

What impact does the provision of separate toilets for girls at school have on their primary and secondary school enrolment, attendance and completion?

**A systematic review of the evidence
(Protocol)**

A collaborative project of:

the London School of Hygiene & Tropical Medicine and
Institute of Education

With guidance by:

Save the Children USA and UNICEF

Protocol

Main title	What impact does the provision of separate toilets for girls at schools have on their primary and secondary school enrolment, attendance and completion?	
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1. Background

1.1 Aims and rationale for review

The education of girls is increasingly recognised as an investment with many valuable returns, including the health and economic prosperity of women, their families and nations (Herz 2004). Despite this, girls are still less likely than boys to be in school in 28 countries, 18 of which are in sub-Saharan Africa (UNESCO 2009). Thus there is much interest in identifying the most effective ways of increasing girls' enrolment and completion. UNICEF and the International Water and Sanitation Centre have noted that "education for girls can be supported and fostered by something as basic as a girls-only toilet," (UNICEF 2005) arguing that the lack of access to separate and decent toilets at school is impeding girls' access to their education. We propose to conduct a systematic review to determine what impact the provision of separate toilets for girls has on their primary and secondary school enrolment, attendance and completion.

1.2 Definitional and conceptual issues

This section outlines and defines the key issues that will be addressed in this review. Systematic research syntheses require explicit and precise definitions so that the limits of the review are made clear, and a coherent search strategy can be developed.

1.2.1 School-based water, sanitation and hygiene interventions

There are a wide range of school-based interventions that fall under the umbrella of 'water, sanitation and hygiene' (WASH) interventions, including clean water for drinking and washing, hygiene education and safe waste disposal. For this review, WASH interventions will be defined as any school-based intervention which is delivered within the context of a toilet (i.e., the physical space for excreta disposal), including the provision of separate toilets for girls.

1.2.2 Educational settings

The interventions to be reviewed will be implemented in formal educational settings, including primary and secondary schools (both public and private), where girls and boys aged 4-18 are in attendance.

1.2.3 Lower and middle income countries

This review will focus on lower and middle income countries (LMIC) as defined by the World Bank (<http://data.worldbank.org/about/country-classifications>). The main criteria for classifying countries are based on Gross National Income (GNI) per capita. A full list of countries that meet the World Bank Criteria, according to 2009 GNI per capita, will be compiled and used to screen studies for inclusion.

1.2.4 Educational and health outcomes

The review will identify studies that report both educational and health outcomes. The key educational outcomes will include

Enrolment: The total number of individuals registered in both primary and secondary schools

Attendance: The number of students present at a school during the time it is in session

Completion: The total number of individuals who complete primary or secondary school

A wide range of health outcomes will be considered, including infectious/vector-borne diseases (diarrhea, helminth infections, respiratory infections); sexual health (sexual exploitation at or on the way to school; HIV/STI); and reproductive health (menstrual management, pregnancy). Mental health outcomes will also be included, such as experiences of bullying and harassment, privacy (especially related to puberty and menstruation), embarrassment and cognition.

1.3 Research background

A growing number of organisations are calling for increased investment in WASH in schools, through such initiatives as the Raising Clean Hands for WASH in Schools (Raising Clean Hands, 2010). A strong argument for increasing investments is the potential impact on girls' education, namely that improved WASH conditions can empower girls to attend school. To date, few rigorous studies have evaluated the impact of school-based WASH interventions on girls' educational outcomes. Some recent cluster-randomized controlled trials are underway to assess school-based WASH interventions (Rheingans 2009) and hand-washing (Bowen 2007), however, no trial has been registered to assess the impact of separate-sex toilets in particular (Cochrane Central Register of Controlled Trials).

In practice, girls' toilets are rarely provided in isolation, but as one component within a 'bundle' of WASH interventions (including 'hardware' like the provision of safe water, soap and adequate lighting, as well as 'software' such as hygiene education and/or teacher training). Even 'girl-friendly latrines' - a concept growing in popularity among international organisations, governments and women's rights movements - should not only be separate from boys, but provide water, soap, supplies for menstrual management, and privacy from other girls as well as boys. Thus, evidence of their 'impact' in comparative studies, such as those in a 6-country pilot project of UNICEF/IRC, cannot be attributed to the provision of separate toilets alone (UNICEF/IRC 2006; SSHE 2006). Additionally, the educational improvements cited in such comparisons do not provide evidence of causality as they do not adequately control for confounding factors (e.g., the allocation of schools to receive girl-friendly interventions was not random, but often based on conditions like the availability of supportive staff; and/or confounding factors were not collected or considered in analyses). Furthermore, few such studies provide baseline data before the introduction of an intervention, and differences in educational outcomes may have predated the WASH intervention.

1.4 Review questions and approach

1.4.1 Potential review synthesis questions

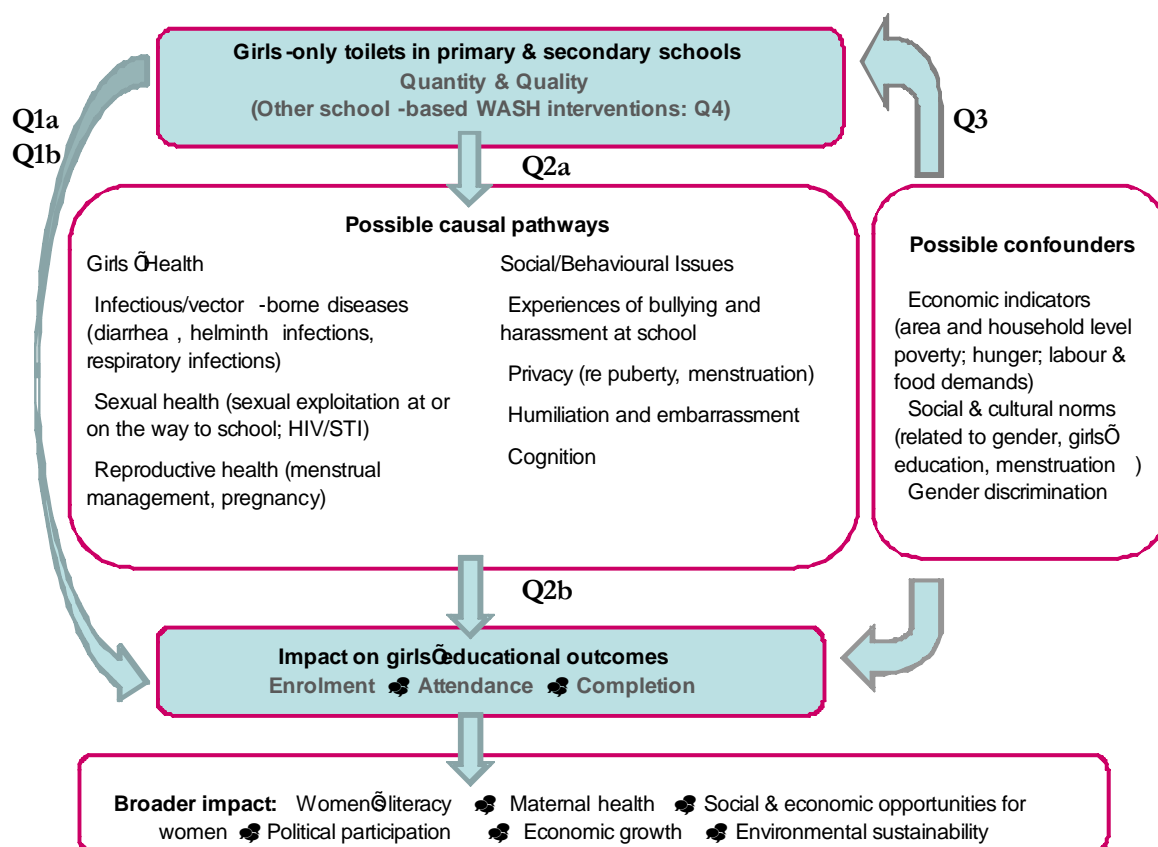
Figure 1 illustrates the framework we will use to guide the review, based on our understanding of the literature in this and related areas. It will inform how we search for and describe studies which can answer the following potential review synthesis questions:

Q1a. Is there any evidence of an *impact* of providing single-sex toilets on the enrolment, attendance and/or completion of girls in primary or secondary schools?

Q1b. Is there evidence of *associations* between separate toilets and girls' educational outcomes?

Answering these questions will be the primary aim of the review. To do so, we will focus on research in which separate toilets are the intervention of interest, or identified as part of a broader intervention. We will first aim to identify evidence of causality between the provision of separate toilets and girls' educational outcomes, (i.e., where impact can be attributed to the separate provision of toilets). We will also seek to report associations between separate toilets and girls' educational outcomes (e.g., where changes in educational outcomes cannot be attributed to the provision of separate toilets alone). In as much detail as possible, we will assess the quantity and quality of research addressing questions 1a and 1b to determine what evidence exists and what further evidence is needed.

Figure 1. Guiding framework for the review



In the absence or scarcity of evidence to answer questions 1a-b, we propose to map research

In

in three related areas. First, to explore possible causal pathways by which single-sex latrines may impact educational outcomes, we will search for studies that address the following questions:

Q2a. What is the impact of separate toilets on girls' health? And,

Q2b. For those health factors shown to be influenced by separate toilets, is there any evidence of their impact on girls' educational outcomes?

Such questions can help build indirect evidence of an impact of separate toilets on girls' educational outcomes. For example, research has shown that school WASH conditions are related to health issues such as vector-borne diseases including diarrhoea and soil transmitted helminths (Migele 2007), incidents of harassment and sexual violence in school toilets (Abrahams 2006; Leach 2003), menstrual management (Sommer 2009), and girls' perceptions of security and privacy (Sommer 2009b). For example, in qualitative research exploring girls' reasons for absenteeism, schoolgirls in Malawi and South Africa have admitted they stay at home during menstruation, sometimes pretending to be sick, due to the conditions of toilets and water at school, feeling unwell, privacy and fears in contexts of HIV/AIDS (Sommer 2009; McPhedran 2010). Thus, improving menstrual management may be a mechanism by which girls' toilets can improve girls' schooling. And other health issues may be identified as important links in this way. To map studies that address questions 2a-b, we will focus on whether the provision of *separate* toilets (rather than *any* toilets) are related to girls' health issues.

To explore possible confounders of the relationship between separate toilets and educational outcomes, we could also aim to answer:

Q3. Of factors known to influence girls' educational outcomes (e.g., poverty and gender norms and expectations) which are important determinants of whether schools provide separate toilets for girls?

As an example, socio-economic conditions may explain educational improvements since school with more resources may be more likely to provide separate-sex toilets (as in Ekpo et al's comparison of government and private schools in Nigeria, 2008) and also more likely to achieve better educational outcomes. Socio-economic factors would thus be the underlying explanation for why girls-only toilets may be associated with girls' educational outcomes. Similarly, issues like gender discrimination may explain why some schools do not cater to girls' needs (e.g., through separate toilets) or show improvements in enrolling and retaining girls, particularly if girls are burdened with WASH duties like water collection and cleaning of toilets.

Finally, if we do not find sufficient research on the provision of separate toilets (in Qs1-3), we also propose to enumerate the literature on a wider range of school-based WASH interventions, to answer:

Q4. Is there evidence that any school-based WASH interventions have an impact on girls' educational outcomes?

In the most rigorous study in this area to date, a cluster randomised trial (CRT) in China showed that an intensive handwashing campaign can reduce absenteeism (Bowen 2007). Preliminary evidence from a CRT in Kenya suggests that a comprehensive school WASH programme (including improvements in hygiene, sanitation and water treatment) reduced absenteeism, including absenteeism due to illness (Personal Communication, Mathew Freeman, May 2010). A cross-sectional assessment revealed associations between the condition and number of school latrines and attendance (Rheingans 2009). We will note the quantity and type of studies assessing the impact of any school WASH programmes on educational outcomes disaggregated by sex, and among sub-populations of girls (e.g., by

socio-economic status). This could include whether the provision of *any* toilets (separated or not) impact girls' educational outcomes.

1.4.2 Type of review approach

The review questions move from narrow (impact) to broad (mapping) and have implications for the type of review methodology we apply. We are proposing a two-stage review process:

Stage one: Search for studies which investigate school-based water, sanitation and hygiene interventions and which report girls' education and/or health outcomes.

The aim of the first stage is to identify all studies that meet the review inclusion criteria (see 2.2.1), and can answer *any* of the research questions listed above. Descriptive information about these studies will be collected using a pre-determined coding framework to produce a 'map' of the research and populate the guiding framework in Figure 1.

Stage two: Use the map to decide whether we have evidence/data that can

- i) be synthesised to answer Q1a or Q1b; or
- ii) provide a conceptual map of mediating factors (causal or confounding) by which separate toilets may impact educational outcomes (Q2a-b, Q3); or
- iii) build a map of all the school WASH studies identified (Q4).

2. Methods used in the review

2.2 User involvement

2.1.1 Approach and rationale

We plan to engage potential users in all aspects of the review, from the design and process of the review to the dissemination and application of findings. Our collaborators represent UNICEF, Save the Children and DFID, and will inform the progress of the review at five key points:

- 1) **Protocol:** Users will have the opportunity to assess the scope of the review including the conceptual framework, search strategy and draft inclusion and exclusion criteria
- 2) **Searching:** We will announce the review and a 'Request for Relevant Research' via the websites and networks of UNICEF, Save the Children, DFID, Emory University's Center for Global Safe Water, LSHTM's MARCH (Maternal, Reproductive and Child Health) and SHARE (Sanitation & Hygiene Applied Research for Equity) Centres. (See Appendix 2 for more details)
- 3) **Draft report:** We will organise a workshop in early November (jointly hosted by MARCH, SHARE and EPPI-Centre) to share preliminary findings of the review with researchers and users. The workshop will address how the review findings can serve as a catalyst for better research and evaluation by discussing:
 - a) adequacy of the evidence base to support the prioritising of and/or to inform decisions about investments in separate toilets for girls;
 - b) the limitations of existing research;
 - c) how better research and systematic monitoring can fill existing gaps;
 - d) how to increase interest and investments in high-quality research in this area, including building capacity to undertake rigorous impact studies; and
 - e) opportunities for integration of girl-friendly WASH interventions with other school health initiatives (e.g., life skills-based education, and health-promoting policies and health services, as outlined by the FRESH framework).It is hoped this process will engage a range of sectors in the implementation and evaluation of school-based sanitation and hygiene, including education, health, water and private sectors, together with civil society. The feedback and recommendations of the workshop will be incorporated into the final report
- 4) **Dissemination:** The final report will be disseminated in printed and electronic form via the SHARE and MARCH websites and user networks nurtured throughout the project. We will be happy to work with the DFID programme and stakeholders to develop ways of disseminating the results to a range of audiences. We also plan to submit the review for publication in a peer review journal.

2.2 Identifying and describing studies

2.2.1 Defining relevant studies: inclusion and exclusion criteria

To be included in the map research must:

- 1) Scope & Setting: Examine the educational and/or health impact of a school-based WASH intervention delivered in a 'formal' educational setting, e.g., a public, independent or private school
- 2) Geographical location: Be conducted in a lower or middle income country
- 3) Population: Collect and report outcome data for girls aged between 4-18 years old
- 4) Study design: Be empirical research
- 5) Date: any
- 6) Language: any

Therefore, research will be excluded for any of the following reasons (and the specific reasons for exclusion will be recorded for every study that is screened):

- 1) Did not examine the impact of a toilet-based intervention delivered in a 'formal' educational setting
- 2) Was not conducted in a lower or middle income country
- 3) Did not collect and report educational and/or health outcome data for girls aged between 4-18 years old
- 4) Was either ('non-empirical' research):
 - a) descriptive
 - b) methodological paper
 - c) editorial, commentary, book review
 - d) policy document
 - e) resource, textbook
 - f) bibliography
 - g) theoretical paper
 - h) position paper

We will be inclusive in the types of study designs and conceptualise 'impact' to be broader than the 'effect' of an intervention. For example, the types of evidence synthesised may include girls' perceptions of the impact of separate toilets on their educational outcomes.

2.2.2 Identification of potential studies: Search strategy

Key search terms will be determined by the review question and the inclusion and exclusion criteria, and will be tested against papers already identified through hand searching.

The search strategy will involve developing strings of terms to denote three key aspects of the review, namely:

- Relevant interventions - e.g., sanitation, hygiene, toilets, girl-friendly
- Population / Setting - e.g. schools, pupils, girl
- Research type - e.g. evaluation, impact, intervention, perception

Appendix 1 includes a more complete list of generic terms from which search strings will be developed.

The strings will include 'free text' terms (i.e. the database searches for an instance of a term in the title and abstract of a record) and descriptor terms (i.e. codes applied by individual databases to characterise studies also referred to as MeSH headings, thesaurus terms or keywords).

- Published research: Searches will be undertaken of the following bibliographic databases
 - PubMed
 - ERIC
 - Social Sciences Citation Index (SSCI)
 - Global Health
 - LILACs
 - POPLINE
 - IBSS
 - British Library for Development Studies

We have conducted searches in the first three databases listed above. The search strings applied, and the number of hits, have been summarised in **Appendix 2**.

- Website search: the following websites will be searched for relevant research
 - OECD
 - DFID
 - World Bank
 - Water Aid
 - IRC International Water and Sanitation Centre
 - WHO
 - CDC
 - Health Management Information Consortium (HMIC) database
 - WASH Research News (<http://washresearch.wordpress.com>)
 - WASH in Schools (<http://www.schools.watsan.net>)
 - freshschools.org
 - schoolsandhealth.org
- Reviews: identification of reviews as a source of further research studies will include searching the following databases
 - Cochrane
 - 3ie
- Key journals: we will hand search the following key journals
 - Waterline
 - Journal of Education for International Development
 - Journal of Development Effectiveness
 - Journal of Water, Sanitation and Hygiene for Development

Reports, grey literature and research underway: To help identify research reports (not necessarily published in academic journals), grey literature and research that has not yet been published, we will issue a '*Request for Relevant Research*' through the respective networks of all project partners. We hope the Request will spread widely, through a ripple effect, to reach the largest audience possible. The draft text for the 'Request' has been

included in **Appendix 3**, and a dedicated e-mail account has been created to receive any submissions (wash.review@lshtm.ac.uk).

2.2.3 Screening studies: applying inclusion and exclusion criteria

Inclusion and exclusion criteria will be applied successively to (i) titles and abstracts and (ii) full reports. Full reports will be obtained for those studies that appear to meet the criteria or where we have insufficient information to decide. These reports will be entered into a second database. The inclusion and exclusion criteria will be re-applied to the full reports and those that do/did not meet these initial criteria will be excluded. ('EPPI-Reviewer' software will be used for screening, coding and analysing, using a single web location to house the documents and monitor progress of the review.)

2.2.4 Characterising included studies

The studies remaining after application of the criteria will be assigned keywords. This means that a set of codes will be developed and applied to each study to help create the 'map' or description of the characteristics of all relevant studies.

Codes or 'keywords' across several dimensions of characteristic will be developed including:

- Description of the intervention, e.g., separate toilets, girl-friendly toilets (with components specified)
- Comparison groups in the study analysis, e.g., separate vs shared toilets; separate vs no toilets; 'girl-friendly' toilets with menstrual supplies vs separate toilets without supplies, *etc.*
- Population characteristics/setting, e.g., age, primary school, secondary school
- Study design, e.g., randomised controlled trial, in-depth interviews, *etc.*
- Outcomes measured, e.g., educational enrolment, attendance, completion
- Geographical location, e.g., which lower middle income county, urban/rural

2.2.5 Identifying and describing studies: quality assurance process

A sample of the citations that could potentially be included in the research review will be screened by two researchers, working first independently and then comparing their decisions and coming to a consensus. Where it is not possible to reach consensus advice from a third party will be sought. The exclusion criteria may be further revised after this moderation exercise is completed. Another sample of citations will be double screened to check the consistency in the application of the inclusion and exclusion criteria. The remaining sample of studies will be screened independently by single reviewers on EPPI-Reviewer. For the initial title and abstract screening this will be done on a sample of 100 papers and for the second round of screening on full reports the criteria will be applied to 20 percent of the reports. An agreement rate of 90 percent will be required to proceed to independent screening. The remaining sample of studies will be screened independently by single reviewer.

2.3 Synthesis of evidence

2.3.1 Moving from broad characterisation (mapping) to synthesis (in-depth review)

A descriptive map of all eligible studies (meeting the inclusion and exclusion criteria) will allow us to quantify and describe research by types of intervention, study design, outcomes reported and context. This map will help us understand the the nature of the

literature that is available. We will use the map to decide whether to limit synthesis to studies which answer Questions 1a and b, or to extend synthesis to Questions 2-4 (e.g., if there are less than 10 studies that can answer Questions 1a and 1b). Thus, criteria for selecting studies to include in any detailed synthesis will be developed after the mapping has been completed.

The methods of synthesis used will depend on the types of studies included in the review, the detail and quality of reporting in these studies and their heterogeneity. Only studies that can provide evidence of an impact or an association between separation toilets and girls' educational outcomes will be critically appraised and analysed through quantitative synthesis such as meta-analysis or meta-narrative synthesis (if data is not amenable to meta-analysis and/or cannot be pooled due to heterogeneity).

We anticipate that the types of interventions assessed will be locally specific, tailored to cultural practices and beliefs. For example, where girls' toilets are provided, their design, condition and usage vary by setting and even by school, thus limiting the comparability of studies and generalisability of findings. How toilets are 'separated' may also differ (e.g., segregation by walls, boards or curtains; or 'shifts' when toilets are allocated for girls or boys; etc. We will aim to document such differences through a collection of photographs of separate toilets in schools around the world). The results of the synthesis will thus need to be interpreted within the context of geographic and cultural diversity, as well as issues particular to settings of conflict and high HIV/AIDS.

In short, the synthesis of the review will reflect on:

- Whether questions 1a and 1b can be answered from existing research; and
- How it could be answered through future research and improved monitoring of programmes, taking account of confounding factors identified in Q3, and/or by tracing causal pathways identified in Q2a-b.

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Appendices

Appendix 1. Generic search terms from which to develop search strings

WASH Interventions	Setting / Population	Research methods
Sanitation / Facilities	School* (variations of)	Intervention*
Sanitary	Primary	Evaluation*
Hygiene	Secondary	Trial*
Water quality	Elementary	Controlled
Toilets*	Pupil*	Impact
water closet	Education*	Perception*
Latrine*	Student*	
Privy / Privies	Girl*	
Lavatory / Lavatories		
Facilities		
Hand washing		
Soap		
Girl-friendly		

Appendix 2. Sample of database searches conducted so far

Database / Platform	Date	String	Hits
Pubmed	15 th July 2010	((pupils[TIAB] OR pupil[TIAB] OR student[TIAB] OR students[TIAB] OR schoolchildren[tiab] OR schoolchild[tiab] OR schoolgirls[tiab] OR schoolgirl[tiab]) OR (children[TIAB] OR child[TIAB] OR girl[TIAB] OR girls[TIAB] AND (education[TIAB])) OR ((schools[MeSH Terms:noexp]) OR (students[MeSH Terms:noexp]) OR (colleges[TIAB]) OR (college[TIAB]) OR (schools[TIAB]) OR (school[TIAB]) OR (educational institution[TIAB]) OR (educational institutions[TIAB]) OR (educational establishment[TIAB]) OR (educational establishments[TIAB]) OR (educational facilities[TIAB]) OR (educational facility[TIAB]))) AND (toilet facilities[MeSH Terms] OR (toileting[tiab]) OR (bathroom facilities[tiab]) OR (hand-washing[tiab]) OR (toilet*[tiab]) OR (toilet[tiab] OR toilets[tiab]) OR (latrine[tiab] OR latrines[tiab]) OR (privy[tiab] OR privies[tiab]) OR (water closet[tiab]) OR (lavatory[tiab] OR lavatories[tiab]) OR (water closets[tiab]) OR (handwashing[tiab]) OR (handwash[tiab]) OR ((sanitary[tiab] OR sanitation[tiab] OR hygienic[tiab] OR hygiene[tiab]) AND (facilities[tiab] OR facility[tiab])) OR girl-friendly[tiab])	850
ERIC via CSA	15 th July 2010	((KW=toilet*) or(KW=(privy or privies)) or(KW=(lavatory or lavatories)) or(KW=latrine*) or(KW=(girl friendly)) or(KW=(hand washing)) or(KW=soap) or(KW=(water closet)) or(KW=sanitation) or(KW=(sanitary facilities)) or(KW=hygiene)) and((DE=("community schools" or "day schools" or "elementary schools" or "nursery schools" or "public schools" or "rural schools" or "secondary schools" or "slum schools" or "small schools" or "state schools" or "suburban schools" or "traditional schools" or "urban schools"))) or(DE=("elementary secondary education" or "access to education")) or(DE=("elementary school students" or "secondary school students")))	503
SSCI	15 th July 2010	(Topic=(sanitary OR sanitation OR hygienic OR hygiene) AND Topic=(facilities OR facility)) OR (Topic=(toileting OR bathroom facilities OR hand-washing OR toilet OR toilets OR latrine OR latrines OR privy OR privies OR water closet OR lavatory OR lavatories OR water closets OR handwashing OR handwash OR girl-friendly)) AND Topic=(pupils OR pupil OR student OR students OR schoolchildren OR schoolchild OR colleges OR college OR schools OR school OR educational institution OR educational institutions OR educational establishment OR educational establishments OR educational facilities OR educational facility) OR Topic=(children OR child OR girl OR girls) AND Topic=(education) OR Topic=(schoolgirls) OR Topic=(schoolgirl)	623

Appendix 3. Draft text for the 'Request for Relevant Research' to be disseminated widely

Dear colleague,

We would like to share with you a new research project, and a way in which we would like you to be involved.

With funding and guidance from DFID, we are working together to conduct a systematic review to answer the following question:

"What impact does the provision of separate toilets for girls at schools have on their enrolment, attendance and completion of primary and secondary schooling?"

We would like to ask your help identifying relevant research to include in the review. In particular, if you know of studies (published or unpublished) that have assessed the impact of either:

- 1) separate sex toilets; or
- 2) other school-based WASH interventions

on girls' health or educational outcomes, please forward any documents or details to wash.review@lshtm.ac.uk

We would also be interested to receive any photographs showing what separate toilets look like in schools around the world.

We are grateful for your help to ensure we capture all evidence that is available. Please also let us know if you would like to receive a copy of the final report when it is available later this year.

Yours sincerely,

Isolde Birdthistle, Oona Campbell & Sandy Cairncross (London School of Hygiene & Tropical Medicine, UK)

Kelly Dickson (Institute of Education, UK)

Matt Freeman and Rick Rheingans (Emory University Center for Global Safe Water) Seung

Lee (Save the Children)

Murat Sahin (UNICEF)
