

## Evidence and Gap Map Research Brief

### UNICEF STRATEGIC PLAN 2018–2021 GOAL AREA 4: EVERY CHILD LIVES IN A SAFE AND CLEAN ENVIRONMENT

#### What this research brief is about

This research brief is one of a series of five briefs which provide an overview of available evidence shown in the Campbell Collaboration-UNICEF Mega-Map on the effectiveness of interventions to improve child welfare in low- and middle-income countries. These briefs summarize evidence as mapped against the five goal areas of UNICEF's 2018–2021 Strategic Plan, although it is anticipated that they will also be useful for others working in the child well-being space.

The Campbell-UNICEF Child Welfare Mega-Map maps evidence synthesis studies – evidence and gap maps and systematic reviews – which report on the effectiveness of interventions to improve child welfare. The evidence is structured by intervention categories, such as education, nutrition and rights, and outcome domains, such as school attendance and learning outcomes or healthy development.

Systematic reviews help establish which programmes are effective, for who, and in what circumstances. Evidence maps guide users to the evidence from systematic reviews and impact evaluations. The Mega-Map is an evidence and gap map of 302 systematic reviews and 16 evidence and gap maps, organized into six intervention categories and six outcome domains.

The map shows evidence syntheses which summarize evidence from around the world. It does not show individual impact evaluations. The map shows what evidence syntheses are available and the quality of the included studies, not what the evidence says.

This brief provides an overview of the available evidence related to interventions to ensure every child lives in a safe and clean environment.

The purpose of the research brief is to identify

- Areas in which there is ample evidence to guide policy and practice, and so to encourage policy makers and practitioners to use the map as a way to access rigorous studies of effectiveness
- Gaps in the evidence base, and so encourage research commissioners to commission studies to fill these evidence gaps.

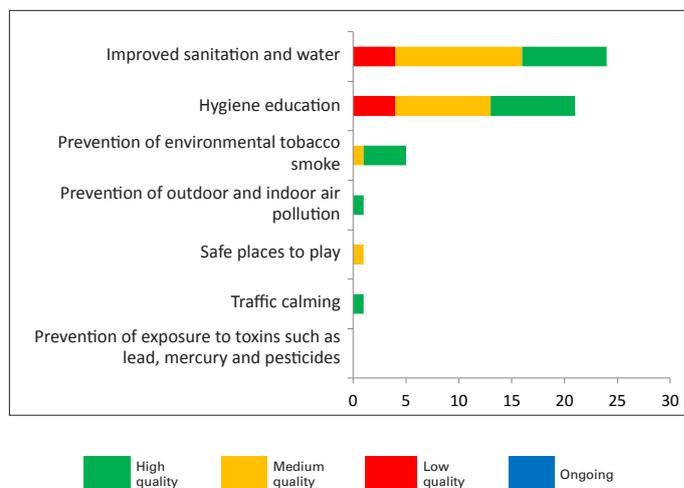
#### What interventions are included for a safe and clean environment?

The UNICEF Strategic Goal that every child lives in a safe and clean environment is touched on in four Sustainable Development Goals (SDGs): (i) SDG 3: Ensure healthy lives and promote well-being for all at all ages; (ii) SDG 6: Ensure availability and sustainable management of water and sanitation for all; (iii) SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable; and (iv) SDG 12: Ensure sustainable consumption and production patterns.

Interventions to ensure that every child lives in a safe and clean environment are in the environmental health section of the Mega-Map which has seven intervention subcategories:

- Improved sanitation and water (24 studies); e.g. Waddington (2009) [Water, sanitation, and hygiene interventions to combat childhood diarrhoea in developing countries](#)
- Hygiene education (21 studies); e.g. Buck (2017) [Promoting handwashing and sanitation behaviour change in low- and middle-income countries A mixed-method systematic review](#)
- Prevention of outdoor and indoor air pollution (one study), which is the smoking-related study; (Behbod, 2018) [Family and carer smoking control programmes for reducing children’s exposure to environmental tobacco smoke.](#)
- Prevention of environmental tobacco smoke (five studies), which is often part of a larger study; e.g. (Bhutta, 2005) [Community-based interventions for improving perinatal and neonatal health outcomes in developing countries: a review of the evidence.](#)
- Prevention of exposure to toxins such as lead, mercury and pesticides (0 studies)
- Safe places to play (one study): (Leavy, 2016) [A Review of Drowning Prevention Interventions for Children and Young People in High, Low and Middle Income Countries.](#)
- Traffic calming (one study): (Gupta, 2015) [Regulatory and road engineering interventions for preventing road traffic injuries and fatalities among vulnerable \(non-motorised and motorised two-wheel\) road users in low- and middle-income countries.](#)

**Figure 1 Number of studies by intervention subcategory and study quality**



Environmental health is one of the less heavily populated areas of the map. A moderate number of reviews address WASH and hygiene around (25 for each), though there is a substantial overlap with reviews covering both subcategories. The other interventions have few reviews. This compares with over 100 reviews for health and nutrition interventions.

In the Mega-Map, most environmental health studies are concentrated under WASH and hygiene education for three health outcomes: morbidity, mortality and child health and disability. These same three outcomes appear for the next most common intervention, preventing tobacco smoke.

Study quality is assessed using the widely used AMSTAR quality assessment tool (see endnote for details). There is a lower percentage of high quality reviews on environmental health (40 per cent) than overall (45 per cent), and a higher share of medium quality ones (44 versus 33 per cent).

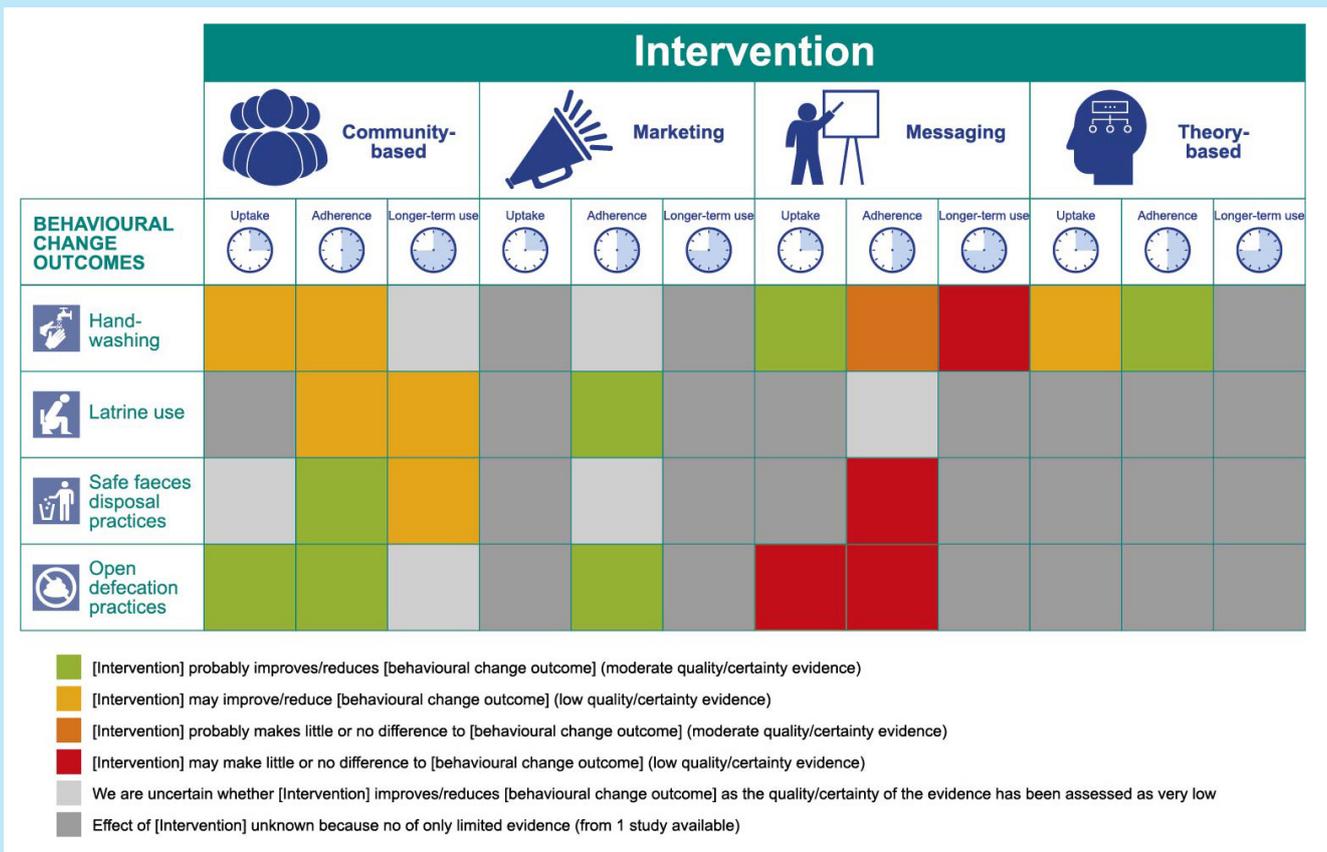
The evidence and gap map shows what evidence is there but not what it says. However, to give a taste of the evidence contained in the studies, Box 1 summarizes the evidence of selected studies related to water and sanitation.

**Box 1: Challenges in improving child health through WASH interventions. Findings from selected reviews**

The evidence from several reviews is clear that WASH interventions are effective in reducing child diarrhoea (which is the most common outcome indicator in WASH studies). [Waddington \(2009\)](#) finds a 40–60 per cent reduction in child diarrhoea from interventions to improve water quality, and both sanitation and hygiene interventions. However, there is no impact from simply increasing the quantity of water – e.g. community standpipes. Even when water from community sources is clean, it is often stored and so may be recontaminated before use.

However, the review also points to problems of sustained compliance, which means that impact declines after the project finishes. The study gives the following examples: (1) in a study in Cambodia, only 31 per cent of the follow-up households were still using the filters that had been provided 36 months or even less after receiving them, (2) in Kenya, only 30 per cent continued to pasteurize their water ([Iijima et al., 2001](#)) and (3) in Guatemala, just 14 per cent reported using the flocculant-disinfectant promoted by the project, with only 5 per cent meeting the criteria for active repeat use and only 1.5 per cent having detectable chlorine in their drinking water.

So, the policy challenge is how to encourage sustained adoption of improved water and better hygiene practices. A review of this issue found that there is a lack of studies on long-term adoption. High quality studies are only available for messaging approaches, which are found to be ineffective in promoting handwashing (see figure below). Lower quality evidence suggests that community-based approaches may be effective in promoting latrine use and safe disposal of faeces.



Source: Bunk et al. (2017). Infographic design by Centre for Evidence-based Practice

**Table 1 Outcomes for every child lives in a safe and clean environment**

Sustainable Development Goal				
Goal Area 4: Every Child Lives in a Safe and Clean Environment	3: Ensure healthy lives and promote well-being for all at all ages	6: Ensure availability and sustainable management of water and sanitation for all	11: Make cities and human settlements inclusive, safe, resilient and sustainable	12: Ensure sustainable consumption and production patterns
Risk factor reduction		Hand washing (7) Clean environment (6)	Childhood injuries (2)	Maternal smoking (18) Alcohol abuse/ substance abuse (3) Clean environment (6)
Health impacts	Mortality (149), morbidity (169) and disability and childhood illness (110)			

### What outcomes are reported?

The Mega-Map shows studies according to the outcomes they report. For 'every child lives in a safe and clean environment' the most relevant outcome domain is risk factor reduction. There are also relevant outcomes under health impacts.

Table 1 shows the number of studies for each outcome subdomain, classified by the relevant SDG. There are a substantial number of studies reporting outcomes related to SDG 3, but these outcomes are of course linked to a wide range of interventions. The number of studies across these three outcomes related to the safe and clean environment intervention subcategories is around 25. There are only a small number of evidence synthesis studies for most other outcomes, notably childhood injuries.

### Where is the evidence from?

Systematic reviews are often global in scope. We included in the map all reviews for which studies from developing countries were eligible for inclusion, whether or not there were actually any studies from developing countries included. The screening process did not include a check as to whether the review actually included studies from developing countries. An example of a global review is Leavy (2016) [A Review of Drowning Prevention Interventions for Children and Young People in High, Low and Middle Income Countries](#).

However, given the nature of the topic, several reviews in this area have a focus on developing countries; e.g. Waddington (2009) [Water, sanitation, and hygiene interventions to combat childhood diarrhoea in developing countries](#), Arnold (2007) [Treating water with chlorine at point-of-use to improve water quality and reduce child diarrhea in developing countries: a systematic review and meta-analysis](#) and Promoting handwashing and sanitation behaviour change in low- and middle-income countries: Buck (2017) [A mixed-method systematic review](#).

### Where are the evidence gaps?

There are many evidence gaps in evidence synthesis relating to interventions to ensure that every child lives in a safe and clean environment. The available evidence is concentrated on the impact of WASH interventions on health outcomes. Moreover, even for WASH, a closer investigation of the evidence as presented in Box 2 shows an evidence as presented gap concerning successful approaches to promote sustained adoption.

For the other intervention categories in the map – and their related outcomes – there are very few evidence synthesis studies. There are no or few studies to help identify effective strategies to reduce the exposure of children to indoor and outdoor air pollution; the risk of accidents including road-related accidents; or the risk of exposure to toxic materials.

### Implications of findings

There is a strong need for mapping, reviews and primary studies to develop an evidence-based programme to ensure that every child lives in a safe and clean environment. Even where there is evidence, as for WASH, important policy issues need to be addressed.

Since this is a map of evidence synthesis studies, the lack of evidence synthesis does not mean there are no primary studies. In areas in which there is a reasonable amount of evidence synthesis already, e.g. WASH, evidence and gapmaps need to be constructed to gain an idea of the extent of the developing country literature, and also to develop a taxonomy of approaches relevant in these contexts. Such a map already exists for WASH but needs to be regularly updated.

In areas where there are no or few evidence synthesis studies, a map will help provide an overview of the extent of primary studies, and so inform decisions about whether to commission a review or focus on primary studies as a priority.

## How can the map be used by UNICEF?

The map will help UNICEF staff and partners to identify evidence-based programmes and practice to help achieve the agency's strategic goals. Although the evidence base is weak, the existing reviews do yield relevant information. For example, the review of interventions to prevent drowning is clear that messaging alone is ineffective and that multi-strategy approaches need to be used ([Leavy, 2016](#)).

However, the evidence base is thin. So in this area, UNICEF and partners should be using their programmes as a means to strengthen the evidence by building studies into programmes.

### Endnote: How we assessed the quality of reviews

For systematic reviews we scored each study using the 16 item checklist called AMSTAR 2 ('Assessing the Methodological Quality of Systematic Reviews' version 2; Shea et al. 2017). The 16 items cover: (1) PICOS in inclusion criteria, (2) ex ante protocol, (3) rationale for included study designs, (4) comprehensive literature search, (5) duplicate screening, (6) duplicate data extraction, (7) list of excluded studies with justification, (8) adequate description of included studies, (9) adequate risk of bias assessment, (10) report sources of funding, (11) appropriate use of meta-analysis, (12) risk of bias assessment for meta-analysis, (13) allowance for risk of bias in discussing findings, (14) analysis of heterogeneity, (15) analysis of publication bias, and (16) report conflicts of interest.

Items 2, 4, 7, 9, 11, 13 and 15 are termed 'critical'. Study quality is rated high if there is no more than one non-critical weakness, and medium if there is no critical weakness but more than one non-critical weakness. Studies with one or more critical weaknesses are rated low quality.

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### About this UNICEF Research Brief

This research brief was prepared by Howard White and Ashrita Saran with assistance from Yashika Kanojia, Campbell Collaboration. The production of the brief benefited from technical inputs provided by Kerry Albright, Lawrence Chandy and Priscilla Idele, UNICEF. Funding to support its production was provided by UNICEF's Office of Research-Innocenti. Comments may be sent to [info@campbellcollaboration.org](mailto:info@campbellcollaboration.org) or to [research@unicef.org](mailto:research@unicef.org)