed legislation would have required educational institutions to sell healthy foods, advertisers to prize a slim figure less, schools to implement nutrition education programs, certain foods to have 'high calorie' warning labels and prevent marketers from promoting unhealthy foods to children. However, the bill has subsequently been heavily amended (e.g. all references to sugar were removed) and nothing has been implemented. Narayan argues that the primary barrier is political intransigence and a disconnect between Congress and the Ministry of Health. In 2006 a similar piece of legislation failed in the US Congress.

These failures to combat obesity through legislation are disappointing. However, a more positive note is sounded by Hawkes (2008) who considers that in China, given its unique characteristics and position in the world today, there is an opportunity for the government and the agro-food industry to lead the world, by creating a balanced, health promoting model of complementary legislation and industry action. He examines the regulation of food marketing and nutrition labelling as strategies to help prevent the further growth of obesity in China and encourage the agro-food industry to supply healthier foods. He argues that government legislation and guidance, as well as self-regulation and voluntary initiatives, are needed to reduce children's exposure to food advertising and promotion, and increase the effectiveness of nutrition labelling. He points out that policies on food marketing and nutrition labelling should be contextualised and be accompanied by further action throughout the food supply chain.

3.6 Strengthening democratic governance

At city level the local government is responsible for implementation and accountable for meeting the governance aspects of demand and supply. The growth of informal settlements and slums in many cities around the world is evidence of a failure of governance.

Better housing and living conditions, access to safe water and good sanitation, efficient waste management systems, safer working environments and neighbourhoods, food security and access to services such as education, health, welfare, public transportation and child care are all examples of social determinants of nutritional status that can be addressed through good governance. Governance is a key equity issue in urban environments because many families living in informal settlements are illegal squatters lacking any property rights or 'voice' within local governance structures to influence decision-making processes.

By challenging the hitherto assumption that nutrition was not a governance issue, the WHO CSDH opened the way for increased political commitment for nutrition at international and national levels. Their final report identified an urgent need to tackle the inequitable distribution of power, money and resources in society through strengthening democratic governance. Governance is a much broader concept than government, UN-HABITAT (2002) defines governance in the urban setting as ‘the sum of the many ways in which individuals and institutions, public and private, plan and manage the common affairs of the city’. The Knowledge Network on Urban Settings (KNUS) refers to healthy urban governance as ‘the systems, institutions and processes that promote a higher level and fairer distribution of health in urban settings’(2008). The CSDH report argues that good governance is needed

to provide legitimacy, space, and support for civil society, for an accountable private sector, and for people across society to agree public interests and reinvest in the value of collective action.....in a globalized world, the need for governance dedicated to equity applies equally from the community level to global institutions. (p.2)

Recognising the importance of governance in the urban setting, the WHO Centre for Health Development in Kobe, Japan (known as WKC), was designated as the hub of the KNUS and used governance as the lens through which to develop its single project on ‘Optimizing the Impact of Social Determinants of Health on Exposed Populations in Urban Settings’. Drawing on a conceptual model for ‘Health in New Urban Settings developed by Ilona Kickbush (WHO, 2005 p.9) the WKC project viewed health governance as a critical causal pathway for interventions to reduce environmental and physical hazards, economic barriers, social and political exclusion of slum dwellers and influence values, behaviour and lifestyle. This WHO project was implemented in seven countries including Chile and Kenya.

Key features of healthy urban governance are (i) putting health and nutrition equity and human development at the centre of government policies and actions; (ii) building on and supporting community grassroots efforts of the urban poor to gain control over their circumstances and the resources they need to develop better living environments and public service provision; (iii) developing mechanisms for bringing together private, public and civil society sectors; and (iv) winning and wisely using resources- aid, investment, loans (KNUS, 2008 p.13). KNUS (2008 p.41) suggests the following elements for building good governance:

1. Assessing the urban context
2. Identifying stakeholders
3. Developing the capacity of stakeholders to take action and build social capital and cohesion.
4. Assessing institutions and creating opportunities to build alliances and ensure intersectoral collaboration
5. Mobilizing resources
6. Implementation including strengthening the demand side of governance.
7. Advocating for scaling up and change of policy to relevant stakeholders at different levels.

KNUS argue that good governance can bring together all interventions to improve health and nutrition in poor urban settings in a sustainable way. In practice this means building relationships and redistributing resources through trust, reciprocity and accountability mechanisms so that families living in poor urban areas gain a greater share of decision-making in matters that affect them as well as control over resources. It also means that local government needs to be able to influence the upstream determinants.

Booth (2011) reviews recent thinking on institutions, governance and development and argues that research in this field needs to start with answering the question ‘What is there to build on’. He identifies the need for researchers to deliver ‘more finely tuned ideas about what are the building blocks, and what may be the room for manoeuvre, in facilitating appropriate and feasible institutional innovations’ (p.18). Grindle (2011)) introduces the

concept of good enough governance to question established thinking on the institutional changes and capacity-building deemed important for development. She suggests that decision making about what to do in a specific country should be informed by an analysis of the sources of support and opposition for any intervention embedded in the political economy of the country and on the implications of the proposed intervention for conflict and implementation systems.

Despite the currently high profile given to institutions and governance in development, the literature search found little evidence of any research done to understand the governance aspects of successful response models in cities and big metropolitan areas. However, there is evidence from one study to support the link between governance and child malnutrition. This study was a doctoral thesis by Rokx (2006) which combined a quantitative analysis of country level data from eighty two developing countries with a well-designed in-depth case-study of governance in Madagascar. The quantitative analysis found that countries with higher scores on the four indices used to measure progress on governance across countries have lower levels of child undernutrition. These indices are voice/demand and accountability, political stability, government effectiveness, rule of law and control of corruption.

The case study found that 'voice' can be created through building local support and creating demand for improved nutrition, and that lower levels of undernutrition can be achieved when this voice is used to increase political commitment, accountability and financing for nutrition. This case study demonstrates that good governance contributes to the creation of an enabling environment in which public accountability for reducing undernutrition can be built and investment in nutrition interventions is more likely. It also points out that whilst community participation has long been recognized as important to the design and implementation of nutrition programmes, the case study has demonstrated its value as an instrument for building public accountability for nutrition. There is also some evidence that countries controlled by political parties with more egalitarian ideologies tend to have more economically redistributive policies, and more equitable health outcomes (Navarro et al., 2006).

Although no macro quantitative study can yield definitive conclusions on the influence of the reformed processes implied by the term 'good governance' taken together with the findings from the case study this thesis does support the importance of good governance to reducing child undernutrition and imply that governance could be an effective entry point for change.

Libman et al. (2010) report on a review of existing initiatives to address child obesity in London and New York City which addresses two questions: How have municipal governance structures in each city influenced its capacity to respond effectively? How can policy and programmatic interventions to reduce childhood obesity also reduce the growing socioeconomic and racial/ethnic inequities in its prevalence? The study identified 11 broad strategies to reduce childhood obesity which could be enacted at the municipal level to reduce socioeconomic and racial/ethnic inequalities in obesity. These strategies were based on their estimated impact, their political feasibility over the next decade, and their potential for mobilizing diverse constituencies. They are listed in Figure 6 and range from the broadest citywide actions to more community-based proposals (not in order of their importance). Looking at these strategies it is evident that the challenge here is to establish, support and evaluate cross-sectoral participatory actions within major cities while building consensus on an attainable level of rigor in evaluation designs for community-driven interventions.

3.6 Broadening community participation

The literature shows that there is increasing emphasis at city level amongst civil society, donors and academic institutions to partner with the urban poor living in informal settlements and slums to create organisations and networks that represent all stakeholders. A review of the literature on social capital and health development by Pridmore et al. (2007) found some

evidence to link improvements in social capital/cohesion with improvement in health in urban areas was slowly accumulating. Social capital/cohesion interventions frequently use participatory educational methodologies (often known as participatory learning and action (PLA)¹⁶ to help build trust, strengthen social capital/social cohesion and create 'voice' so that the demands of the poor can be heard in decision-making processes and policy development. However, there are many pitfalls and misconceptions around the use of these methodologies. To achieve meaningful participation the methodologies used must lead to a shift in power relationships so that community people become more empowered to drive initiatives and make their own choices. Many so-called participatory interventions simply inform community members of what is to happen and expect them to be compliant. This is not community participation. (For a typology of community participation see Popay et al. (2006)).

Land use and planning

1. Use zoning authority, land use review and other municipal authority to limit access to fast food and the promotion of unhealthy foods to children.
2. Use zoning, tax incentives, and city owned property to increase the availability of healthy, affordable, and culturally appropriate food in neighbourhoods where it is limited.
3. Incorporate active design principles into building codes, housing strategies, and neighbourhood planning.

Food

4. Set standards for municipal purchase of food in public agencies and leverage economies of scale to promote food systems that support economic, environmental, and human health.
5. Redefine food safety standards to reflect current threats to health and create new ways to use the municipal food safety workforce to promote healthier eating.

Parks and Green Space

6. Promote and support urban agriculture as a sustainable and health promoting use of green space.
7. Increase access to and safety of places where people can be physically active.

Transportation

8. Promote walking and cycling, especially in neighbourhoods with high levels of childhood and adult obesity.

Schools

9. Implement a universal free school meal program with nutritional standards that promote health.
10. Provide drinking water in schools by improving infrastructure for tap water delivery and bathrooms.

Research and training

11. Promote research that helps cities understand how to best address health inequalities and childhood obesity by:
 - Developing and improving the data systems that monitor childhood obesity so that cities can track and report citywide prevalence as well as information about social, economic, and geographic disparities;
 - Tracking the cost and outcomes of municipal policies and programs that address childhood obesity and disseminate this work internationally;
 - Documenting the adverse impact of food marketing practices on children and designing and evaluating strategies to reduce this influence;
 - Finding the best ways to prepare health providers, educators and others to reduce childhood obesity; and
 - Using urban planning as a tool for assessing and changing the built environment to promote health.

Figure 6 Key strategies to reduce childhood obesity in cities

A cluster randomised controlled trial of a community based intervention by Manandhar et al. (2004) in Nepal demonstrated the potential of participatory approaches to empower women and improve child health outcomes. In each intervention cluster (average population 7000), a local woman facilitator convened nine, monthly women's group meetings during which she supported the groups through a participatory action research (PAR) process in which they identified local perinatal problems and formulated strategies to overcome them. This participatory methodology harnessed the creativity, self interest, and self organising activities of poor women and seemed to bring about changes in home-care practices and health-care seeking. The intervention reduced neonatal mortality by 30%. Maternal mortality was also significantly lower in intervention areas.

A multisectoral community-driven programme supported by the Danish Ministry of Foreign Affairs (DANIDA) known as the Community Based Nutrition Programme (CBNP) was implemented through the Ministry responsible for Social Development in Kenya. The Programme aimed to reduce child undernutrition by training multisectoral teams from relevant line ministries at district and divisional levels and using the district level teams to facilitate a participatory educational process to strengthen social cohesion and empower communities to have a voice in decision-making processes and to increase their access to basic services. This programme was eventually implemented at scale.

A study by Havemann (2005) evaluated the CBNP in two communities where the activities had been implemented for three years. Data were gathered using anthropometric measurements from baseline and follow up surveys together with semi-structured interviews and innovative participatory tools, within a quasi experimental design. Findings from the anthropometric data showed a significant reduction in undernutrition in 1-5 year olds in one of the intervention communities, both over time and compared to the control. Social cohesion and the role of gatekeepers in both horizontal and vertical structures were identified as being key to nutritional outcomes. The overall running expenses of the "core" program were calculated to be around US \$9 per person per year for the three years of the project rising to US \$27 per person per year if start-up expenses and local consultancy fees are added. Costs in the replication phase dropped to US \$0.6 per person per year because a variety of forms of diffusion had occurred (both geographical and technical) within the neighbourhood of the implementation areas.

The importance of context was highlighted in an extensive review and analysis of community based food and nutrition programmes by Ismail et al. (2003)¹⁷. This review concluded that to be successful participatory methodologies need to be embedded within community-driven programmes in an enabling environment provided by policies and interventions at all levels. The analysis was based on three programme cases per region (Africa, Asia, and Latin America) and three desk reviews. Each programme had at least five years programme experience in at least two sectors plus community participation, large scale coverage of young children and the ability to offer insights into institutionalization. The findings showed that although levels of community participation varied widely from passive co-operation to active involvement in decision-making, over time many of the programmes appeared to have achieved some level of community empowerment. The researchers identified seven key factors that may have influenced the rate of this empowerment:

1. Stage of development of the community at the start of the exercise;
2. Level of literacy;

¹⁷ This study was commissioned by the Food and Agriculture Organisation of the United Nations (FAO)

3. Position of women
4. Economic conditions of the community;
5. Pre-existence of a strong representative community group;
6. A culture of working together for the common good rather than as individuals;
7. Degree of homogeneity of the community and;
8. Degree of geographic or social isolation of the community.

They concluded that although there are no shortcuts and many pitfalls and setbacks in the application of the participatory methodology, much can be achieved and once achieved the nutritional improvements are likely to become permanent. Lessons learned for success include crucially a strong macro policy environment and technical expertise at national and subnational level, meaningful participation, systematic planning using a comprehensive framework, and institutionalization of nutrition activities within government structures at all levels. They stress that successful and sustainable community-based nutrition programmes are not stand alone 'island of excellence but are **embedded within an enabling environment provided by policies and actions at all levels.** (See Appendix 4 for further details of the lessons learned.)

Engaging the whole community

There is evidence that child obesity rates can be significantly reduce if whole communities are involved for the long-term. A 12-year study in France by Romon et al. (2009) which compared obesity rates between a town that implemented a whole community approach and one that took no coordinated action. Over 12 years the town using the whole community approach had significantly lower childhood obesity rates than the control town and lower rates than at the start of the study. Key elements of this approach included school-based interventions, parent and community engagement, municipal support for environmental changes such as building new sports facilities, and communication about these efforts through mass media. School-based interventions promoted healthy eating by improving children's nutritional knowledge and the quality and affordability of food in schools. Similarly, physical activity was promoted by organizing walk-to-school days, improving facilities and hiring sports educators. Parents were invited to family breakfast in schools while doctors, shopkeepers, sports and cultural groups organized family events focused on healthy lifestyles. Based on a school wide survey that reported high levels of unhealthy eating and sedentary behaviours, doctors and dieticians provided tailored advice to families. Newspaper, radio, and television coverage of these events also supported the project.

Sassi (2010) cites a 2009 WHO review of 65 community interventions to address obesity, which also indicated that the most successful comprised many different activities and usually included diet and physical activity components.

3.7 Raising woman's social position in society

There is strong evidence that increasing women's social position in society can reduce child undernutrition. An analysis of Demographic and Health Survey Data in 36 countries (in South Asia, Sub-Saharan Africa, and Latin America and the Caribbean), found that increasing the status of women had a significant, positive effect on children's nutritional status in all three regions. The findings also showed that the very high rates of child undernutrition in South Asia, compared to sub-Saharan Africa, are associated with the much lower status of women in South Asia. Combined with the impact of poor sanitation, and rapid urbanization, this lower status has a strong impact on undernutrition. (Smith et al., 2003)

In this study the pattern to improved child nutrition identified in South Asia involves women's nutritional status (as measured by body mass index), prenatal and birthing care for women, complementary feeding practices for children, treatment of illness and immunization of children, and the quality of substitute child caretakers. The pattern is the same in sub-Saharan Africa except that higher women's status improves child nutrition only for women

with very little relative decision-making power. In Latin America and the Caribbean women's status has a positive effect only on children's short-term nutritional status and only in those households in which women's relative decision-making power is very low.

This study also identifies a range of interventions that have successfully improved women's status through reducing discrimination and proactively promoting catch-up in women's status. These interventions include reform of legislation and delivery of basic services to equalize rights and access, improving access to child care and CCT programmes. (Further details of these interventions are given in Appendix 5.)

A more recent review of interventions, that have been well evaluated and have credible evidence to show that within a short period of time women have been empowered, identified four key policy options: (i) microfinance targeted to women (ii) cash transfers targeted to women conditional on girls' attendance at school (iii) the reservation of positions for women in legislative bodies and (iv) providing support for women's reproductive role (King et al., 2008).

3.8 Reforming macro-economic and social policies

Social determinants of child undernutrition have also been successfully addressed through a systemic approach to macro-economic and social policy reform. In China, for example, rapid and dramatic reductions in child undernutrition over the past two decades have been achieved by reforms that have successfully stimulated economic growth, reduced poverty and addressed trade and agriculture (Bryce et al., 2008). However, these reforms have been complemented by policies to support large scale implementation of effective nutrition, health, family-planning, water and sanitation and education interventions (Ruel 2008).

The way in which policies to support socioeconomic development coupled with equity-oriented public policies can improve living conditions and rapidly reduce child undernutrition has been demonstrated by a flurry of recent analyses of Demographic Health Survey (DHS) data from Brazil (Monteiro, 2009, Lima et al., 2010, Monteiro et al., 2010). These analyses have all attributed most of this reduction to macro-socioeconomic and social power policies, which have increased maternal schooling and the purchasing power of families who are poor, and on public investments aimed at increased access of these families to essential public services such as education, health, water supply and sanitation (safe sewage disposal). Most importantly, the analysis by Monteiro et al. (2010) demonstrated that these policy reforms had led to a reduction of the gap in nutritional status between children in the highest and lowest socioeconomic quintiles.

In Thailand dramatic reductions in child undernutrition have been largely attributed to strong leadership armed with good evidence and an informed government working with progressive forces in the food chain to develop a supportive policy environment. This environment included a comprehensive nutrition policy, effective integration of nutrition within the National Economic and Social Development Plan and linkages between agriculture and nutrition for sustainability, together with successful and community-level involvement and strong monitoring and evaluation (Ruel, 2008, Lang, 2002).

Having demonstrated that child undernutrition can be successfully addressed through macro-level policy reforms the debate in many countries has now turned to the need for policy makers to consider the impact of macroeconomic policies on child obesity.

3.9 Synthesis

The review of evidence presented in this section confirms that there is no one single solution to improving child malnutrition in informal settlements and urban slums and that an effective comprehensive approach will require multiple concurrent strategies to be implemented. To achieve such an approach action is needed in four key areas: 1) national policy; 2) municipal policies and regulations; 3) programs and environments; and 4) partnerships.

4. Discussion and conclusion

So far this review has dealt with the Why and What of programming to reduce malnutrition in children living in poor urban settings in developing countries. The findings show that the social determinants of child malnutrition in the informal settlements and urban slums of developing countries are largely environmental and that they are driven by social inequity within the cities. Although the evidence base for action on the social determinants to reduce child malnutrition is ambiguous, many interventions to address the intermediate and basic social determinants have been shown to be effective in specific contexts.

However, to co-ordinate and implement such interventions, in the poor urban areas of developing countries, requires strong leadership and advocacy at municipal level to build political commitment for pro-poor city-wide policies as well as the capacity to mobilise stakeholders around a shared strategic plan to improve child nutrition. Such a plan would need to co-ordinate (and regulate) actions by the public and private sectors and non-governmental organisations and promotes democratic governance and voice. It could be used to attract targeted funding and to improve domestic resource mobilisation.

It must also be recognised that developing a shared strategic plan and designing effective interventions is not enough - the delivery of such programmes on the ground also requires good programme management and effective use of information for awareness creation, monitoring, learning and evaluation. In many urban areas of developing countries the challenges posed by these requirements are exacerbated by impediments to effective action such as HIV/AIDS and weak infrastructure.

The final section of this review, therefore, turns to the 'How' of nutrition programming at the municipal level where local government is responsible for implementation and for meeting the governance aspects of demand and supply. It discusses the implications of the findings for the further development and implementation of the Nick Project in the cities of Mombasa and Valparaiso and identifies the key issues and challenges in relation to (i) strengthening 'healthy' urban governance (ii) establishing multisectoral teams at the municipal level and enabling them to work together successfully (iii) achieving meaningful participation and (iii) designing interventions that could lead to a measurable change in child nutritional status after only 18 months of intervention.

4.1 Making multidisciplinary interventions work

The first challenge here is to identify the right stakeholders and to develop effective channels of communication and mechanisms for dialogue and partnership. In the NICK Project stakeholders in the PAR teams need to be in a position to commit human and financial resources to support their chosen actions in addition to reviewing their current practices to ensure they support better child nutrition. These stakeholders include different sectors of national and local government, local leaders, local councils, sports associations, parent-teacher associations, clubs, NGOs, academics, the media and private sector.

Developing the capacity of the PAR teams to work together to build their leadership and advocacy skills and to develop, implement and evaluate cross-disciplinary, multi-sector actions has proved difficult in the past. This is partly due to the 'silo mentality' whereby, for example, nutritionists tend to work within the Ministry of Health and apply biomedical solutions. It is also due to the way that institutions and their funding streams operate vertically, which often leads to failure to apply gender methodologies to the design and implementation of interventions and gender links are not articulated or not acted upon. However, given the urgent need to take action, there is no choice but to document successes and try again.

Section 3 of this review has identified some experiences where successful cross-sectoral interventions have been implemented by NGOs and multi-sectoral teams from relevant line ministries when the capacity of the teams has been strengthened for nutrition advocacy and

action. Experience in Kenya has also shown that community development funds dispersed through the municipal level and ring-fenced for cross-sectoral actions can be a key incentive to make cross-sectoral actions work. In the NICK, the in-country researchers and the PAR teams will need to identify any funding strategies that can be used to encourage cross-sectoral programming in their study site.

The challenges will need to be taken into account when establishing a multidisciplinary team at municipal level in each study site in collaboration with the city council and defining roles. Each PAR team will have about twelve members including the in-country researchers, a local politician, a policy maker, an administrator, a member of the city council, a local health worker, a local social development worker, a member of civil society and a local action group, a member of the commercial private sector, as well as adult child and youth representatives (chosen by and from the community). To reduce power disparities and ensure that all team members have a voice the teams will need to be sensitively facilitated using participatory educational approaches and work in peer groups with plenary reporting.

4.2 Facilitating the participatory action research groups

The PAR will involve three, six-monthly cycles each of which will involve capacity building for leadership and advocacy, situational analysis and cross-sectoral planning, action and reflection in order for the teams to design, trial and improve on a range of small scale community-based interventions.

The PAR process will be facilitated and supported by members of the core-research team using a participatory educational process adapted from the PANS process used by the Community-Based Nutrition Programme (CBNP) that successfully reduced malnutrition in Kenya (see section 3.6). In Chile this process has been well tried and tested in two previous healthy urbanisation projects and substantially adapted.

Each cycle of the action research process follows 4 steps: Study, Plan, Act, Evaluate (and then re-plan). In the first workshop the PAR group studies to answer the questions: What are the social determinants of child malnutrition in our city? What are the consequences? What have we done and what are we currently doing to reduce the problem? What more can we do? The group then moves on to plan a multisectoral intervention. After a period of implementation and monitoring the group will come back together to study and evaluate what they have done and to replan. The process then continues until three cycles of planning, action and reflection have been completed. The aim of this process is to enable social learning, develop leadership skills and encourage partnering and the building of alliances between public, private, nongovernmental and civil society institutions and organisations.

4.3 Entry points and meaningful community participation

The evidence reviewed shows that successful interventions have used a range of different entry points. The choice of entry point(s) for the interventions designed by the PAR teams will need to depend on which sectors are most effective at the local level in each specific context. What is important is to ensure that the intervention or package of interventions is culturally appropriate for the target population.

The literature reviewed in section 3.6 shows that without some buy-in at the local level by community members, a programme will not be sustainable. Nearly all the programmes reviewed claim to be community-based but, as explained, this may mean little more than passive attendance at a nutrition education programme. Some of the programmes reviewed emphasise the importance of programmes being community driven or having 'real' community involvement; but, whilst the reports are usually clear about the process of recruiting and selecting the (paid) facilitators, there is much less information – if any at all – on the process by which community members emerge or are chosen or even recruited to be

the active community volunteers. Within the 'community' itself there may be an issue of local power and tensions which will limit the effectiveness of the programme.

4.4 Key issues and challenges of assessment

The funding proposal for the NICK Project indicates that the impact of the small scale interventions designed by the PAR teams will be assessed quantitatively through collection of child anthropometric data (weight-for-height, weight-for-age and height-for-age). These data will be collected in baseline and follow up surveys and any change in nutritional status will be measured using a before-after experimental design. The proposal also indicates that qualitative, process data will be collected to illuminate the actions, pathways and mechanisms (including those in existing structures) through the social determinants can be changed to improve nutrition. These data will be collected throughout the PAR using diaries, semi-structured interviews and informal discussions, observation and participatory techniques. Baseline data will also include data on any pro-poor policies or initiatives currently in place at the municipal so that any changes can also be monitored and evaluated.

The question arises as to what interventions can reasonably be expected to reduce under- or over nutrition in children, as measured by anthropometry, with about 18 months between the baseline and follow-up surveys. To show impact on child nutritional status, especially stunting (low height-for-age - which is the key indicator for under-nutrition) many indirect interventions require longer follow-up periods.

To address the difficulty of showing impact through change in child nutritional status many of the evaluation studies in the foregoing review have used more proximal indicators that measure change along the way. Proximal indicators could include increased access to nutritious food and public services, improved child caring practices and decreased prevalence of domestic violence and family breakdown, increased employment opportunities or family income, increased social capital/cohesion and social safety nets, change in governance structure for improved governance and voice, higher status and autonomy of women. For over-nutrition, proximal indicators could include reduced dietary intake of fat and sugar, increased exercise, more safe places to play, and changes in the market to reduce access to fast food outlets. There is also a need to further develop and assess valid indicators and methodologies that can be used at the national level and municipal levels to provide rapid feedback on progress in generating political commitment, strategic and operational capacities, coverage and effect, as well as institutional and policy change, for example, a change towards city-wide pro-poor policies..

Assessing cost effectiveness

To be sustainable, programmes to tackle malnutrition need to be cost-effective. The NICK research team will therefore need to give carefully consideration to the collection and analysis of the data needed to make cost-benefit estimates. A discussion of costing challenges was given in section 1.4.

The foregoing review of evidence for action on child malnutrition found surprisingly little systematic cost data to complement the evidence for effectiveness of the interventions which corroborates the findings of the earlier review of evidence on child undernutrition by Pridmore and Carr-Hill (2009). Both reviews found some evidence that community-driven programmes to raise women's status can be cost-effective but few systematic costing data were available even for these programmes and there was notable variability with wide ranges in cost-benefit estimates. They found even less data available on costing community participation and it is unsurprising that any estimates of cost effectiveness for programmes relying heavily on community participation will be very diverse.

As noted by Pridmore and Carr-Hill, assessing cost effectiveness is therefore difficult; and assessing cost effectiveness of real community participation more so, partly because of the lack of real cost data but mostly because of the difficulties of identifying the beneficiaries. Some cost-benefit analyses have tried to estimate the cost of donated services such as volunteer time under the heading of 'off-budget' costs. It is difficult to be precise with such estimates but it does mean that cost estimates based on-budget costs only will lead to significant overestimation of cost-effectiveness for some programmes.

CCT programmes to increase uptake of MCH services appear to be highly cost-effective but have only been shown to reduce stunting in middle-income countries. They may also be cost-effective in low-income countries depending on the threshold value of the cash transfer needed to reduce child undernutrition and the cost of strengthening the health system to deliver adequate quality services. In the case of CCT to increase girls' attendance in school, additional costs may arise from the need to improve the quality of teaching and learning in the schools.

The research team will need to develop a consensus on how to cost the interventions where there is real community participation and on the procedures for making cost-effectiveness estimates. There is also a need to gain consensus on an attainable minimum of rigour in the qualitative aspects of the study. The team will need to be clear on their use of the term community involvement and for it to be related to a typology of participation because of the importance of factoring in community participation as a valued democratic outcome in itself.

4.3 Concluding comments

This review has highlighted the need for urgent action to address the neglected crisis of child undernutrition, which has become an endemic problem in many low income countries, jeopardizing the physical and mental development of growing children. It has also shown that the growing pandemic of child overweight and obesity especially in middle income countries, is a major public health problem causing psychological and social problems for children and predisposing them to adult obesity with increased risk of morbidity and mortality from chronic diseases.

The analysis of the social determinants of child malnutrition in low-income urban areas has shown that they are complex and operate at different levels and across different sectors. Consequently, they cannot be addressed by any sector alone and collaborative, multisectoral efforts are needed at the municipal level to develop a strategic plan to address both 'upstream' and 'downstream' social determinants and create an enabling environment for nutrition. It has also identified the need for more studies to reduce child malnutrition in the early years during which long-term dietary and physical activity habits are established, with potential lifelong effects on health.

The analysis of the evaluations and studies on the effectiveness of interventions to change the social determinants of child malnutrition in poor urban settings shows that although the evidence is ambiguous, a range of indirect interventions at the municipal level can be effective. However, the establishment of a good urban governance mechanism is a key and critical pathway to creating an enabling environment for nutrition. The reality is that every step of the change process is conditioned by capacity for leadership and advocacy and the particularities of the environment in each situation including the history, culture, economic and political situation.

The review has also considered the implications of the findings for the further development of the NICK Project. It has identified the need to find new ways to build the leadership and advocacy skills of multisectoral teams at the municipal level (involving personnel from government, civil society and the private commercial sector) and their ability to work together to develop a strategic plan incorporating effective interventions that are well coordinated and implemented. This will involve offering them the space to develop shared understanding of the complexity of the problem and to use their local knowledge and

experience to generate the best solutions for effective intervention and implementation. The challenge facing the NICK team is how best to support the capacity building and action research whilst carefully monitoring the process and rigorously evaluating the outcomes.

Ultimately, however, winning the fight against childhood malnutrition in the informal urban settlements and slums of developing countries, including those of Valparaiso and Mombasa, will depend on having national and municipal governance structures and institutions in place to create and support an enabling environment for nutrition. Such an environment requires strong leadership and advocacy to develop a culture of evidence-based decision making, accountability at all levels, inclusivity of private and voluntary sectors. It also requires promotion of equal rights for all and efforts to redress social inequalities through city-wide pro-poor policies and practices to support interventions targeted to low-income families, and especially women and children. The challenges are many but so are the opportunities to change the social determinants of child malnutrition and improve the lives of millions of disadvantaged children.

References

- ACKERSON, L. K. & SUBRAMANIAN, S. V. (2008) Domestic Violence and Chronic Malnutrition among Women and Children in India. *American Journal of Epidemiology*, Volume 167, 1188-1196.
- AINSWORTH, M. & SEMALI, I. (2000) The impact of adult deaths on child health in Northwestern Tanzania. Washington, World Bank.
- ALBALA, C., EBBELING, C. B., CIFUENTES, M., LERA, L., BUSTOS, N. & LUDWIG, D. S. (2008) Effects of replacing the habitual consumption of sugar-sweetened beverages with milk in Chilean children. *American Journal of Clinical Nutrition*, 88, 605-11.
- ANGELES-AGDEPPA, I., LANA, R. D. & BARBA, C. V. C. (2003) A case study on dual forms of malnutrition among selected households in District 1, Tondo, Manila. *Asia Pacific Journal of Clinical Nutrition*, 12, 438-46.
- BANDURA, A. (1977) *Social Learning Theory*, New York, General Learning Press.
- BENSON, T. (Ed.) (2008) *Improving nutrition as a development priority : addressing undernutrition in national policy processes in Sub-Saharan Africa*, Washington DC, International Food Policy Research Institute.
- BLACK, R. E., ALLEN, L. H., BHUTTA, Z. A., CAULFIELD, L. E., DE ONIS, M., EZZATI, M., MATHERS, C., RIVERA, J., MATERNAL & CHILD UNDERNUTRITION STUDY, G. (2008) Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet*, 371, 243-60.
- BONEFOY, P. (2010) Combating Chile's exploding obesity rates. World News from GlobalPost.
- BOOTH, D. (2011) Aid, Institutions and Governance: What Have We Learned? *Development Policy Review* 29 s5-s26.
- BREWIS, A. A., MCGARVEY, S. T., JONES, J. & SWINBURN, B. A. (1998) Perceptions of body size in Pacific Islanders. *Int J Obesity* 22 185–89.
- BRINKMAN, H.-J., DE PEE, S., SANOGO, I., SUBRAN, L. & BLOEM, M. W. (2010) High food prices and the global financial crisis have reduced access to nutritious food and worsened nutritional status and health. *Journal of Nutrition*, 140, 153S-61S.
- BRYCE, J., COITINHO, D., DARNTON-HILL, I., PELLETIER, D. & PINSTRUP-ANDERSEN, P. (2008) Maternal and child undernutrition: effective action at national level. *The Lancet. Series: Maternal and child undernutrition*, 371, 510-526.
- CABALLERO, B. (2005) A Nutrition Paradox — Underweight and Obesity in Developing Countries. *N Engl J Med*, 1514-1516.
- CABALLERO, B. & POPKIN, B. M. (Eds.) (2002) *The nutrition transition: diet and diseases in the developing world*, London, Academic Press.
- CALDWELL, J. C. (1979) Education as a factor in mortality decline: an examination of Nigerian data. *Population Studies*, 33, 395–413.
- CARR-HILL, R. & STREET, A. (2007) Approach to the Economic Analysis/Modelling of Cost-effectiveness of Community Engagement to Improve Health. London, National Institute of Health and Clinical Excellence (NICE)

- CASE, A. & MENDEZ, A. (2007) Sex differences in obesity rates in poor countries: Evidence from South Africa. IN 13541, N. W. P. N. (Ed. Cambridge, MA).
- CHAN, C., DEAVE, T. & GREENHALGH, T. (2010) Childhood obesity in transition zones: an analysis using structuration theory. *Sociology of Health & Illness*, 32, 711-729.
- COLLISON, K. S., ZAIDI, M. Z., SUBHANI, S. N., AL-RUBEAN, K., SHOUKRI, M. & AL-MOHANNA, F. A. (2010) Sugar-sweetened carbonated beverage consumption correlates with BMI, waist circumference, and poor dietary choices in school children. *BMC Public Health*, 10, 234.
- CUEVAS, A., ALVAREZ, V. & OLIVOS, C. (2009) The emerging obesity problem in Latin America. *Expert Review of Cardiovascular Therapy*, 7, 281-8.
- CUTTS, B. B., DARBY, K. J., BOONE, C. G. & BREWIS, A. (2009) City structure, obesity, and environmental justice: An integrated analysis of physical and social barriers to walkable streets and park access. *Social Science & Medicine*, 69, 1314-1322.
- DAHLY, D. L., GORDON-LARSEN, P., POPKIN, B. M., KAUFMAN, J. S. & ADAIR, L. S. (2010) Associations between multiple indicators of socioeconomic status and obesity in young adult Filipinos vary by gender, urbanicity, and indicator used. *Journal of Nutrition*, 140, 366-70.
- DE ONIS, M. & BLOSSNER, M. (2000) Prevalence and trends of overweight among preschool children in developing countries. *American Journal of Clinical Nutrition*, 72, 1032-9.
- DEININGER, K., GARCIA, M. & SUBBARAO, K. (2003) AIDS-Induced Orphanhood as a Systemic Shock: Magnitude, Impact, and Program Interventions *Africa World Development*, 31, 1201-1220.
- DEVEREUX, S., ELLIS, F. & WHITE, P. (2007) Regional Lesson Learning from the Case Studies *Case Study Briefs, Regional Evidence Building Agenda*. . Johannesburg, Regional Hunger and Vulnerability programme (RHVP).
- DOANE, D. (2004) Beyond corporate social responsibility, minnows, mammoths and markets. . *Futures* 37, 215–229.
- DOS SANTOS, J. V., GIGANTE, D. P. & DOMINGUES, M. R. (2010) Prevalence of food insecurity in Pelotas, Rio Grande do Sul State, Brazil, and associated nutritional status. [Portuguese]
- Prevalencia de inseguranca alimentar em Pelotas, Rio Grande do Sul, Brasil, e estado nutricional de individuos que vivem nessa condicao. *Cadernos de Saude Publica*, 26, 41-49.
- EDSTRÖM, J. & SAMUELS, F. (2007) *HIV, nutrition, food and livelihoods in sub-Saharan Africa: evidence, debates and reflections for guidance*. , London., Institute for Development Studies and Overseas Development Institute.
- FELISBINO-MENDES, M. S., CAMPOS, M. D. & LANA, F. C. F. (2010) [Nutritional assessment in children under 10 in Ferros, Minas Gerais]. *Revista Da Escola de Enfermagem Da Usp*, 44, 257-65.
- FITZGIBBON, M. L. & BEECH, B. M. (2009) The Role of Culture in the Context of School-Based BMI Screening. *Pediatrics*, 124, S50-S62.
- FLYNN, M. A. T., MCNEIL, D. A., MALOFF, B., MUTASINGWA, D., WU, M., FORD, C. & TOUGH, S. C. (2006) Reducing obesity and related chronic disease risk in children and youth: a synthesis of evidence with 'best practice' recommendations. *Obesity Reviews*, 7 Suppl 1, 7-66.
- FREIRE, P. (1970) *Pedagogy of the Oppressed*, New York, Herder and Herder.

- FRIIS, H. (2006) Micronutrient intervention and HIV infection: a review of current evidence. *Tropical Medicine & International Health*, 11, 1-9.
- GAPA (2011) *Non-communicable disease prevention: Investments that Work for Physical Activity*. (A complementary document to The Toronto Charter for Physical Activity: A Global Call to Action). GAPA (Global Action for Physical Activity group of the Council of the International Society for Physical Activity and Health (ISPAH)). <http://www.globalpa.org.uk/pdf/investments-work.pdf> (visited 25.02.1011).
- GALAL, O., CORROON, M. & TIRADO, C. (2010) Urban environment and health: food security. *Asia-Pacific Journal of Public Health*, 22, 254S-261S.
- GALASSO, E. & UMAPATHI, N. (2007) *Improving nutritional status through behavioral change: lessons from Madagascar*, Washington DC, World Bank.
- GILLESPIE, S. & KADIYALA, S. (2005) HIV/AIDS and food and nutrition security: from evidence to action. . Washington DC, International Food Policy Research Institute.
- GILLMAN, M. W. (2010) Early infancy as a critical period for development of obesity and related conditions. *Nestle Nutrition Workshop Series. Paediatric Programme*, 65, 13-20; discussion 20-4.
- GRACEY, M. (2002) Child health in an urbanizing world. *Acta Paediatrica*, 91, 1-8.
- GRANTHAM-MCGREGOR, S., CHEUNG, Y. B., CUETO, S., GLEWWE, P., RICHTER, L. & STRUPP, B. (2007) Developmental potential in the first 5 years for children in developing countries. *Lancet*, 369, 60-70.
- GRINDLE, M. S. (2011) Good Enough Governance Revisited. *Development Policy Review* : s199-s221, 29 s199-s221.
- HARDEMAN, W., S., GRIFFIN, S., JOHNSTON, H., KINMONTH, A. L. & WAREHAM, N. J. (2000) Interventions to prevent weight gain: a systematic review of psychological models and behaviour change methods. *International Journal of Obesity*, 24, 131-143.
- HAWKES, C. (2008) Agro-food industry growth and obesity in China: what role for regulating food advertising and promotion and nutrition labelling? *Obesity Reviews*, 9 Suppl 1, 151-61.
- HILL, K. (2003) Frameworks for studying the determinants of child survival. *Bull World Health Organ Bulletin of the World Health Organisation*, 81, 138-139.
- HUGHES, A. R. & REILLY, J. J. (2008) Disease management programs targeting obesity in children: Setting the scene for wellness in the future. *Disease Management and Health Outcomes*, 16, 255-266.
- JAMES, W. P. T. (2008) The epidemiology of obesity: the size of the problem. *Journal of Internal Medicine*, 263, 336-52.
- JENSEN, B. (1994) Action, Action Competence and Change in the Field of Environmental and Health Education. IN JENSEN, B. B. & SCHNACK, K. (Eds.) *Action and Action Competence as Key Concept in Critical Pedagogy*. Copenhagen, Royal Danish School of Educational Studies.
- KAIN, B. J., UAUY, D. R., LEYTON, D. B., CERDA, R. R., OLIVARES, C. S. & VIO, D. F. (2008) Effectiveness of a dietary and physical activity intervention to prevent obesity in school age children. [Spanish] Efectividad de una intervencion en educacion alimentaria y actividad fisica para prevenir obesidad en escolares de la ciudad de Casablanca, Chile (2003-2004). *Revista Medica de Chile*, 136, 22-30.

- KAIN, J., CONCHA, F., SALAZAR, G., LEYTON, B., DEL PILAR RODRIGUEZ, M., CEBALLOS, X. & VIO, F. (2009a) Obesity prevention in preschool and schoolchildren attending public schools from a district of Santiago, Chile: pilot project 2006. [Spanish] Prevencion de obesidad en preescolares y escolares de escuelas Municipales de una Comuna de Santiago de Chile: Proyecto piloto 2006. *Archivos Latinoamericanos de Nutricion*, 59, 139-146.
- KAIN, J., LEYTON, B., CERDA, R., VIO, F. & UAUY, R. (2009b) Two-year controlled effectiveness trial of a school-based intervention to prevent obesity in Chilean children. *Public Health Nutrition*, 12, 1451-61.
- KHAN, N. C. & KHOI, H. H. (2008) Double burden of malnutrition: the Vietnamese perspective. *Asia Pacific Journal of Clinical Nutrition*, 17 Suppl 1, 116-118.
- KING, E., KLASSEN, S. & PORTER, M. (2008) Women and Development. Copenhagen, Copenhagen Consensus Centre.
- KLOHE-LEHMAN, D. M., FREELAND-GRAVES, J., CLARKE, K. K., CAI, G., VORUGANTI, V. S., MILANI, T. J., NUSS, H. J., PROFFITT, J. M. & BOHMAN, T. M. (2007) Low-income, overweight and obese mothers as agents of change to improve food choices, fat habits, and physical activity in their 1-to-3-year-old children. *Journal of the American College of Nutrition*, 26, 196-208.
- KNUS (2008) Our cities, our health, our future: Acting on social determinants for health equity in urban settings. Report from the Knowledge Network on Urban Settings (KNUS). . Kobe.
- KUMANYIKA, S. & GRIER, S. (2006) Targeting interventions for ethnic minority and low-income populations. *Future of Children*, 16, 187-207.
- LAGARDE, M., HAINES, A. & PALMER, N. (2007) Conditional cash transfers for improving uptake of health interventions in low-and middle-income countries - A systematic review. *Jama-Journal of the American Medical Association*, 298, 1900-1910.
- LAGARDE, M., HAINES, A. & PALMER, N. (2009) The impact of conditional cash transfers on health outcomes and use of health services in low and middle income countries. *Cochrane Database of Systematic Reviews*.
- LANE, S. D., KEEFE, R. H., RUBINSTEIN, R., LEVANDOWSKI, B. A., WEBSTER, N., CIBULA, D. A., BOAHENE, A. K., DELE-MICHAEL, O., CARTER, D., JONES, T., WOJTOWYCZ, M. & BRILL, J. (2008) Structural violence, urban retail food markets, and low birth weight. *Health & Place*, 14, 415-423.
- LANG, T. (2002) Can the challenges of poverty, sustainable consumption and good health governance be addressed in an era of globalisation? IN CABALLERO, B. & POPKIN, B. M. (Eds.) *The nutrition transition*. London Academic Press.
- LANIGAN, J., BARBER, S. & SINGHAL, A. (2010) Prevention of obesity in preschool children. *Proceedings of the Nutrition Society*, 69, 204-10.
- LEMKE, S., VORSTER, H. H., VAN RENSBURG, N. S. J. & ZICHE, J. (2003) Empowered women, social networks and the contribution of qualitative research: broadening our understanding of underlying causes for food and nutrition insecurity. *Public Health Nutrition*, 6, 759-64.
- LIBMAN, N. K., FREUDENBERG, N. & O'KEEFFE, E. (2010) A tale of two obesCities: the role of municipal governance in reducing childhood obesity in New York City and London 87(5):
Journal of Urban Health, 755-70.

- LIMA, A. L. L. D., SILVA, A. C. F. D., KONNO, S. C., CONDE, W. L., BENICIO, M. H. D. A. & MONTEIRO, C. A. (2010) Causes of the accelerated decline in child undernutrition in Northeastern Brazil (1986-1996-2006). *Revista de Saude Publica*, 44, 17-27.
- LIVINGSTONE, M. B. E., MCCAFFREY, T. A. & RENNIE, K. L. (2006) Childhood obesity prevention studies: lessons learned and to be learned. *Public Health Nutrition*, 9, 1121-1129.
- LOB-CORZILIUS, T. (2007) Overweight and obesity in childhood--a special challenge for public health. *International Journal of Hygiene & Environmental Health*, 210, 585-9.
- LOVASI, G. S., HUTSON, M. A., GUERRA, M. & NECKERMAN, K. M. (2009) Built Environments and Obesity in Disadvantaged Populations. *Epidemiologic Reviews*, 31, 7-20.
- MARTIN-PREVEL, Y., MAIRE, B. & DELPEUCH, F. (2000) [Nutrition, urbanization and poverty in subsaharan Africa]. *Medecine Tropicale*, 60, 179-91.
- MEDINA-BLANCO, R. I., JIMENEZ-CRUZ, A., PEREZ-MORALES, M. E., ARMENDRIZ-ANGUIANO, A. L. & BACARD-GASCN, M. (2010) Assessment of physical activity in school children with accelerometry. *Obesity Reviews*, Conference: 11th International Congress on Obesity, ICO 2010 Stockholm Sweden. Conference Start: 20100711 Conference End: 20100715. Conference: 11th International Congress on Obesity, ICO 2010 Stockholm Sweden. Conference Start: 20100711 Conference End: 20100715. Conference Publication: (var.pagings). 11, 387.
- MOESTUE, H., HUTTLY, S., SARELLA, L. & GALAB, S. (2007) 'The bigger the better' - mothers' social networks and child nutrition in Andhra Pradesh. *Public Health Nutrition*, 10, 1274-1282.
- MONTEIRO, C. A. (2009) The decline in child malnutrition in Brazil. *Cadernos de Saude Publica*, 25, 950-1.
- MONTEIRO, C. A., BENICIO, M. H. D. A., CONDE, W. L., KONNO, S., LOVADINO, A. L., BARROS, A. J. D. & VICTORA, C. G. (2010) Narrowing socioeconomic inequality in child stunting: the Brazilian experience, 1974-2007. *Bulletin of the World Health Organization*, 88, 305-11.
- MOODIE, R., SWINBURN, B., RICHARDSON, J. & SOMAINI, B. (2006) Childhood obesity--a sign of commercial success, but a market failure. *International Journal of Pediatric Obesity*, 1, 133-8.
- MOSLEY, W. H. & CHEN, L. C. (1984) An analytic framework for the study of child survival in developing countries. . *Population Development Review* 10, 25-45.
- MULDER, C., KAIN, J., UAUY, R. & SEIDELL, J. C. (2009) Maternal attitudes and child-feeding practices: relationship with the BMI of Chilean children. *Nutrition Journal*, 8, 37.
- MVO, Z. L., DICK, J. & AL, E. (1999) Perceptions of overweight African women about acceptable body size of women and children. *Curationis*, 2, 27-31.
- NARAYAN, R. (2010) Argentina's failed 'obesity law' and the implications for policy." ICO 2010 . Conference Start: 20100711 Conference End: 20100715. Conference: 11th International Congress on Obesity, ICO 2010 Stockholm Sweden. Conference Start: 20100711 Conference End: 20100715. Conference Publication: (var.pagings). 11: 443. *Obesity Reviews Conference: 11th International Congress on Obesity (ICO)*, . Stockholm Sweden, ICO.

- NAVARRO, V., MUNTANER, C., BORRELL, C., BENACH, J., QUIROGA, A., RODRÍGUEZ-SANZ, M., VERGÉS, N. & PASARIN, I. (2006) Politics and Health Outcomes. *Lancet*, 367, 1033-1037.
- NIELSEN, S. J. & POPKINS, B.M. (2003) Patterns and Trends in Food Portion Sizes, 1977-1998. *Journal of the American Medical Association*, 289, 450-453.
- NUNES, M. A., FERRI, C. P., MANZOLLI, P., SOARES, R. M., DREHMER, M., BUSS, C., GIACOMELLO, A., HOFFMANN, J. F., OZCARIZ, S., MELERE, C., MANENTI, C. N., CAMEY, S., DUNCAN, B. B. & SCHMIDT, M. I. (2010) Nutrition, mental health and violence: From pregnancy to postpartum Cohort of women attending primary care units in Southern Brazil - ECCAGE study. *BMC Psychiatry*, 10.
- ODI (2006) Food, Nutrition and HIV: What next? . London, Overseas Development Institute.
- ONIS, M. (2010) *International Journal of Pediatric Obesity* 5, 20-22.
- PANIGASSI, G., SEGALL-CORREA, A. M., MARIN-LEON, L., PEREZ-ESCAMILLA, R., SAMPAIO, M. D. F. A. & MARANHA, L. K. (2008) [Food insecurity as an indicator of inequity: analysis of a population survey]. *Cadernos de Saude Publica*, 24, 2376-84.
- PHELAN, S. T. (2009) Obesity in Minority Women: Calories, Commerce, and Culture. *Obstetrics and Gynecology Clinics of North America*, 36, 379-+.
- POPKIN, B. M. (2002) The dynamics of the dietary transition in the developing world. IN CABALLERO, B. A. P., B.M. (Ed.) *The nutrition transition*. London, Academic Press.
- POSKITT, E. M. E. (2009) Countries in transition: underweight to obesity non-stop? *Annals of Tropical Paediatrics*, 29, 1-11.
- PRENTICE, A. M. (2006) The emerging epidemic of obesity in developing countries. *International Journal of Epidemiology*, 35, 93-9.
- PRIDMORE, P. (2008) Access to conventional schooling for children and young people affected by HIV and AIDS in sub-Saharan Africa: A cross-national review of recent research evidence. . Institute of Education, University of London.
- PRIDMORE, P. & CARR-HILL, R. (2010) Tackling the drivers of child undernutrition in developing countries: what works and how should interventions be designed?. , . *Public Health Nutrition*, Available on CJO 19 Jul 2010 doi:10.1017/S1368980010001795
- PRIDMORE, P., THOMAS, L., HAVEMANN, K., SAPAG, J. & WOOD, L. (2007) Social Capital and Healthy Urbanisation in a Globalised World. *Journal of Urban Health*, 84, pp 130-143.
- ROKX, C. (2006) Governance and Malnutrition: Exploring the Contribution of 'Good Governance' to Malnutrition Reduction in Developing Countries. *Faculty of Law*. Enschede, , University of Maastricht, The Netherlands.
- ROMON, M., LOMMEZ, A., TAFFLET, M., BASDEVANT, A., OPPERT, J. M., BRESSON, J. L., DUCIMETIÈRE, P., CHARLES, M. A. & BORYS, J. M. (2009) Downward trends in the prevalence of childhood overweight in the setting of 12-year school- and community-based programmes. *Public Health Nutrition*, 12, 1735-42.
- ROWLAND, J. (1997) *Questioning Empowerment: Working with Women in Honduras*, Oxford, Oxfam.
- RUEL, M. T. (2008) Addressing the underlying determinants of undernutrition: Examples of successful integration of nutrition in poverty-reduction and agriculture strategies. *UN ACC/SCN News*, 18-21.

- RUEL, M. T., GARRETT, J. L., HAWKES, C. & COHEN, M. J. (2010) The Food, Fuel, and Financial Crises Affect the Urban and Rural Poor Disproportionately: A Review of the Evidence. *Journal of Nutrition*, 140, 170S-176S.
- RUEL, M. T., HADDAD, L. & GARRETT, J. L. (1999) Some urban facts of life: Implications for research and policy. *World Development*, 27, 1917-1938.
- SANDERS, D. & PUOANE, T. (2010) Obesity and overweight in South Africa: Trends, causes and required interventions. *Obesity Reviews*, Conference: 11th International Congress on Obesity, ICO 2010 Stockholm Sweden. Conference Start: 20100711 Conference End: 20100715. Conference: 11th International Congress on Obesity, ICO 2010 Stockholm Sweden. Conference Start: 20100711 Conference End: 20100715. Conference Publication: (var.pagings). 11, 22.
- SASSI, F. (2010) *Obesity and the economics of prevention* Organisation for Economic Co-operation and Development (OECD).
- SINGHAL, A. (2007) Does breastfeeding protect from growth acceleration and later obesity? *Nestle Nutrition Workshop Series. Paediatric Programme*, 60, 15-25; discussion 25-9.
- SMITH, L. C., RAMAKRISHNAN, U., NDIAYE, A., HADDAD, L. & MARTORELL, R. (2003) The importance of women's status for child nutrition in developing countries. *Research Report*. Washington, D.C., IFPRI.
- STEWART, R. C. (2007) Maternal depression and infant growth - a review of recent evidence. *Maternal and Child Nutrition*, 3, 94-107.
- STURM, R., POWELL, L. M., CHRQUI, J. F. & CHALOUPIKA, F. J. (2010) Soda Taxes, Soft Drink Consumption, And Children's Body Mass Index. *Health Affairs*, 29, 1052-1058.
- SUMMERBELL, C. D., WATERS, E., EDMUNDS, L. D., KELLY, S., BROWN, T. & CAMPBELL, K. J. (2005) Interventions for preventing obesity in children. *Cochrane Database of Systematic Reviews*.
- THANGATA, P. H., HILDEBRAND, P. E. & KWESIGA, I. F. (2007) Predicted impact of HIV/AIDS on improved fallow adoption and rural household food security in Malawi. *Sustainable Development*, 15, 205 - 215.
- TOMLINSON, M. & LANDMAN, M. (2007) 'It's not just about food': mother-infant interaction and the wider context of nutrition. *Maternal & Child Nutrition*, 3, 292-302.
- UN-HABITAT (2002) City to City Cooperation: Issues arising from Experience. *Draft Second Interim Report*. Nairobi, UN-HABITAT.
- UNAIDS (2008a) HIV, Food Security and Nutrition: Policy Brief. Geneva. Geneva, USAID.
- UNAIDS (2008b) Policy Brief: HIV, Food Security and Nutrition. New York, UNAIDS.
- VASQUEZ, F., ANDRADE, M., RODRIGUEZ, M. P. & SALAZAR, G. (2008) Effect of educational nutrition program on the energy and macronutrients intake of preschoolers attending Junji day care centres in the eastern sector of Santiago, Chile. [Spanish]
- Efecto de un programa de educacion nutricional en el consumo de energia y macronutrientes de preescolares asistentes a jardines infantiles Junji de la zona oriente de Santiago, Chile. *Archivos Latinoamericanos de Nutricion*, 58, 241-248.
- VENTURA, A. K. & BIRCH, L. L. (2008) Does parenting affect children's eating and weight status? *International Journal of Behavioral Nutrition and Physical Activity*, 5.

- VICTORA, C., ADAIR, L., FALL, C., HALLAL, P. C., MARTORELL, R., RICHTER, L. & SACHDEV, H. S. (2008) Maternal and child undernutrition: consequences for adult health and human capital *The Lancet*, 371, 340 - 357.
- VILLAMOR, E., MSAMANGA, G., URASSA, W., PETRARO, P., SPIEGELMAN, D., HUNTER, D. J. & FAWZI, W. W. (2006) Trends in obesity, underweight, and wasting among women attending prenatal clinics in urban Tanzania, 1995-2004. *American Journal of Clinical Nutrition*, 83, 1387-94.
- WFP (2006) HIV/AIDS school feeding: children at risk. Rome, World Food Programme.
- WHO (2000) Obesity: Preventing and managing the global epidemic. Geneva, The World Health Organisation.
- WHO (2005) A billion voices: listening to the health needs of slum dwellers and informal settlers in new urban settings. Kobe, Japan, WHO Kobe Centre.
- WHO (2008) Closing the gap in a generation: Health equity through action on the social determinants of health. Report of the WHO Commission on the Social Determinants of Health. Geneva, WHO.
- WORLD BANK (2009) World Bank, urban and local government strategy. Washington, The World Bank.
- WU, Y., HUXLEY, R., LI, M. & MA, J. (2009) The growing burden of overweight and obesity in contemporary China. *CVD Prevention and Control*, 4, 19-26

Appendix 1 Search strategy

Step 1

A structured electronic search was conducted from 20-26th October 2010 of the following data bases and internet sites to identify relevant literature in English published from 2000-2010: MEDLINE and MEDLINE in Process, EMBASE, HMIC, NHS Economic Evaluation Database, Social Science Citation Index, WHOLIS (World Health Organization). Two library Catalogues were searched: the British Library; and the Library of Congress as well as the websites of the World Health Organization – Nutrition.

Limits: All databases were searched from 1998 to the most recent date available. No language or study design limits were applied.

Search Strategies

After testing, the following string of search terms proved the most effective in identifying the relevant literature for the MEDLINE (OvidSP) search. Similar strings of key words were used for the other searches.

MEDLINE and MEDLINE In Process (Ovid) 1998-Oct Wk1 2010

Date searched: 20/10/10: Records found: 2325

1. Malnutrition/
2. (young child nutrition or malnutrition or undernutrition or under nutrition or obesity or overnutrition or over nutrition or fast food or commercial social responsibility).ti,ab.
3. 1 or 2
4. Program Evaluation/
5. (policy or policies or program or programs or programme or programmes or service\$ or initiative\$ or intervention\$ or campaign\$ or project\$ or review\$ or evaluat\$).ti,ab,hw.
6. (multisector\$ or multi sector\$ or intersector\$).ti,ab.
7. decision making, organizational/ or efficiency, organizational/ or multi-institutional systems/ or program development/ or public health administration/
8. organizational policy/ or public policy/
9. (social determinant\$ or governance or voice or social capital or social cohesion or social environment\$ or capacity build\$ or macro politi\$ or community-driven or participatory or empowering).ti,ab.
10. International Agencies/ or World Health Organization/
11. (World Health Organization or World Bank).ti,ab,in,au.
12. or/4-11
13. 3 and 12
14. Nutrition Policy/
15. ((food or nutrition\$) adj2 (demonstration\$ or security or policy or policies)).ti,ab.
16. ((food or nutrition\$) adj2 (family or families or communit\$)).ti,ab.
17. hygiene education.ti,ab.
18. or/14-17
19. 13 or 18
20. Developing Countries/
21. exp Africa/ or exp South America/
22. (urban area\$ or urbani?ation or slum or slums or informal settlement\$ or kenya or chile).ti,ab.
23. World Health/
24. (developing world or developing countr\$ or developing nation\$).ti,ab.
25. (third-world countr\$ or third-world nation\$).ti,ab.
26. (3rd world countr\$ or 3rd world nation\$).ti,ab.
27. (low income countr\$ or low income nation\$ or upper middle income countr\$ or upper middle income nation\$).ti,ab.

28. or/20-27
29. exp Child/
30. exp Infant/
31. Adolescent/
32. (child\$ or infant\$ or pediat\$ or paediat\$ or adolescen\$ or teen\$ or schoolchild\$ or preschool\$).ti,ab.
33. (young people or young person\$ or youth).ti,ab.
34. Women/
35. (maternal or mother\$ or woman or women).ti,ab.
36. or/29-35
37. 19 and 28 and 36
38. 37
39. limit 38 to yr="1998 - 2011"

EMBASE (Ovid) 1998- 2010 Wk4

Date searched: 20/10/10

Records found: 2674

1. *MALNUTRITION/
2. (young child nutrition or malnutrition or undernutrition or under nutrition or obesity or overnutrition or over nutrition or fast food or commercial social responsibility).ti,ot,ab.
3. 1 or 2
4. (policy or policies or program or programs or programme or programmes or service\$ or initiative\$ or intervention\$ or campaign\$ or project\$ or review\$ or evaluat\$).ti,ot,ab,hw.
5. (multisector\$ or multi sector\$ or intersector\$).ti,ot,ab.
6. *organizational efficiency/
7. *multihospital system/
8. *program development/
9. *public health service/
10. (social determinant\$ or governance or voice or social capital or social cohesion or social environment\$ or capacity build\$ or macro politi\$ or community-driven or participatory or empowering).ti,ot,ab.
11. *international cooperation/
12. *world health organization/
13. (World Health Organization or World Bank).ti,ot,ab,in,au.
14. *policy/
15. or/4-14
16. 3 and 15
17. ((food or nutrition\$) adj2 (demonstration\$ or security or policy or policies)).ti,ot,ab.
18. ((food or nutrition\$) adj2 (family or families or communit\$)).ti,ot,ab.
19. hygiene education.ti,ot,ab.
20. or/17-19
21. 16 or 20
22. developing country/
23. exp Africa/
24. exp South America/
25. (urban area\$ or urbani?ation or slum or slums or informal settlement\$ or kenya or chile).ti,ot,ab.
26. (developing world or developing countr\$ or developing nation\$).ti,ot,ab.
27. (third-world countr\$ or third-world nation\$).ti,ot,ab.
28. (3rd world countr\$ or 3rd world nation\$).ti,ot,ab.
29. (low income countr\$ or low income nation\$ or upper middle income countr\$ or upper middle income nation\$).ti,ot,ab.
30. or/22-29
31. exp child/

32. exp adolescent/
33. (child\$ or infant\$ or pediat\$ or paediat\$ or adolescen\$ or teen\$ or schoolchild\$ or preschool\$).ti,ot,ab.
34. (young people or young person\$ or youth).ti,ot,ab.
35. female/
36. (maternal or mother\$ or woman or women).ti,ot,ab.
37. or/31-36
38. 21 and 30 and 37
39. limit 38 to yr="1998 - 2011"

HMIC (Ovid) 1998 – September 2010

Date searched: 20/10/10

Records found: 10

1. (young child nutrition or malnutrition or undernutrition or under nutrition or obesity or overnutrition or over nutrition or fast food or commercial social responsibility).ti,ab.
2. (policy or policies or program or programs or programme or programmes or service\$ or initiative\$ or intervention\$ or campaign\$ or project\$ or review\$ or evaluat\$).ti,ab.
3. (multisector\$ or multi sector\$ or intersector\$).ti,ab.
4. (social determinant\$ or governance or voice or social capital or social cohesion or social environment\$ or capacity build\$ or macro politi\$ or community-driven or participatory or empowering).ti,ab.
5. (World Health Organization or World Bank).ti,ab,au.
6. or/2-5
7. 1 and 6
8. ((food or nutrition\$) adj2 (demonstration\$ or security or policy or policies)).ti,ab.
9. ((food or nutrition\$) adj2 (family or families or communit\$)).ti,ab.
10. hygiene education.ti,ab.
11. or/8-10
12. 7 or 11
13. (urban area\$ or urbani?ation or slum or slums or informal settlement\$ or kenya or chile or africa\$ or south america\$).ti,ab.
14. (developing world or developing countr\$ or developing nation\$).ti,ab.
15. (third-world countr\$ or third-world nation\$).ti,ab.
16. (3rd world countr\$ or 3rd world nation\$).ti,ab.
17. (low income countr\$ or low income nation\$ or upper middle income countr\$ or upper middle income nation\$).ti,ab.
18. or/13-17
19. (child\$ or infant\$ or pediat\$ or paediat\$ or adolescen\$ or teen\$ or schoolchild\$ or preschool\$).ti,ab.
20. (young people or young person\$ or youth).ti,ab.
21. (maternal or mother\$ or woman or women).ti,ab.
22. 19 or 20 or 21
23. 12 and 18 and 22
24. limit 23 to yr="1998 -Current"

NHS Economic Evaluation Database (Cochrane Library 2010 Issue 10)

Date searched: 25/10/10

Records found: 0

- #1 (policy or policies or program or programs or programme or programmes or service* or initiative* or intervention* or campaign* or project* or review* or evaluat*):ti,ab
- #2 (multisector* or "multi sector*" or intersector*):ti,ab
- #3 ("social determinant*" or governance or voice or "social capital" or "social cohesion" or "social environment*" or "capacity build*" or "macro politi*" or "community-driven" or participatory or empowering):ti,ab

#4 "World Health Organization" or "World Bank"
 #5 (#1 OR #2 OR #3 OR #4)
 #6 ("young child nutrition" or malnutrition or undernutrition or "under nutrition" or obesity or overnutrition or "over nutrition" or "fast food" or "commercial social responsibility"):ti,ab
 #7 (#5 AND #6)
 #8 ((food or nutrition*) and (demonstration* or security or policy or policies)):ti,ab
 #9 ((food or nutrition*) and (family or families or communit*)):ti,ab
 #10 "hygiene education":ti,ab
 #11 (#8 OR #9 OR #10)
 #12 (#7 OR #11)
 #13 ("urban area*" or urbanisation or urbanization or slum or slums or "informal settlement*" or kenya or chile or africa* or "south america*"):ti,ab
 #14 ("developing world" or "developing countr*" or "developing nation*"):ti,ab
 #15 ("third-world countr*" or "third-world nation*"):ti,ab
 #16 ("3rd world countr*" or "3rd world nation*"):ti,ab
 #17 ("low income countr*" or "low income nation*" or "upper middle income countr*" or "upper middle income nation*"):ti,ab
 #18 (#13 OR #14 OR #15 OR #16 OR #17)
 #19 (child* or infant* or pediat* or paediat* or adolescen* or teen* or schoolchild* or preschool*):ti,ab
 #20 ("young people" or "young person*" or youth):ti,ab
 #21 (maternal or mother* or woman or women):ti,ab
 #22 (#19 OR #20 OR #21)
 #23 (#12 AND #18 AND #22)
 #24 (#23), from 1998 to 2010

Social Science Citation Index (ISI) 1998 - date

Date searched: 25/10/10

Records found: 1532

#21 #20 AND #16
 #20 #19 OR #18 OR #17
 #19 Topic=((maternal or mother* or woman or women))
 #18 Topic=(("young people" or "young person*" or youth))
 #17 Topic=((child* or infant* or pediat* or paediat* or adolescen* or teen* or schoolchild* or preschool*))
 #16 #15 AND #10
 #15 #14 OR #13 OR #12 OR #11
 #14 Topic=(("low income countr*" or "low income nation*" or "upper middle income countr*" or "upper middle income nation*"))
 #13 Topic=(("third-world countr*" or "third-world nation*"))
 #12 Topic=(("developing world" or "developing countr*" or "developing nation*"))
 #11 Topic=(("urban area*" or urbanisation or urbanization or slum or slums or "informal settlement*" or kenya or chile or africa* or "south america*"))
 #10 #9 OR #5
 #9 #8 OR #7 OR #6
 #8 Topic=("hygiene education")
 #7 Topic=((food or nutrition*) and (family or families or communit*))
 #6 Topic=((food or nutrition*) and (demonstration* or security or policy or policies))
 #5 #4 OR #3 OR #2 OR #1
 #4 Topic=(("young child nutrition" or malnutrition or undernutrition or "under nutrition" or obesity or overnutrition or "over nutrition" or "fast food" or "commercial social responsibility") and ("World Health Organization" or "World Bank"))
 #3 Topic=(("young child nutrition" or malnutrition or undernutrition or "under nutrition" or obesity or overnutrition or "over nutrition" or "fast food" or "commercial social responsibility")

and ("social determinant*" or governance or voice or "social capital" or "social cohesion" or "social environment*" or "capacity build*" or "macro politi*" or "community-driven" or participatory or empowering))

#2 Topic=(("young child nutrition" or malnutrition or undernutrition or "under nutrition" or obesity or overnutrition or "over nutrition" or "fast food" or "commercial social responsibility") and (multisector* or "multi sector*" or intersector*))

#1 Topic=(("young child nutrition" or malnutrition or undernutrition or "under nutrition" or obesity or overnutrition or "over nutrition" or "fast food" or "commercial social responsibility") and (policy or policies or program or programs or programme or programmes or service* or initiative* or intervention* or campaign* or project* or review* or evaluat*))

British Library Catalogue 1998 - date

Date searched: 25/10/10

Records found: 25

Words anywhere: nutrition or undernutrition or overnutrition or obesity

AND

Words anywhere: developing countries or third world or low income countries or kenya or chile or africa or south america?

AND

Words anywhere: child? or infant? or young people or maternal or mother?

Library of Congress Catalogue 1998 - date

Date searched: 25/10/10

Records found: 30

(nutrition OR undernutrition OR overnutrition OR obesity)[in Keyword Anywhere (GKEY)]

AND

(kenya OR chile OR africa)[in Keyword Anywhere (GKEY)]

AND

(child? OR infant? OR maternal OR mother?)[in Keyword Anywhere (GKEY)]

WHOLIS 1998 - date

Date searched: 25/10/10

Records found: 38

nutrition or undernutrition or overnutrition or obesity

AND

“developing countries” or “third world” or “low income countries” or kenya or chile or africa or “south America\$”

AND

child\$ or infant\$ or young people or maternal or mother?

Step 2

An additional search of the “grey literature” by using the Google Scholar search engine and accessing relevant development agency websites UN – SCN, UN FAO, World Bank, WHO, Food Policy Research Institute Emergency Nutrition Network, Save the Children, Action Aid, Oxfam, DANIDA, DFID, GIZ, USAID.

The following key words were used in different combinations within the search box for each agency listed above and within agency’s “publications” section. These key words were also used in Google Scholar both with and without agency names listed above for literature triangulation):

Malnutrition

Nutrition

Food Security

Food Policy

Policy or policies or program or programs or programme or programmes or initiative or intervention or project

Multisector or multi sector

Nutrition Policy

Underlying causes

Determinants

Child mortality

Under 5 or under five

Timeframe: Primarily 19980 – 2008

Step 3

In addition, a number of experts from various international organizations and universities were contacted for copies of reports. Further publications were also obtained by going through the references of the retained publications to identify those that were relevant for this topic.

|

Appendix 2 Cost effectiveness

This appendix has been abstracted from Pridmore and Carr-Hill, 2009, pp 86-94.

Liberty of association is one of the building blocks of a democratic society. The presumption of this exercise is therefore that community engagement in a democratic society is universally a good thing. Such a presumption is not subject to economic analysis (cf. Okun 1975). The issue here is only whether community engagement is a better vehicle for improving the community's health than another approach.

Applying the Standard Economic Evaluation Framework to this Problem

The standard framework of economic evaluation to assess the cost effectiveness cannot be readily applied to community engagement. Problems include:

1. Multiple Perspectives and Time Frames
2. Identifying and costing activities and specifically
3. Costing community contributions
4. Identifying and Measuring Benefits
5. Identifying comparator communities
6. How the intervention interacts with the community and therefore identifying end gainers and losers and eventually how the former might compensate the latter
7. Attribution of any changes in community (health) to the approaches and methods of community engagement (CE)
8. Quantification across the whole range of CE

1. Multiple Perspectives and Time Frames

There are at least six different perspectives possible: Public Health Care system, Social Care system (if it exists), government, global, societal (society wide), social (local community). The difference between societal and local social is because what is seen as beneficial by a local group may not be beneficial from the perspective of other larger communities. There is also the potential of a ripple effect over time of building community engagement which is then the basis of other activity which, in turn, may have positive or negative effects on the quality of life of either the local or surrounding communities.

Thinking of specific studies, the perspective could be that of the funder of a particular community engagement initiative (e.g. a donor) who may have a relatively narrow concern with accountability and reporting. Even the organisation that receives the funding for implementing the initiative may have a relatively narrow concern with the direct costs of managing the project and a similarly narrow brief in terms of the outcomes that will be considered. If, for example, the national Ministry of Health were to commission an evaluation, the correct perspective would be that of the Public Health Care System; but given the commitment to take into account the interests of other stakeholders means in this case that it would be important to understand the perspective of funders and the community. But the views of the community members are likely to be a much more diffuse and hence to pose problems in identifying and measuring the costs, measuring benefits and identifying any externalities. There will be similarly diverse audiences for the results of any evaluation. The guidance should be aimed at professionals working in the public health care system, central government, other public sector organisations and those in the private, voluntary and community sectors with a direct or indirect role in community engagement and community development. But, given that members of the community in which the intervention is being carried out are themselves stakeholders, then their multiple interests and values have to be taken into account and this is what will pose most difficulty in carrying out a cost-effectiveness study. The relevant time frame for measuring the benefits of community engagement initiatives, as with a programme of tobacco cessation, could be very long because, although we can describe the pathways through which community engagement

initiatives might work (Popay 2006) we do not have clear evidence as to when the „ripple“ effect of a community engagement initiative dissipates. This raises the problem of the ways in which studies have measured effectiveness and the appropriate analytic method (dealt with elsewhere in the Introduction?).

2. Identifying Activities Relevant to an Intervention

Prior to costing activities (whether or not attributable to an intervention), it will be important to define and identify the pre-existing patterns of activity in the community that are relevant to the intervention (whether or not those activities were specifically oriented towards improvement in nutrition status, and whether or not they are to be considered as community engagement),

Any case study, in whichever context of successful or unsuccessful community engagement makes it clear that there are a very large number of factors (activities and/or resources) that are or *could have been* relevant to the process and outcomes of community activities. There are a number of well-known participatory techniques for eliciting, together with the community, the potentially relevant set of activities. But such participatory techniques are not very good at identifying the broader structural factors that might be the most important. For example, high pre-existing levels of education among a community mean that some pre-conditions of successful cooperation are taken for granted in ways that they would not be in a poorer community (or vice versa, in that members of poorer communities know that they have to work together in order to get anywhere in contrast to members of richer communities). At the other extreme of relative wealth, whilst people are usually pretty good at identifying the proximate external causes of their condition, their understanding of global economic processes is often likely to be limited.

3. Costing Community Contributions

In most community interventions, there will be some elements that can be costed using conventional accounting methods such as capital outlays on buildings and infrastructure and current expenditure on rental, utilities, office materials and meals/ refreshments. But there are some more „unconventional“ issues which arise when costing the labour inputs of volunteers. Thus there will be several elements of the community engagement process that involve contributions of effort and non-labour contributions without directly involving any monetary transactions. These will be both at the inception/ implementation stage and in sustaining the intervention. Some analysts have simply presumed that because no money changes hands, then the volunteer input is costless. But whilst that might be appropriate in an accounting exercise, it is not sensible in terms of the use of the totality of human and material resources available. The only economic tool available is the concept of opportunity cost: i.e. what else could have been done with the resources and this involves attaching a cost to those resources. The problem then becomes what to use as the appropriate wage rate to assess opportunity cost of the volunteer effort put into initiating, implementing and sustaining the intervention. There are conventional rules for costing *individual* time; using for example the minimum wage rate or the average wage; and the choice will clearly change the calculations substantially. But it is not clear how these apply to an activity which only makes sense when collectively shared, nor when some of the individuals will say that, if they were not involved, he or she would prefer to be doing nothing. In either case, one could, in principle, carry out a sensitivity analysis with different wage rates to examine this.

Further, the review for this study has shown that there are only a very limited number of cases where comprehensive cost data have been collected at the same time as information on benefits/outcomes; and this is also true in developed countries (Carr-Hill and Street, 2007). In technical terms, assuming that the different types of costs can be identified probably the only eventual solution would be to simulate the impact of different assumptions about costing using both the limited data that can be collected on site and findings from elsewhere. But the utility of a sensitivity analysis depends on there being a reasonably

narrow range of possible values for each of the different types of cost (otherwise the simulations will lead to such widely different answers that the results would be of no or very limited use to a decision maker). And, in this case, given that the studies have been carried out across a very wide range of contexts, it seems likely that the range of values would be quite wide.

4 Identifying and measuring benefits/outcomes

The measurement of outcomes at an individual level is known to be difficult – and not only in respect of health and health behaviour. But at least the difficulty is contained to the problem of reliability and validity of the measuring instrument which can be treated as a technical issue. The problem with assessing the outcomes of a specific community intervention is that the benefits/outcomes will, in many cases, be distributed unevenly (with some community members gaining and others losing) because the intervention interacts with the structure and organisation of the community (this is more than considering the differential impact of a drug). In general, the presumption is that gainers and losers can be added up without any actual compensation being paid to losers. If a group of patients is given a drug which will make people on average better off, but you can't tell in advance who will benefit and who won't, then the drug is accepted. But this logic is rarely taken to its (logical) conclusion, because if a drug has occasional catastrophic adverse effects, then this average net benefit argument is superseded by a Pareto criterion¹⁸ (where no-one should suffer as the result of a change) and the drug is banned.

In this case, the logic of adding up net benefits across individuals cannot be applied at the community level. Consider an intervention that has positive net benefits when aggregated across individuals but will, fairly certainly, give dis-benefits to a known subgroup in society; that inequality is of course destructive/harmful to the process of community engagement itself. So the Pareto criterion should be applied. It is therefore important to be careful in using statistics summarised across community members: at the very least, one needs an indication of variability of response; indeed, there will be several occasions where it is more appropriate to provide data disaggregated to (different types of) community members. In particular, it is possible that some community engagement activities will be 'captured' by the wealthier members of the community and that their health is improved but that the poorer members of the community do not benefit. Whilst population health improves, inequalities have been exacerbated; and recommendations that make health inequalities worse should be avoided. We would also want to avoid any interventions where the costs of the intervention to the community in terms of *non*-health outcomes are seen as excessive relative to any possible health gain. It is therefore important in assessing cost-effectiveness to take a broad view of what aspects of health & social welfare might be affected by community engagement. The point here is that the costs and adverse consequences of individual health care interventions are more circumscribed and easily identifiable; similar assessments on a community level will have to be more global. Obviously these would be partly subjective judgments differing between communities as well as between interventions and settings; but the important issue is to develop a *framework* within which those benefits can be identified. Lasker and Weiss (2003) in their discussion of broad-based community participation and community collaborative practices and partnerships point to the sources of

¹⁸ Under the yardstick of Pareto optimality, no-one is allowed to be worse off. Gainers should be able to pay off losers by giving them the money equivalent of their losses, but some may not wish to be compensated in this way (money will not compensate for the death of a loved one). Under Hicks-Kaldor conditions, gainers have only to **virtually** compensate losers, and it is this assumption that allows respectability for cost-benefit analysis (and by extension cost effectiveness analysis). Under Rawlsian and Nosickian assumptions, different results pertain. It is not clear that the standard cost-benefit or cost-effectiveness are appropriate for community engagement.

frustration relating to determining effectiveness. 'Thus far, it has been very difficult to document that broad participation and collaboration actually strengthen the ability of communities to improve the health and well-being of their residents.' They cite the following reasons:

- Terms like community engagement, partnership and collaboration mean different things to different people.
- Efforts to engage people and organisations in community problem solving have been too short-term and insufficiently resourced to be fairly evaluated.
- Evaluations have generally looked at end results rather than investigating the impact of the collaborative process on the results.
- The multi-disciplinary nature of the collaborative process complicates the determination of impact by requiring diverse disciplines to work together and learn from each other.

5. What is the comparator or control?

In contrast to a clinical trial where we can compare and contrast with a placebo corresponding to the intervention, it is not clear what would count as a zero intervention. Communities have human members who are acting in large measure in their own interest all the time: this may or may not involve intervening in community affairs. An outside intervention affects that balance but does not mean there was no prior community involvement. However, what we want to assess is the *change* in costs and benefits attributable to community engagement approach. While randomised trials may not be feasible, interrupted time series analysis may be one way forward. However, this methodology presupposes adequate baseline data on costs and effects, data that allow appropriate adjustment for confounding factors and sufficient follow up periods. It is still unclear whether there is sufficient evidence to facilitate such an approach. In addition, it is important to recognise that there is always some level of community engagement between sentient members of a community so that an outside intervention or even a new activity generated from within the community is affecting the existing balance of community engagement. Yet whilst very few research studies measure levels of activity, even fewer measure *pre-existing* levels of activity.

6. How the Intervention interacts with the community

There are also some less tangible issues concerned with the way in which any intervention will interact with the history, organisation and structure of the community. In particular, the involvement of individual community members in or withdrawal from community engagement is, in general, neither uniform nor monotone. Beyond this „random“ behaviour, a given cluster of individuals may 'get stuck' for a long period until external changes trigger rapid change. Even where there are only a small number of committed individuals in a group, all of the group can become involved if the proportion is large enough (Cave and Godfrey, 2007). The change process will also be affected by the networks of connections of community members.

Formally, it has been shown that where there are strong peer effects (both in terms of peer pressure and peer learning), there can be multiple equilibria, cascade or herd behaviour, punctuated paths of long periods of slow and localised change separated by brief periods of profound or discontinuous adjustment, path dependence or hysteresis (locally irreversible change), cycles, and the sort of S shaped paths often seen in epidemiological dynamic disease models (Cave and Godfrey, 2007) Parallels can be drawn to community involvement. Policy interventions, whether global or localised, do not produce a constant stream of effects but instead have tipping points and delayed impacts that must work through the network as a whole before producing observable changes. On the other hand, the impacts when they come might be profound.

7. Problem of Attribution

The general problem is deciding which activities are likely to have been the most important in producing the observed benefits (and therefore should be costed) because this will vary with the specifics of every situation; that is why history is the most complex social science. Essentially, identifying the most important activities is much easier *post hoc* than *propter hoc*; and even then historians will argue interminably about the correct interpretation of events and processes.

8. Quantification across the range of Community Engagement

The discussions over the last few months have also raised a version of the Tukey problem: give a child a hammer and they will hit *anything* with it. Several of the case studies that have passed the minimal threshold that were accepted as OK for the economic review of evidence, passed those thresholds precisely because the 'community' activities and intended benefits are relatively easy to identify and cost (or at least propose plausible estimates for those costs and cost savings). But the reason why they are easy to cost (and ascribe benefits) is that they relate to specific events (e.g. prevention of identifiable harmful incidents to identifiable individuals) rather than processes (e.g. improving population diet over a long period). In some cases, the community members (at least the active ones) would claim that the whole community is involved and that the potential harm is perceived – again at least by the active community members – to affect the whole community population; so that, if their activity were successful, one could attribute the harm reduction (at least when measured at the level of that community). But there would then be questions about the harm reduction at societal level rather than for that particular community.

The 'community engagement' approach often involves encouraging (individual) community members to be good neighbours (in the one case, identifying vulnerable older people for whom some specific inputs can be provided to reduce their risk of falling; in the other case, encouraging cyclists to wear helmets to avoid head injuries if they fall or are knocked off). Referring back to the typology originally proposed (Popay 2006), it is clear that, although the older people involved as volunteers did the needs assessment which helped to identify the problems and their solutions, and some carried out the block warden work on hazard awareness, much of this is at the lowest level of providing information. Indeed, where it is entirely an individual activity, one could question whether or not these should be described as community engagement rather than as simply good neighbourliness.

9. Applying these principles to CE approaches and methods

In terms of economic modelling of the cost effectiveness of community engagement (CE) approaches and methods, the scarcity of evidence make it necessary to 'borrow' data from other studies and model their application to the specific intervention being considered. The key imperative is that we have sufficient data to be able to develop a 'decision rule' i.e. a statement of the circumstances under which it would be appropriate to follow one procedure rather than another. With sufficient data from a range of different types of approaches/methods, we would be able to make an attempt to provide estimates of cost-effectiveness across at least those types of community engagement. However, it is abundantly clear, from both the reviews of health promotion and the wider social determinants, that there is only a very small number of studies which can be even considered as providing some relevant information on both costs and benefits for community engagement. None of them is sufficiently precise to provide the basis for a decision rule. Moreover, even if there were one or two cases in which one could have sufficient confidence in the data used to be able to make a 'not-harmful and probably beneficial' judgment and agree that the costs are sufficiently small to guesstimate that the intervention was probably cost-effective, the wide range of possible community engagement

interventions ranging from information to pro-active community control (see typology in Popay, 2006), would make it impossible to extrapolate from one situation to another. On this basis, the view of the authors is that economic „modelling“, as traditionally pursued, i.e., extrapolating from studies with real data to other examples in the same area, is neither appropriate nor feasible. **Is the standard approach to evaluation appropriate?** The few studies that have been retained in the cost effectiveness reviews have, rather obviously, had great difficulty in following the standard approach to evaluation. This raises the question of whether struggling to impose a standard economic modelling approach – which relies on a range of data from such cost-effectiveness reviews – is a sensible approach in the first place.

References

- Cave, J. and Godfrey, (2007) C. Economics of addiction and drugs. In Nutt, D., Robbins, T.W., Stimson, G.V., Ince, M. and Jackson, A. (eds.) *Drugs and the Future: Brain Science, Addiction and Society*. Amsterdam: Elsevier, 2007. Chapter 13, 389-416.
- Lasker R.D. and Weiss E.S. (2003) Broadening Participation in Community Problem Solving: a Multidisciplinary Model to Support Collaborative Practice and Research *Journal of Urban Health: Bulletin of the New York Academy of Medicine* Vol. 80, No. 1, March 2003
- Popay, J. (2006) Community Engagement For Health Improvement: Questions Of Definition, Outcomes And Evaluation *A Background Paper Prepared For Nice By Professor Jennie Popay et al.* March 1st 2006

Appendix 3 Actions needed to address HIV, food security and nutrition

The following actions are recommended within a comprehensive, multisectoral approach to address HIV, food security and nutrition by UNAIDS, WFP and WHO (Benson, 2008 p.15).

Actions for governments

1. Use poverty reduction strategies, social protection policies and sector, district and local plans, including disaster preparedness plans to sustain livelihoods; integrate approaches to food security and nutrition with responses to HIV.
2. Incorporate nutrition indicators into HIV monitoring and evaluation activities, including monitoring and evaluation of the national AIDS strategy.
3. Work across departments and sectors and with civil society and people living with HIV to reach the most vulnerable, ensuring that food and nutrition assistance is relevant, appropriate and does not fuel stigma and discrimination.
4. Integrate HIV and food and nutrition programmes by, for example: expanding nutritional support, including for pregnant and lactating women and children; emphasizing appropriate infant feeding as part of the prevention of mother-to-child transmission of HIV; supporting adequate dietary and nutritional intake as a part of successful treatment programmes, including through provision of nutritional counselling and linking individuals to services.
5. Engage the private sector in developing local food fortification initiatives that generate income and in linking these initiatives to treatment interventions.
6. Ensure agricultural policies and programmes are HIV responsive by, for example: improving livelihood options in and around the community, thereby reducing the need to migrate; integrating HIV information into agricultural extension programmes; enabling affected households to participate in agricultural production and marketing by accommodating the need to be near home to care for sick relatives; using cooperatives and farmers organizations as entry points for mitigation, care and support activities, such as establishing community health insurance funds or social funds to provide care and support to orphans and other children made vulnerable by AIDS.

Actions for International Partners

1. Fund and support multisectoral HIV programming that incorporates effective food and nutrition interventions as a way of reducing vulnerability to HIV infection and increasing resilience to AIDS.
2. Recognize and support (with technical assistance and funding) initiatives tailored to specific contexts such as school feeding, home or communal gardens, cash transfers, income-generation activities, and actions to increase agricultural production.
3. Support governments in programmes that incorporate nutrition and food and livelihood security in line with scale-up towards universal access to prevention, treatment, care and support by 2010.

Actions for Civil Society

1. Advocate policies and programmes incorporating nutrition and food security in line with scale-up towards universal access to prevention, treatment and care and support by 2010.
2. Increase networking and information exchange about interactions between HIV, food security and nutrition to promote accurate understanding of how proper food and nutrition can reduce vulnerability to HIV infection and increase resilience to AIDS.

3. Work with the government and people living with HIV to reach the most vulnerable, assuring that assistance including food assistance is relevant to the needs and capacities of the beneficiaries and addresses issues of stigma and discrimination.

Appendix 4 Lessons learned from successful community-based food and nutrition programmes (extracted from Ismail et al. 2003)

Macrocontextual factors

- A strong, supportive policy environment is crucial to the success and sustainability of a community-based nutrition programme.
- International agencies and donors can help to create awareness of the need to address nutritional issue.
- Funders must not impose their own priorities or time scales on countries.
- Strong technical institutions and expertise are needed to achieve a quality programme.
- Events at the national or subnational levels, such as economic recession, political instability, civil war or natural disasters will affect the achievements of the programme.
- Community-based programmes should seek to establish collaborative links with other programmes (nutrition or otherwise) that could enhance their own programme impact; partnerships with institutions outside the government sector can make valuable contributions to programme achievements and sustainability.

Community-level factors

- Community participation is an orientation, which should not be taken for granted, it should be an overriding and conscious concern, so as to avoid degenerating into mere rhetoric.
- A fully participatory approach to programme design and implementation is difficult to reconcile with donor procedures for seeking programme funds and also with programme durations that are normally acceptable to donors.
- Community participation for nutrition improvement cannot function in the absence of a supportive macroenvironment, at the national and subnational level, which ensures good quality nutrition support services and which responds to community demands in a timely fashion; capacity building and easy access to sound technical advice are essential components of effective community participation.
- The utilization of existing community groups, provided these are active, may be preferable to the superimposition of new groups.
- Local cultural practices and knowledge can provide useful entry points for community action; sharing of experiences and information among communities can lead to greater empowerment and the ability to have better representation at the next level (district or municipality).
- The programme must seek to ensure that funding and technical support is available to support the micro-projects that communities select and design to meet their felt needs.

Programme design features

- Developing a conceptual framework, setting objectives, links to other programmes, targeting, provision of basic services; programme monitoring and evaluation, participatory monitoring; transparent, responsive and supportive management.
- Sustainability
- Community participation, Institutionalization of nutrition activities within the government structure at all levels.

