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# Engagement of stakeholders in the development of a Theory of Change for handwashing and sanitation behaviour change

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## ABSTRACT

A Theory of Change (ToC) is an approach to map programmes aimed at inducing change in a specific context, with the goal of increasing their impact. We applied this approach to the specific case of handwashing and sanitation practices in low- and middle-income countries and developed a ToC as part of a systematic review exercise. Different existing sources of information were used to inform the initial draft of the ToC. In addition, stakeholder involvement occurred and peer review took place. Our stakeholders included methodological (ToC/quantitative and qualitative research) and content experts (WASH (Water, Sanitation, Hygiene)/behaviour change), as well as end-users/practitioners, policy-makers and donors. In conclusion, the development of a ToC, and the involvement of stakeholders in its development, was critical in terms of understanding the context in which the promotional programmes are being implemented. We recommend ToC developers to work with stakeholders to create a ToC relevant for practice.

## ARTICLE HISTORY

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handwashing; sanitation;  
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middle-income countries

## Introduction

Lack of hygiene and access to clean water and basic sanitation are responsible for nearly 90 % of all deaths from diarrhoea, and diarrhoea is among the 10 leading causes of death in the world (Prüss-Üstün et al. 2008; UNICEF and WHO 2015). Today 663 million people worldwide still use unimproved drinking water sources, 2.4 billion people still use unimproved sanitation facilities worldwide and 946 million people are still practising open defecation (United Nations 2015). Efforts have been made to improve this situation by introducing water, sanitation and hygiene (WASH) interventions, with the main focus on water supply and treatment, latrine use (including latrine construction and latrine hygiene), faeces disposal, discouraging open defecation and activities to promote hygiene (DFID 2013).

Hygiene consists of many aspects, including handwashing as the most crucial one. Early interventions mainly focused on the ‘hardware component’, which is providing infrastructure and water supply/quality and sanitation technologies, interventions with proven effectiveness (Clasen et al. 2010, 2015). However, it has been shown that impact of these interventions falls over time. An example of this are water quality interventions showing decreased effectiveness over longer periods (Waddington et al. 2009; Cairncross et al. 2010). In order to improve effectiveness of WASH interventions in low- and middle-income countries (LMICs), several programmes to promote behaviour change (‘software components’) have been designed in the last decade. Many of these promotional approaches are based on psychosocial theories, marketing principles, and use of incentives (Peal et al. 2010), however it is not always clear if these promotional approaches result in behaviour change (and on the longer term health improvements) and which barriers and facilitators exist when implementing such programmes. To address this knowledge gap, we developed a mixed-methods systematic review (De Buck et al. 2017) to collect and critically analyse existing research studies on the effectiveness (quantitative arm) of handwashing and sanitation promotional approaches, and factors influencing the implementation of these approaches (qualitative arm). In order to focus and structure the systematic review and to ensure the uptake of the findings/conclusions of the systematic review by policy-makers and implementing agencies, we developed a Theory of Change (ToC).

The ToC originates from the field of programme theory and programme evaluation in the 1990s in the domain of community initiatives. Weiss described a ToC as ‘a theory of how and why an initiative works’. More specifically, it aims at developing a shared understanding of the processes and underlying mechanisms by which interventions are likely to work (Weiss 1995). It describes how a programme brings about specific long-term outcomes through a logical sequence of intermediate outcomes. A ToC is often developed using a backward mapping approach which starts with the long-term outcome and then maps the required process of change and the short- and medium-term outcomes required to achieve this (Anderson 2005). It articulates the causal pathways through which a programme/intervention is expected/hypothesized to achieve its programme objectives (i.e. (long-term) outcomes or impact), and specifies the factors influencing these pathways. There is an important emphasis on formulating the specific assumptions of how different parts of the chain result in progression to the next stage. It is essential to define which assumptions are critical to success and to support these with evidence. A ToC wants to make these assumptions explicit with the aim of strengthening programmes/interventions by increasing their impact. The development of a ToC is an iterative process and there are many ways in which to develop a ToC. Stakeholders can be engaged in developing the ToC from the beginning, or an initial ToC can serve as a tool to engage relevant stakeholders in discussion and refinement of the pathways. Moreover, ToCs are not fixed but can be adapted as new information becomes available. ToCs are often presented in the form of a diagram with a narrative detailing the links between the interventions and results, with emphasis on the causal assumptions. The use of the ToC approach is widespread in the field of public health (Breuer et al. 2016). It is increasingly being used in international development to map complex programmes aimed at inducing change in a specific context. A ToC can be used for a specific programme/intervention or – as is the case for the ToC presented in this paper – as a more generic ToC. ToCs provide an interesting perspective to model complex interventions and interactions (Baxter et al. 2014; Kneale et al. 2015). Many development organizations, as well as donor agencies, have evaluated this methodology as accessible and useful (Anderson 2005; Vogel 2012).

In this paper, we will illustrate the development of a ToC by means of a worked example in the context of handwashing and sanitation practices in low- and middle-income countries (LMICs).

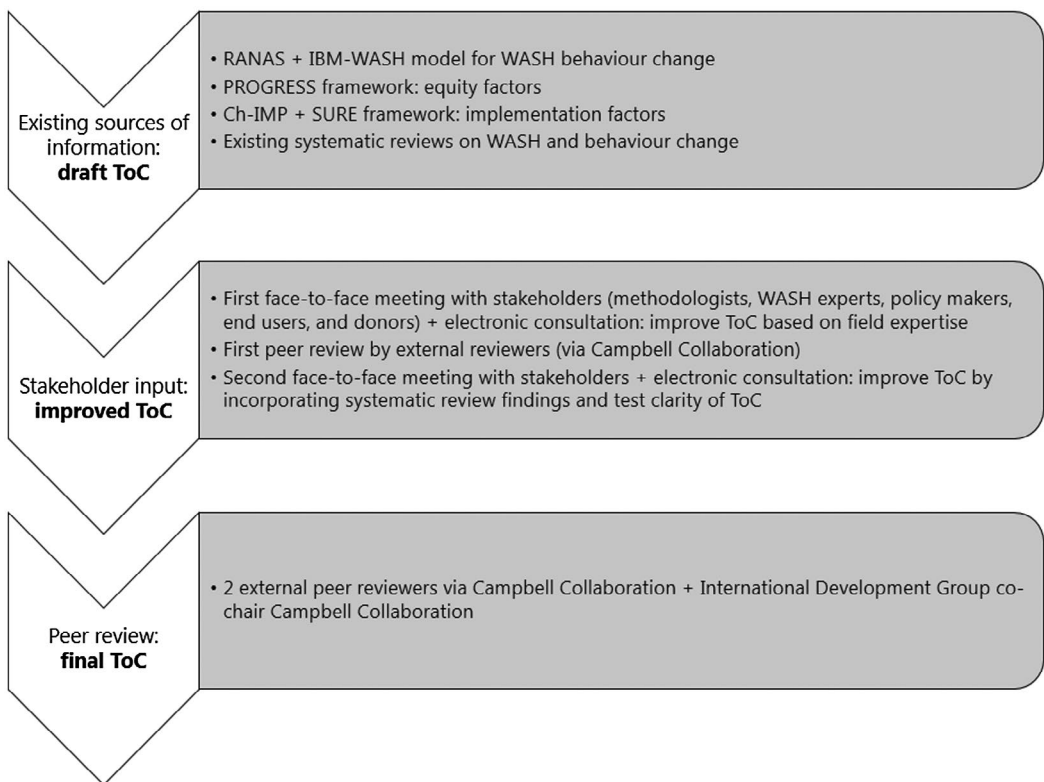
The aim of this paper is to describe the development of a ToC that is relevant for practice. This ToC can serve as a framework for policy-makers, decision-makers, implementing organizations and researchers, explaining how promotional approaches are expected to lead to behavioural factors (e.g. knowledge and skills, leading to behaviour change), behaviour change and health outcomes, and what factors are influencing the implementation of these promotional approaches.

## Methods

The methodology used to develop the ToC is schematically depicted in Figure 1, and includes the use of existing sources of information, followed by stakeholder consultation and external peer-review, which is described more in detail below. A ToC is composed of three major components: the intervention(s), the results and the factors influencing the different steps in the ToC (i.e. contextual factors and factors influencing implementation). The results are composed of outputs and outcomes, where outcome is defined here as the effect that the intervention aims to achieve, and is composed of short-term outcomes (these outcomes that lead to actual WASH behaviour in case of our WASH example, called the 'behavioural factors'), intermediate term outcomes (actual behaviour) and long-term outcomes (health outcomes). Contextual factors are characteristics of the environment which could influence the different links between intervention and programme outputs and outcomes, including socio-cultural, physical and personal factors. Factors influencing implementation are programme-related factors on the one hand, and factors leading to the behavioural factors (short-term outcomes) on the other hand. The latter are factors on the level of the implementer and the recipient (more detail below).

### Project context

The ToC described in this paper is part of a project in which we conducted a mixed-methods systematic review about the effectiveness of water and sanitation promotion programmes on behaviour change and about factors influencing the implementation of these programmes. The project is a collaboration



**Figure 1.** Overview of the development of a Theory of Change (ToC) based on existing sources of information and stakeholder consultation.

Notes: RANAS: Risks, Attitudes, Norms, Abilities, and Self-regulation; IBM-WASH: The Integrated Behavioural Model for Water, Sanitation, and Hygiene; PROGRESS: Place of residence, Race/ethnicity/culture/language, Occupation, Gender/sex, Religion, Education, Socio-economic status, and Social capital; Ch-IMP: Checklist for implementation; SURE: Supporting the Use of Research Evidence.

between the Centre for Evidence-Based Practice of the Belgian Red Cross, and the Centre of Evidence-Based Health Care at Stellenbosch University, who prepared the actual work described below.

The team involved in the development of the ToC was composed of methodological experts (systematic review, qualitative research) (EDB, KH, TG, HVR, AVV, PV, TY) and a topical expert in WASH behaviour change (H-J M).

One of the requirements of the funding agency 3ie (International Initiative for Impact Evaluation) was to actively involve different stakeholders, in order to increase the chance of implementation in practice. A group of stakeholders was composed (“Advisory Group”) by recruiting relevant stakeholders from our existing networks, with the following profile: a methodologist (programme implementation in vulnerable populations) (MC), WASH experts (AA, CC, LG, BKE, HJ), a policy-maker (AA), end users (AA, CC, LG, BKE, HJ), and a representative of the donor community (CC). The majority of topical experts and end-users were from LMICs, i.e. Sub-Saharan Africa and South Asia.

### ***Use of existing sources of information***

A first draft of the ToC was developed by three of the team members (EDB, HVR, AVV), and with electronic input of the other team members. The draft ToC was based on different existing sources of information, including theoretical models, frameworks and systematic reviews. To identify these, (1) a literature review was performed to search for existing systematic reviews describing WASH promotion programmes and behaviour change in LMICs (De Buck et al. 2017), and (2) methodological experts in programme implementation and qualitative research were consulted. This resulted in a list of resources that was used to create a first draft of the ToC.

The literature review was done using specific search strategies in seven scientific databases (Cochrane Library, Medline, EMBASE, Web of Science, ERIC, Cinahl, Campbell Library) and seven relevant websites (IRC International Water and Sanitation Center website, Social Science research network, WHO, World Bank, USAID, UNICEF, International Center for Diarrhoeal Disease Research) and identified systematic reviews focusing on WASH promotional approaches (details will be published elsewhere) and WASH behavioural models. The review identified six existing systematic reviews on WASH promotional approaches. These reviews included effectiveness studies that measured the effect of promotional approaches on ‘knowledge, skills, attitude’ (behavioural factors, e.g. knowledge on hand hygiene, handwashing skills) and actual behaviour (e.g. handwashing) (De Buck et al. 2017). These outcomes were included in the ToC as short-term and intermediate term outcomes. In addition, a further systematic review of WASH behavioural models (Dreibelbis et al. 2013) described a model that was used as a basis for the development of the ToC, the RANAS model (Mosler 2012). This model was selected from the review, since it was the only model that included all WASH aspects, and the model had already been tested in practice (Mosler 2012). The different elements of the RANAS model, and how these fed into the ToC, are discussed in the Results section. The review authors developed a new WASH behavioural model, the IBM-WASH (‘The Integrated Behavioural Model for Water, Sanitation, and Hygiene’) model, which provided us three additional influencing factors that were added to our ToC (Dreibelbis et al. 2013).

Since our literature review only identified systematic reviews of quantitative studies on the effectiveness of WASH promotional programmes, and we anticipated that evidence on barriers and facilitators on implementation of the programmes would mainly come from qualitative research, we consulted two experts (KH, MC) on qualitative research and programme implementation from our network (team members and stakeholders). This consultation resulted in the use of the PROGRESS framework, the Checklist for implementation (‘Ch-IMP’) and the SURE framework. The PROGRESS framework is developed to provide an equity lens in the conduct, reporting and use of research. PROGRESS stands for Place of residence, Race/ethnicity/culture/language, Occupation, Gender/sex, Religion, Education, Socio-economic status, and Social capital (O’Neill et al. 2014). These factors illuminate inequities in health, and are relevant contextual factors to feed the ToC. The Ch-IMP is composed of a list of process and implementation-related factors, relevant in understanding aspects of the implementation of a

certain intervention or programme (Cargo et al. 2015). This checklist served as a source of information for programme environment and process evaluation factors. Process evaluation (or implementation evaluation) determines whether a programme has been implemented as intended. In addition to the Ch-IMP, the SURE framework was identified as a checklist with factors that could affect the implementation of a policy option. The SURE ('Supporting the Use of Research Evidence') Collaboration has been established to strengthen evidence-informed policy-making in Africa, and developed a set of resources to support in that. The factors of the SURE framework were used to further inform the ToC, if not covered yet by the other sources of information (The SURE Collaboration 2011). The SURE framework has already proven to be useful in an existing mixed methods systematic review with a theory-based approach (Lewin et al. 2010; Glenton et al. 2013). In summary, the three frameworks were all used as a source of relevant factors that were included in the ToC.

### ***Stakeholder consultation and iterative improvement of ToC***

The draft ToC was circulated electronically to the stakeholders, in preparation for a face-to-face meeting with the majority of the team members and stakeholders (13 participants), which was held from 10 to 12 February 2016 in Cape Town, South Africa. The stakeholders that were not able to join the face-to-face meeting provided their feedback electronically. During the first meeting day presentations concerning the project plan, WASH and behaviour change, systematic review methodology, and ToC development were provided by different team members/stakeholders. In addition, definitions for interventions and outcomes mentioned in the ToC were presented, discussed and finally approved by all meeting participants. Following a short explanation on ToC development in general, and on how the ToC was developed so far, a workshop was initiated with the main aim of improving/refining the current ToC, and making it more relevant for our different stakeholders and target groups. The group was divided in three small working groups, each composed of 4–5 people. Participants with a similar profile (e.g. methodologists) were divided over the groups, so that each group contained experts with methodological and content expertise. Each group received a large format print-out of the ToC (A3), on which they could draw and write. Each group was assigned a specific task: (1) discuss the positive and negative moderators of behavioural factors, (2) discuss the factors influencing implementation, and (3) discuss the contextual factors that influence the relation between the intervention and the outcomes. In addition, feedback that was provided electronically was projected so that each group could consider this feedback in its discussions. Following 45 min of discussion in small groups, a 30-min plenary discussion was held to discuss suggestions made by the individual groups. Following the first meeting day, the suggestions made by the group were inserted in the draft version of the ToC by the project coordinator. This version was then printed and represented to the group on meeting day 2 and 3 in the morning. In this way it was possible to show to (and re-discuss with) the stakeholders the results of the feedback they provided, and to let them approve the improved version of the ToC. An expert on ToC development who was not present in the meeting was consulted regularly via email during the meeting.

Between February and December 2016 the mixed-methods systematic review was conducted and finalized. A second stakeholder consultation was held in a 2-day face-to-face meeting in Geneva, Switzerland from 3 to 5 December 2016, with the majority of the team and stakeholders, and a broader group of stakeholders (practitioners, policy-makers, donors) not involved in the project before (24 participants). These stakeholders were identified from our own network, and by contacting relevant organizations. One of the aims of this meeting was to update the ToC based on the findings of the review and to test if the ToC was clear and understandable for stakeholders with a different background (field view, research view, donor view). ToC development was thus an iterative process, where the ToC helped to structure the systematic review, and the evidence from the systematic review fed into the ToC. Feedback collected during this meeting was incorporated in the ToC to obtain an improved version.



## External peer review

After the first stakeholder meeting, the improved ToC was submitted to the Campbell Collaboration on 18 February 2016, as part of the protocol for the systematic review to be developed. It was reviewed by two external reviewers and the International Development co-chair. Following incorporation of this (minor) feedback, the ToC became part of a review protocol that was approved by the Campbell Collaboration on 8 April 2016, and was published in the Campbell Library on 2 May 2016. Following the second stakeholder meeting the ToC was again submitted to the Campbell Collaboration on 14 December 2016, as part of the full systematic review, and finally approved without modifications on 19 April 2017, resulting in the final ToC. The full systematic review was published in the Campbell Library on 19 May 2017 (De Buck et al. 2017).

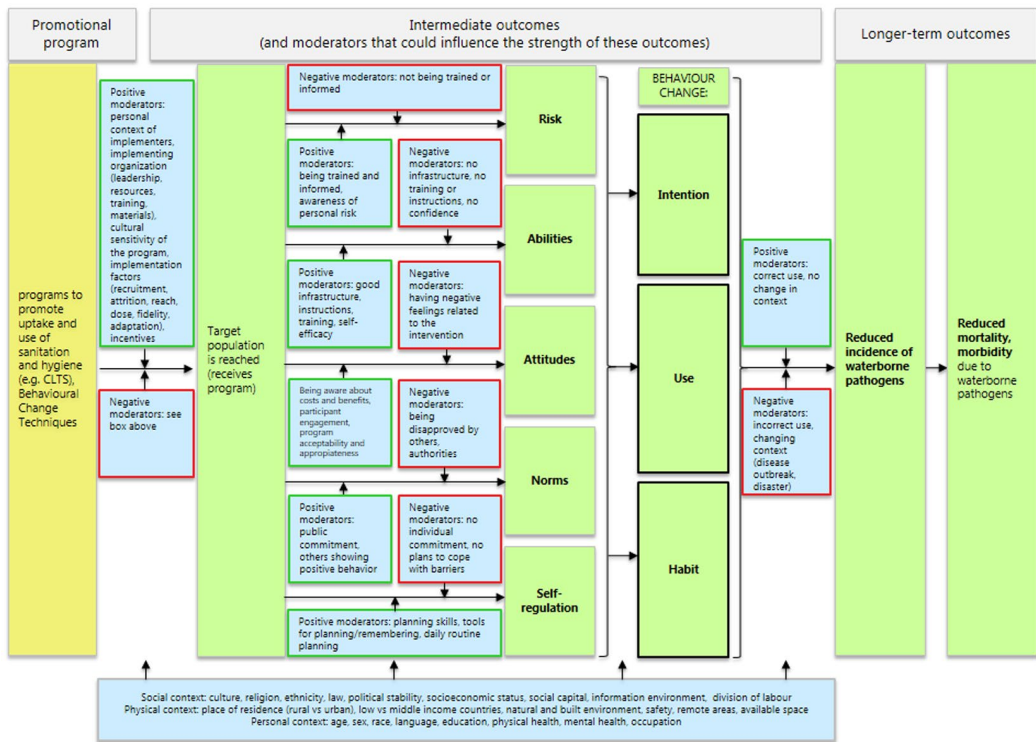
## Results

Below we described how the three main components of the ToC (interventions, results and influencing factors) were developed based on existing sources of information, and were finalized following stakeholder consultation and external review: (1) the promotional approaches relevant to our case, (2) the programme outputs and the short-term, intermediate term and long-term outcomes, and (3) the factors influencing the different steps in the ToC (contextual factors and factors influencing the implementation of the promotional approaches).

### Promotional approaches relevant to our case

*In the draft ToC*, we defined a promotional approach as ‘a planned and systematic method which encourages people to adopt a specific behaviour’ (Peal et al. 2010; Mosler 2012; Dreibelbis et al. 2013; Aunger and Curtis 2015). The existing systematic reviews we identified contained promotional approaches such as education (Joshi and Amadi 2013; Ejemot-Nwadiaro et al. 2015; Hulland et al. 2015), social marketing (Mah et al. 2008; Evans et al. 2014), and Community-Led Total Sanitation (Hulland et al. 2015), the latter being a participatory community-based approach. Since we were not sure about the completeness of the overview of promotional approaches, we initially included a box in the draft ToC called ‘programmes to promote uptake and use of sanitation and hygiene’ (see Figure 2). In the draft ToC this ‘programme box’ led to the box ‘target population is reached’.

*Following stakeholder consultation*, we (1) refined the definition of promotional approaches aimed at handwashing and sanitation behaviour change, (2) added an ‘assessment box’ as a preparatory phase for the selection of a promotional approach, and (3) indicated more clearly which outcomes are influenced by the promotional approaches. First, the definition was refined into six different promotional approaches aimed at handwashing and sanitation behaviour change: health education of programme recipients, approaches based on psychosocial theories, community-based participatory approaches, social marketing approaches, incentives, and advocacy (Peal et al. 2010; Mosler 2012; Dreibelbis et al. 2013; Aunger and Curtis 2015). An example of a health education is an educational handwashing intervention at school level. For approaches based on psychosocial theories, behavioural factors or factors leading to the behavioural factors (e.g. certain feelings, social pressure), are derived from social psychology theories and then addressed with specific promotional programmes (‘behaviour change techniques’), as in the Evo-Eco approach or RANAS approach (Mosler 2012; Aunger and Curtis 2015). Examples of community-based participatory approaches, in which communities build a sense of responsibility and create sustainable solutions, are among others PHAST (standing for Participatory Hygiene and Sanitation Transformation), SARAR (standing for and based on the principles of Self-esteem, Associative Strengths, Resourcefulness, Action-Planning, and Responsibility) and Community Health Clubs (based on regular meetings with community volunteers) (Peal et al. 2010). Social marketing is the use of commercial marketing techniques to promote the adoption of behaviour that will improve the health or well-being of the target audience or of society as a whole.

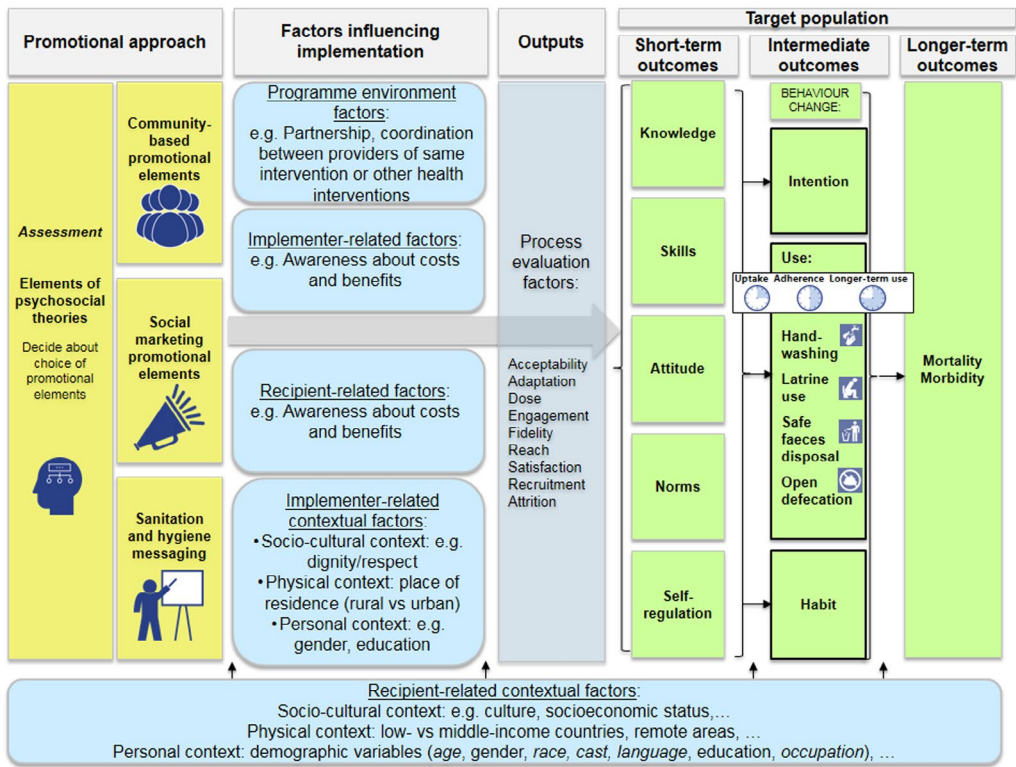


**Figure 2.** Draft theory of change framework, consisting of three different groups of boxes, based on existing theoretical models and sources of information.

Note: The intervention box (yellow box) contains the promotional approaches. The outcome boxes (green boxes) contains the intermediate outcomes (primary outcomes with bold border), based on the RANAS model, and longer term outcomes. The boxes with contextual and influencing factors (blue boxes) contains factors that can positively (green border) or negatively (red border) influence the implementation of the promotional approaches. The RANAS model, IBM-WASH model and PROGRESS model served as a source of 'overall' contextual factors (horizontal blue box at bottom of figure); the Ch-IMP en SURE checklist served as source of factors influencing implementation (blue boxes at left-hand side).

It combines enterprise approaches with demand stimulation, and an example is the Public Private Partnership for Handwashing with Soap (PPPHWS) (Peal et al. 2010). Incentives can be financial (e.g. loans or micro-credits) and non-financial (e.g. food). Advocacy concerns activities targeting policy or decision-makers. Following the evidence identified in our systematic review, and a second stakeholder consultation, it was concluded that advocacy and incentives are most often part of a broader promotional approach, and it was decided to only include the four first groups of promotional approaches (see Figure 3). The stakeholders asked to clearly indicate how we defined 'health education' and the name of this category was changed into 'sanitation and hygiene messaging' to make clear that this is a predominantly directive educational approach, consisting mainly of one-way communication, designed to help individuals and communities improve their health, by increasing their knowledge and/or skills. An example of sanitation and hygiene messaging is a school-based handwashing intervention based on a video, pamphlets and school bags with slogans on hand hygiene. A more detailed description of the different promotional approaches is provided elsewhere (De Buck et al. 2017). Second, since elements of psychosocial theories were identified as a consequence of formative research on a small scale (in the studies identified in our systematic review), our stakeholders advised to add this type of promotional elements to an 'assessment box', which was introduced before the three other intervention boxes in the ToC. In a future version of the ToC it could be interesting to make this box more concrete, e.g. by adding examples of behaviour change techniques that specifically target the elements of psychosocial theories, however more evidence is needed on this. Third, our stakeholders asked to visualize that the promotional approaches directly influence the (short-term) outcomes, which led to a clear horizontal





**Figure 3.** Final theory of change (ToC) framework, consisting of three different groups of boxes, following stakeholder consultation and external peer review.

Note: The ToC depicts the effect of promotional approaches (yellow boxes) intended to improve handwashing and sanitation behavioural factors (short-term outcomes), handwashing and sanitation behaviour change (intermediate outcomes) and reduce morbidity and mortality (longer term outcomes) (green boxes). Primary outcomes are indicated in boxes with a black border. Blue boxes contain contextual factors and factors that can influence the implementation of the promotional approaches. Factors indicated in green are newly identified compared to the original ToC. Items in italics are not supported with evidence from our systematic review. © [The Campbell Collaboration]. Reproduced and adapted by permission of The Campbell Collaboration (De Buck et al. 2017).

arrow from the promotional approach boxes to the outcomes. This arrow passes the 'programme outputs', such as 'reach' and 'dose', which will be discussed more in detail in the next paragraph.

### **Programme outputs and short-term, intermediate and longer term outcomes**

In the draft ToC, we defined behavioural outcomes as intermediate outcomes, and health-related outcomes as longer term outcomes. The intermediate outcomes were based on the RANAS model (Mosler 2012), which was identified during our scoping review. The model is based on existing psychosocial theories, such as the Health Belief Model (Rosenstock 1974). RANAS is the acronym for 'Risks, Attitudes, Norms, Abilities, and Self-regulation', also called the 'behavioural factors' in this model. The behavioural factors are based on multiple theories of behaviour change, and need to be favourable in order for a certain behaviour to change. For example, 'Risks' concern factors dealing with a person's understanding and awareness of the health risk. The five behavioural factors lead to 'behaviour change', consisting of 'intention', 'use' and 'habit' of a certain behaviour (Mosler 2012). 'Use' refers to the execution of actions, and covers both 'handwashing' and 'latrine use' in our specific example. It might be surprising that handwashing behaviour and sanitation behaviour are combined in one ToC, however this was decided since many promotional programmes target both behaviours (details can be found elsewhere, De Buck et al. 2017). The behavioural factors were initially introduced in our

ToC as intermediate outcomes together with the three components of behaviour change (intention, use, habit) (Figure 2). In addition to the behavioural factors, and the behaviour change components, 'Reaching the target population' was initially also seen as an intermediate outcome (Figure 2).

The longer term outcomes in the ToC were initially specified as 'reduced incidence of pathogens' and 'mortality and morbidity' (Figure 2). Health outcomes are not part of the RANAS model, but were included since these are the final intended outcomes that follow logically from behaviour change. Health outcomes (such as diarrhoea, cholera, trachoma, helminth infections) are described in different existing systematic reviews on WASH interventions (Fewtrell et al. 2005; Waddington et al. 2009; Cairncross et al. 2010; Dangour et al. 2013; Peletz et al. 2013; Stocks et al. 2014; Strunz et al. 2014; Taylor et al. 2015), including two of the six systematic reviews on promotion and WASH behaviour that we identified in our scoping review (Mah et al. 2008; Joshi and Amadi 2013).

*Following stakeholder consultation*, we (1) created an additional outcome box with short-term outcomes, (2) better defined the intermediate outcome 'use', (3) renamed the long-term outcomes, and (4) made a clear distinction between programme outputs and outcomes. First, the behavioural factors were labelled as short-term outcomes, since it was relevant and important for our stakeholders to distinguish between short-term and intermediate outcomes (Figure 3). We used the wording 'knowledge' instead of 'risk', and 'skills' instead of 'abilities', to reflect the educational outcomes knowledge, skills and attitude, which are more easily interpretable by our stakeholders. We should however acknowledge that by doing this, some of the meaning of the original RANAS items got lost, such as vulnerability which was covered by the term 'risk'. 'Norms' is defined as how someone perceives social pressure towards a behaviour, and 'self-regulation' as the ability to plan and monitor one's own behaviour (Figure 3). Second, together with the stakeholders we further divided 'use' in 'uptake' (which is immediate use), 'adherence' (which is keep on using without close supervision, and we defined as using less than 12 months after the end of the project's implementation period) and 'longer-term use' (which we defined as using at least 12 months after the end of the project's implementation period). Based on stakeholder input and feedback of the peer reviewers we purposely did not use the word 'sustainability', since in practice it is difficult to define when a certain behaviour is sustainable. Instead, 'longer-term use' was introduced as an outcome in the ToC (Figure 3). Third, since the final long-term outcomes are mortality and morbidity, incidence of pathogens as a long-term outcome were removed as separate outcomes by our stakeholders (Figure 3). Fourth, consultation with our stakeholders resulted in a strict distinction between 'outputs' and 'outcomes'. As a consequence, 'reach' is now listed as a programme output, together with other process evaluation factors. Process evaluation factors are measures of programme implementation or programme outputs. In addition to reach, examples of important process evaluation factors are recruitment, attrition, dose, fidelity, adaptation, engagement, satisfaction and acceptability (based on Ch-IMP and SURE framework) (Figure 3) (The SURE Collaboration 2011; Cargo et al. 2015). 'Adaptation' for example is the extent to which the content of the programme intentionally has been changed, to meet the local needs or circumstances; 'dose' refers to the content, frequency, duration and coverage of the programme, which can be 'number of leaflets', 'number of visits' etc. The other process evaluation factors are described in detail elsewhere (Cargo et al. 2015).

### **Factors influencing the different steps in the ToC**

*In the draft ToC*, an attempt was made to formulate positive and negative moderators for each different step represented in the scheme (Figure 2). We distinguished two groups of relevant factors: (1) contextual factors, and (2) factors influencing the implementation of the promotional approaches. Contextual factors were grouped according to socio-cultural context (e.g. socio-economic status, religion, etc.), physical context (e.g. rural vs urban context) or personal context (e.g. gender, race, etc.) (Figure 2). Factors such as socio-economic status, occupation and education are known to be highly associated with adherence to water, sanitation and hygiene programmes (DFID 2013). An overall box with contextual factors that were able to influence all steps in the ToC was proposed, based on contextual factors provided in the RANAS model and IBM-WASH model (Mosler 2012; Dreibelbis et al.

2013), and equity factors provided in the PROGRESS framework (Figure 2) (O'Neill et al. 2014). For the factors influencing implementation we identified factors that could lead to the behavioural factors (=short-term outcomes) from the RANAS model (Mosler 2012), and programme-related factors from the Ch-IMP (Cargo et al. 2015) and SURE checklist (The SURE Collaboration 2011). All these factors influence the link between the implementation of the programme and the short-term outcomes.

*Following stakeholder consultation*, we (1) completed and clarified the list of contextual factors, (2) added a box of recipient- and implementer-related factors directly influencing the short-term outcomes (factors influencing implementation), and (3) a box of programme-related factors (second group of factors influencing implementation). During the first stakeholder workshop, one working group specifically focused on the contextual factors. They completed and clarified the existing list to a more comprehensive list (Figure 3), still subdivided in the three categories of socio-cultural, physical and personal contextual factors. Our stakeholders confirmed that factors such as 'gender' are very relevant in terms of WASH and behaviour change. The following contextual factors were added: 'dignity/respect', 'minorities', and 'cast'. The demographic variables were grouped and named as such, and the factor 'natural and built environment' was explained in more detail. The factor 'political stability' was removed, since there was overlap with 'law/regulation' and 'socioeconomic status/authority'. The contextual factors were separated out in two boxes, the recipient- and the implementer-related contextual factors, since from our stakeholders and from the evidence identified in the systematic review we learned that the profile of the implementer plays a major role when it comes to implementing behaviour change approaches. A second group of stakeholders worked more in detail on factors directly influencing the short-term outcomes, and thus influencing implementation. They concluded that it seemed not useful to define moderators for each behavioural factor separately, since some moderators affect several behavioural factors and the proposed negative moderators were often formulated as the opposite of the positive moderators resulting in redundant information. In this way, they resulted in a box with 'recipient-related factors' and a box with 'implementer-related factors' (Figure 3), containing for example 'awareness about costs and benefits'. A third group of stakeholders specifically discussed factors that directly influence programme implementation. They separated out the actual programme outputs ('process evaluation factors'), and the 'programme environment factors', that are able to influence programme outputs, as well as the short-term outcomes. This resulted in a list of 'programme environment factors', such as 'partnership and coordination between providers of the same or other health interventions' (Figure 3).

### **Further improvements based on stakeholder consultation**

As a general remark, the stakeholders also noticed that it is relevant to them to know which elements of the ToC are based on evidence and which not. Therefore we indicated on the ToC for which elements evidence was lacking, and also which new influencing factors were identified from the evidence, using a specific layout (De Buck et al. 2017).

## **Discussion**

A ToC is an approach to map programmes aimed at inducing change in a specific context, and is increasingly being used in the context of international development. A ToC makes the different assumptions explicit of how different parts of the chain result in progression to the next stage, with the aim of strengthening programmes by increasing their impact.

In this paper, we report on the development of a ToC that is relevant for practice by involving stakeholders. The ToC describes how handwashing and sanitation promotional approaches lead to behaviour change and health outcomes, and what factors affect the success or failure of the promotional programmes.

### ***Added value of involving stakeholders***

In the development of our ToC we worked with stakeholders in order to ensure a ToC that is relevant for practice, which is currently not well described in existing literature. First, definitions were set according to what is relevant in practice (e.g. use of 'longer term' instead of 'sustainable'). The definition of 'promotional approach' contains elements that seem to be relevant in the field, such as the use of hygiene promoters or village health workers. Refining definitions was helpful to refine the intervention(s) and outcomes boxes of our ToC. Second, in order to improve the outcome boxes, a clear distinction between programme outputs and short-term, intermediate and longer term outcomes was made, which is important for practice since based on this scheme it is clear how promotional approaches intend to have impact over time. Third, the group of contextual factors and factors influencing implementation was refined by grouping factors in six different boxes, each influencing a different level in the chain. In addition, contextual factors that seem to be relevant for practice were added to the ones already identified from theory.

### ***Strengths of our approach and ToCs in general***

One of the strengths of our approach is that we worked with a multidisciplinary panel of stakeholders to develop our ToC. Discussion with the different stakeholders resulted in a comprehensive version of the ToC, which is relevant for practice. In addition, the development of a ToC helped to engage with our stakeholders in the broader project (conducting a systematic review). Their involvement in the ToC development created a sense of ownership and stakeholder buy-in, which is important from the point of view of promoting our (future) findings among their network. This approach has been used in other domains as well, for example for the development of a mental health care plan (Breuer et al. 2014; Hailemariam et al. 2015), in interagency planning in child mental health (Hernandez and Hodges 2006), in community nutrition education (Medeiros et al. 2005), and for conducting a systematic review on lay health worker programmes and maternal and child health (Glenton et al. 2013). The roots of stakeholder analysis lay in political and policy science and in management theory (Brugha and Varvasovszky 2000), however stakeholder engagement is extremely relevant in health research (Israel et al. 1998; Cargo and Mercer 2008) and the development of community-oriented global health initiatives (Schiller et al. 2013; Pandi-Perumal et al. 2015).

Other advantages of the use of ToC in general include priority setting for allocating resources, combining conclusions from previous research with new assumptions, and programme design with a greater awareness of the context (Vogel 2012). In addition to using the ToC to inform systematic reviews, ToCs are also being used to guide the development and evaluation of public health interventions. In a recent systematic review, 62 papers describing a theory-based approach for public health interventions have been identified. Of these, 29 % used a ToC to develop the intervention, while 79 % used the ToC in order to evaluate the intervention (Breuer et al. 2016). In a review of home-visiting programmes to prevent child maltreatment, it was shown that a match between a ToC and the programme components and target population was predictive for programme success (Segal et al. 2012).

### ***Limitations of our approach and ToCs in general***

A limitation of our approach was that not all our stakeholders had knowledge about theory-based approaches and systematic review methodology. To address this, a short training session was incorporated in our face-to-face meeting with stakeholders, however the training could not be comprehensive due to time limitations. In addition, knowledge about existing theories of behaviour change was not present with all our stakeholders, which made it difficult to distinguish between behavioural factors, actual behaviour and factors influencing/leading to the behavioural factors. Since a ToC is a living framework, it will be necessary to further validate it in the future, based on further revision by behaviour change theoretical experts and evaluation of its clarity by different stakeholders. A second

limitation was that the development practitioners in our Advisory Group had similar backgrounds. We found that it was very difficult to convince people outside our network to be part of our project, and as a consequence of being a Red Cross National Society, the majority of the practitioner stakeholders in the Advisory Group were part of the Red Cross network. However, we managed to gather stakeholders from the major international NGO's involved in WASH to participate in the second stakeholders meeting in Geneva and overall we had a good geographic representation. In addition, it was difficult to recruit people that were able to participate in a theoretical exercise, and having field experience at the same time. Stakeholder identification is known to be a challenging task since systematic and practical techniques are not well-described in the literature. Known methods of stakeholder identification are focus groups, semi-structured interviews and snowball sampling, but these methods do not ensure systematic identification (Schiller et al. 2013). Schiller et al. developed a framework for identifying and categorizing health stakeholders (Schiller et al. 2013). A plan for communicating with stakeholders and techniques for encouraging their participation has been proposed as well (Pandi-Perumal et al. 2015). A third limitation of our approach is that we used an existing theory of WASH behaviour change, the RANAS model, as a basis (however, in a slightly modified way, by for example replacing 'Risks' with 'Knowledge' in the framework). The behavioural factors included in our ToC were taken from the existing model and were not put into question because of time limitations. However, the RANAS model was selected from a systematic review of different WASH behaviour change models. It is a model that includes all WASH aspects, and has already been used in practice to promote WASH behaviour, which led us to use this model as the basis for our ToC.

Limitations of ToC use in general include that it is a time-intensive process and it holds the risk of oversimplifying complex relationships. In addition, since real effects of programmes could differ from the intended effects, it is important to take into account the real-life situation (Weiss 1995; Anderson 2005; Vogel 2012), as well as more evidence as this becomes available, especially on topics for which evidence is limited (e.g. the elements of psychosocial theories in our example, for which less studies were identified than for other promotional approaches). A possible solution for this time-intensive process is starting from an existing framework, for which the underlying theory is relevant to your specific case. Our ToC for example could serve as a basis for other promotional contexts, outside the WASH domain, with additional input from existing sources of information and/or theoretical models.

### ***Implications for practice and future research***

In a paper by Kneale et al. (2015) it is described that ToCs or logic models are often only used to depict a programme theory, and not as a tool to communicate review findings. In their paper, they introduce some elements of good practice concerning the use of a theory-based approach when developing a systematic review. For our specific ToC, from discussion with our stakeholders we learned that it could be relevant for practice in different ways: (1) it could be used as a guide when developing WASH programmes in order to improve impact of programmes and interventions, (2) it could be used to explain observations in current programmes, (3) it could be used to interpret research and the systematic review we conducted. The ToC we developed can serve as a framework for policy-makers, implementing organizations and anybody who is involved in the decision-making or development of programmes aimed at sustainable handwashing and sanitation.

In addition, the ToC can serve as a framework to inform future research, including primary studies, systematic reviews and practice guidelines. In the context of our specific case, the ToC was found to be very useful to further focus the systematic review we conducted: it helped us to determine the scope of our review questions and to further specify the selection criteria, helped us with data extraction, data synthesis (e.g. subgroup analyses based on influencing factors in the ToC), and interpretation of the results, and to generate a policy relevant review. The Campbell Collaboration, a non-profit organization promoting evidence-based policy in social sciences, states that when involving end-user stakeholders during the whole process of systematic review development, the final review is more relevant and more often used in decision-making. The literature about systematic review methodology also states



that using a ToC could be very useful to capture complexity in systematic reviews (Anderson et al. 2011; Baxter et al. 2014). Since ToC development is an iterative process, we suggest future research to further refine the ToC. First, it would be interesting to further explore if other behaviour change models could further improve/supplement the ToC. Second, we call for more primary research on WASH promotional approaches, which should result in an update of the current systematic review and then should feed back to the ToC. Third, since the current ToC is the result of the specific stakeholders group we worked with, we call for additional input from experts in behaviour change theory, as well as programme developers and practitioners, and for testing the ToC in practice and in other primary studies.

## Conclusion

In conclusion, the development of a ToC, and the involvement of stakeholders in its development, was critical in terms of understanding the context in which the promotional programmes are being implemented. We recommend ToC developers to work with stakeholders to create a ToC relevant for practice. Involving stakeholders in the development of the ToC also creates buy-in of the stakeholders in the topic or question of interest. In addition to informing systematic reviews, we believe that the ToC we created has broader relevance for other research and policy initiatives, such as in the design of primary research studies, and development of practice guidelines and WASH programmes.

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## References

- Anderson A. 2005. The community builder's approach to theory of change: a practical guide to theory development. New York (NY): Aspen Institute Roundtable on Community Change.

- Anderson LM, Petticrew M, Rehfuess E, Armstrong R, Ueffing E, Baker P, Francis D, Tugwell P. 2011. Using logic models to capture complexity in systematic reviews. *Res Syn Methods*. 2:33–42.
- Aunger R, Curtis VA. 2015. A guide to behaviour centred design. Hygiene centre, London school of hygiene and tropical medicine. London: London School of Hygiene and Tropical Medicine.
- Baxter SK, Blank L, Woods HB, Payne N, Rimmer M, Goyder E. 2014. Using logic model methods in systematic review synthesis: describing complex pathways in referral management interventions. *BMC Med Res Methodol*. 14:878.
- Breuer E, De Silva MJ, Fekadu A, Luitel NP, Murhar V, Nakku J, Petersen I, Lund C. 2014. Using workshops to develop theories of change in five low and middle income countries: lessons from the programme for improving mental health care (PRIME). *Int J Mental Health Syst*. 8:15.
- Breuer E, Lee L, De SM, Lund C. 2016. Using theory of change to design and evaluate public health interventions: a systematic review. *Implement Sci*. 11:1–17.
- Brugha R, Varvasovszky Z. 2000. Stakeholder analysis: a review. *Health Policy Plann*. 15:239–246.
- Cairncross S, Hunt C, Boisson S, Bostoen K, Curtis V, Fung IC, Schmidt WP. 2010. Water, sanitation and hygiene for the prevention of diarrhoea. *Int J Epidemiol*. 39 Suppl 1:i193–i205.
- Cargo M, Mercer SL. 2008. The value and challenges of participatory research: strengthening its practice. *Annu Rev Public Health*. 29:75–428.
- Cargo M, Stankov I, Thomas J, Saini M, Rogers P, Mayo-Wilson E, Hannes K. 2015. Development, inter-rater reliability and feasibility of a checklist to assess implementation (Ch-IMP) in systematic reviews: the case of provider-based prevention and treatment programs targeting children and youth. *BMC Med Res Methodol*. 15:628.
- Clasen TF, Alexander KT, Sinclair D, Boisson S, Pelet R, Chang HH, Majorin F, Cairncross S. 2015. Interventions to improve water quality for preventing diarrhoea. *Cochrane Database Syst Rev*:CD004794.
- Clasen TF, Bostoen K, Schmidt WP, Boisson S, Fung IC, Jenkins MW, Scott B, Sugden S, Cairncross S. 2010. Interventions to improve disposal of human excreta for preventing diarrhoea. *Cochrane Database Syst Rev*:CD007180.
- Dangour AD, Watson L, Cumming O, Boisson S, Che Y, Velleman Y, Cavill S, Allen E, Uauy R. 2013. Interventions to improve water quality and supply, sanitation and hygiene practices, and their effects on the nutritional status of children. *Cochrane Database Syst Rev*. 8:CD009382.
- De Buck E, Hannes K, Van Remoortel H, Govender T, Naidoo S, Avau B, Vande Veegaete A, Musekiwa A, Lutje V. 2017. Approaches to promote handwashing and sanitation behaviour change in low- and middle income countries: a mixed method systematic review. *Campbell Systematic Reviews*. 7:1–447.
- DFID. 2013. Sanitation and hygiene evidence paper. London: UK Department for International Development (DFID).
- Dreibelbis R, Winch PJ, Leontsini E, Hulland KR, Ram PK, Unicom L, Luby SP. 2013. The Integrated Behavioural Model for Water, Sanitation, and Hygiene: a systematic review of behavioural models and a framework for designing and evaluating behaviour change interventions in infrastructure-restricted settings. *BMC Public Health*. 13:1015.
- Ejemot-Nwadiaro RI, Ehiri JE, Arikpo D, Meremikwu MM, Critchley JA. 2015. Hand washing promotion for preventing diarrhoea. *Cochrane Database Syst Rev*:CD004265.
- Evans WD, Pattanayak SK, Young S, Buszin J, Rai S, Bihm JW. 2014. Social marketing of water and sanitation products: a systematic review of peer-reviewed literature. *Social Sci Med*. 110:18–25.
- Fewtrell L, Kaufmann RB, Kay D, Enanoria W, Haller L, Colford JM Jr. 2005. Water, sanitation, and hygiene interventions to reduce diarrhoea in less developed countries: a systematic review and meta-analysis. *Lancet Infectious Dis*. 5:42–52.
- Glenton C, Colvin CJ, Carlsen B, Swartz A, Lewin S, Noyes J, Rashidian A. 2013. Barriers and facilitators to the implementation of lay health worker programmes to improve access to maternal and child health: qualitative evidence synthesis. *Cochrane Database Syst Rev*. 10:CD010414.
- Hailemariam M, Fekadu A, Selamu M, Alem A, Medhin G, Giorgis TW, DeSilva M, Breuer E. 2015. Developing a mental health care plan in a low resource setting: the theory of change approach. *BMC Health Serv Res*. 15:1–11.
- Hernandez M, Hodges S. 2006. Applying a theory of change approach to interagency planning in child mental health. *Am J Community Psychol*. 38:165–173.
- Hulland K, Marin N, Dreibelbis R, DeBruicker Valliant J, Winch P. 2015. What factors affect sustained adoption of safe water, hygiene and sanitation technologies? London. EPPI-Centre, Social Science Research Unit, UCL Institute of Education, University College London.
- Israel BA, Schulz AJ, Parker EA, Becker AB. 1998. Review of community-based research: assessing partnership approaches to improve public health. *Annu Rev Public Health*. 19:1–537.
- Joshi A, Amadi C. 2013. Impact of water, sanitation, and hygiene interventions on improving health outcomes among school children. *J Environ Public Health*. 2013:1–10.
- Kneale D, Thomas J, Harris K. 2015. Developing and optimising the use of logic models in systematic reviews: exploring practice and good practice in the use of programme theory in reviews. *PLoS One*. 10:e0142187.
- Lewin S, Munabi-Babigumira S, Glenton C, Daniels K, Bosch-Capblanch X, van Wyk BE, Odgaard-Jensen J, Johansen M, Aja GN, Zwarenstein M, et al. 2010. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. *Cochrane Database Syst Rev*:CD004015.
- Mah MW, Tam YC, Deshpande S. 2008. Social marketing analysis of 2 years of hand hygiene promotion. *Infect Control Hosp Epidemiol*. 29:262–270.

- Medeiros LC, Butkus SN, Chipman H, Cox RH, Jones L, Little D. 2005. A logic model framework for community nutrition education. *J Nutr Educ Behav.* 37:197–202.
- Mosler HJ. 2012. A systematic approach to behavior change interventions for the water and sanitation sector in developing countries: a conceptual model, a review, and a guideline. *Int J Environ Health Res.* 22:431–449.
- O'Neill J, Tabish H, Welch V, Petticrew M, Pottie K, Clarke M, Evans T, Pardo Pardo J, Waters E, White H, et al. 2014. Applying an equity lens to interventions: using PROGRESS ensures consideration of socially stratifying factors to illuminate inequities in health. *J Clin Epidemiol.* 67:56–64.
- Pandi-Perumal SR, Akhter S, Zizi F, Jean-Louis G, Ramasubramanian C, Edward Freeman R, Narasimhan M. 2015. Project stakeholder management in the clinical research environment: how to do it right. *Front Psychiatry.* 6:1–18.
- Peal A, Evans B, van der Voorden C. 2010. Hygiene and sanitation software. An overview of approaches. Geneva: Water Supply & Sanitation Collaborative Council.
- Peletz R, Mahin T, Elliott M, Harris MS, Chan KS, Cohen MS, Bartram JK, Clasen TF. 2013. Water, sanitation, and hygiene interventions to improve health among people living with HIV/AIDS. *AIDS.* 27:2593–2601.
- Prüss-Üstün A, Bos R, Gore F, Bartram J. 2008. Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health. x. Geneva: World Health Organization.
- Rosenstock IM. 1974. Historical origins of the health belief model. *Health Educ Monographs.* 15:175–183.
- Schiller C, Winters M, Hanson HM, Ashe MC. 2013. A framework for stakeholder identification in concept mapping and health research: a novel process and its application to older adult mobility and the built environment. *BMC Public Health.* 13:1–9.
- Segal L, Sara OR, Dalziel K. 2012. Theory! The missing link in understanding the performance of neonate/infant home-visiting programs to prevent child maltreatment: a systematic review. *Milbank Q.* 90:47–106.
- Stocks ME, Ogden S, Haddad D, Addiss DG, McGuire C, Freeman MC. 2014. Effect of water, sanitation, and hygiene on the prevention of trachoma: a systematic review and meta-analysis. *PLoS Med.* 11:e1001605.
- Strunz EC, Addiss DG, Stocks ME, Ogden S, Utzinger J, Freeman MC. 2014. Water, sanitation, hygiene, and soil-transmitted helminth infection: a systematic review and meta-analysis. *PLoS Med.* 11:e1001620.
- Taylor DL, Kahawita TM, Cairncross S, Ensink JH. 2015. The impact of water, sanitation and hygiene interventions to control cholera: a systematic review. *PLoS One.* 10:e0135676.
- The SURE Collaboration. 2011. SURE guides for preparing and using evidence-based policy briefs. Checklist for identifying factors affecting the implementation of a policy option. Geneva: The SURE Collaboration.
- UNICEF and WHO. 2015. Progress on sanitation and drinking water. Update and MDG assessment. 2015. United States of America. Emerson, Wajdowicz Studies NYC.
- United Nations. 2015. The millennium development goals report. New York (NY): United Nations.
- Vogel I. 2012. Review of the use of 'Theory of Change' in international development. London: Department for International Development (DFID).
- Waddington H, Snilstveit B, White H, Fewtrell L. 2009. Water, sanitation and hygiene interventions to combat childhood diarrhoea in developing countries. New Delhi, International Initiative for Impact Evaluation (3ie).
- Weiss C. 1995. Nothing As Practical As Good Theory: Exploring Theory-Based Evaluation for Comprehensive Community Initiatives for Children and Families. In: Connell J, Kubish A, Schorr L, Weiss C, editors. *New Approaches to Evaluating Community Initiatives.* Washington: Aspen Institute; p. 65–92.