An Analysis of Failure: examining why implementation of maternal and child health priority interventions fail and the potential for implementation science and research to help

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Approved by:
First Reader
Second Reader
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<tbody>
<tr>
<td>ANC</td>
<td>Antenatal Care</td>
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<tr>
<td>BemONC</td>
<td>Basic Emergency Obstetric and Newborn Care</td>
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<td>CemONC</td>
<td>Comprehensive Emergency Obstetric and Newborn Care</td>
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<td>CHNRI</td>
<td>Child Health and Nutrition Initiative</td>
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<td>CHW</td>
<td>Community Health Worker</td>
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<td>CPG</td>
<td>Clinical Practice Guidelines</td>
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<td>DHS</td>
<td>Demographic Health Survey</td>
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<td>GAPPS</td>
<td>Global Alliance to Prevent Prematurity and Stillbirth</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>IMCI</td>
<td>Integrated Management of Childhood Illness</td>
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<td>IPC</td>
<td>Intrapartum Care</td>
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<td>IPT</td>
<td>Intermittent Presumptive Treatment</td>
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<td>IPH</td>
<td>Intrapartum Hemorrhage</td>
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<td>IR</td>
<td>Implementation Research</td>
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<td>IS</td>
<td>Implementation Science</td>
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<tr>
<td>ITN</td>
<td>Insecticide-Treated Net</td>
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<td>MCH</td>
<td>Maternal and Child Health</td>
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<td>MDG</td>
<td>Millennium Development Goal</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
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<td>MMR</td>
<td>Maternal Mortality Ratio</td>
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<td>MNCH</td>
<td>Maternal, Newborn, and Child Health</td>
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<td>MOH</td>
<td>Ministry of Health</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>NIH</td>
<td>National Institutes of Health (USA)</td>
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<td>NMR</td>
<td>Neonatal Mortality Rate</td>
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<tr>
<td>ORS</td>
<td>Oral Rehydration Solution</td>
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<tr>
<td>ORT</td>
<td>Oral Rehydration Therapy</td>
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<tr>
<td>PCPNC</td>
<td>Pregnancy Childbirth Postpartum and Newborn Care</td>
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<tr>
<td>PNC</td>
<td>Postnatal Care</td>
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<tr>
<td>PPH</td>
<td>Postpartum Hemorrhage</td>
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<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
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<tr>
<td>SNL</td>
<td>Saving Newborn Lives</td>
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<tr>
<td>SP</td>
<td>Sulfadoxine-Pyramethamine</td>
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<tr>
<td>SSA</td>
<td>Sub-Saharan Afica</td>
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<tr>
<td>STI</td>
<td>Sexually Transmitted Infection</td>
</tr>
<tr>
<td>TBA</td>
<td>Traditional Birth Attendant</td>
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<tr>
<td>TDR</td>
<td>Special Programme for Research and Training in Tropical Diseases</td>
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<tr>
<td>UNFPA</td>
<td>United Nations Population Fund</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>WHO</td>
<td>World Health Organization</td>
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ACKNOWLEDGEMENTS

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RESEARCH AIMS

This paper recognizes the sense of urgency, the opportunities and challenges that implementation science and research have in supporting the adoption and scale-up of new innovative tools, strategies, and interventions to tackle maternal, newborn, and child health mortality and morbidity due to preventable and treatable conditions. This paper aims to:

- Explore current literature on implementation science and research within the field of global maternal, newborn and child health and identify challenges to understanding its role in progressing towards MDGs 4&5

- Examine case studies of priority maternal, newborn and child health interventions that failed to reach impact using IR/IS frameworks

- Contribute to a more general focus on implementation science and research in MNCH
Introduction & Background

It is widely perceived that progress in maternal and child mortality has remained slow \(^1,2\). In two years’ time the global health community and country governments will be held accountable for achieving the Millennium Development Goals (MDGs), yet multiple studies \(^1,3-5\) have shown that this is unlikely despite the availability of inexpensive and efficacious interventions \(^6\). According to the *Countdown to 2015: Maternal, Newborn, and Child Survival*, only 9 of the 75 Countdown countries are on track to achieve MDG 5, and 22 of the 75 for MDG 4 \(^7\). Persistent and wide disparities exist in the coverage of essential maternal and child health interventions amongst and within countries \(^5,8\). Mothers and children, in particular, remain some of the most marginalized groups in society. Progress must be accelerated in countries where reductions in the maternal and child mortality rates have flattened due to poor program implementation \(^1\). The implementation and delivery of priority interventions to women and children when and where they need them must be of prime importance in all countries, but particularly so in those countries which fail to make progress \(^1\).

Efforts have been made in the past three decades to improve the quality of clinical and operational guidelines, as well as, the overall implementation, dissemination, and service delivery of maternal and child health services \(^9-13\). As supported in two recent articles \(^4,14\), measuring the status of MDGs 4 and 5, the acceleration of progress in maternal and child mortality has received renewed political and donor commitment to continue the efforts to bring further attention to this time sensitive

<table>
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<tr>
<th>Global Maternal Health</th>
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<tr>
<td><strong>Millennium Development Goals Indicators:</strong></td>
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<tr>
<td>MDG 5A: Reduce by three quarters the maternal mortality ratio</td>
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<tr>
<td>Maternal Mortality Ratio (maternal deaths per 100,000 live births): 40</td>
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<tr>
<th>Top 5 Direct Causes of Maternal Mortality</th>
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<tr>
<td>1. Post/ante-partum hemorrhage / retained uterus (%)</td>
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<td>2. Sepsis (%)</td>
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<td>3. Complications of unsafe abortion (%)</td>
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<td>4. Eclampsia (%)</td>
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<td>5. Obstructed or prolonged labor (%)</td>
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issue. Additionally, the coverage of interventions delivered in the community (on scheduled occasions) was found, by Bhutta and colleagues\textsuperscript{5}, to be higher than for interventions relying on functional health systems. Sadly, these renewed efforts have met failure rather than substantive progress towards achieving MDGs 4 and 5. The evidence details why these efforts have stalled as well as what additional work must be done to reach these goals\textsuperscript{3,6,15-22}. Experts know that effective interventions to reduce maternal and child mortality exist (Appendix A); however, as noted by Campbell and Graham in the Lancet, “knowing what works”, often times is mediated by a number of country contexts and determinants in health, and therefore, complicates reaching the targeted outcome\textsuperscript{3,15,23}. Furthermore, Penn-Kekana and colleagues\textsuperscript{3}, argued that “context matters” even when countries are equipped with effective interventions. Additionally, the team emphasized that the failure to render strategies effective and deliverable to their intended populations can also be attributed to the lack of technical guidance and support in implementation\textsuperscript{3}.

It is grossly obscene that women and children continue to die despite ground-breaking innovations and improvements in modern medicine. It is undeniable that there have been substantial advances in the capabilities of care-providers to prevent, treat, and address their basic needs. Additionally, it is apparent that reducing maternal and child mortality at country level is possible, as demonstrated by countries such as Sri Lanka, Egypt, Cuba, China, Thailand, and Malaysia\textsuperscript{24}. Yet

<table>
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<th>Global Child health</th>
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<tr>
<td><strong>Millennium Development Goals Indicators:</strong></td>
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<tr>
<td>MDG 4A: Reduce by two thirds the under-five mortality rate</td>
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<tr>
<td><strong>Under-five child mortality Rate</strong> (deaths per 1,000 live births)</td>
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<tr>
<td><strong>Top 5 Direct Causes of Under-five Mortality</strong></td>
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<tr>
<td>1. Pneumonia (%)</td>
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<tr>
<td>2. Preterm birth complications (%)</td>
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<tr>
<td>3. Diarrhea (%)</td>
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<tr>
<td>4. Malaria (%)</td>
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<tr>
<td>5. Intrapartum complications (%)</td>
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*Source: UNICEF 2012*
contrary to these improvements, maternal* and child under-five deaths†, regularly and frequently, occur at staggering rates despite targeted efforts in reduction strategies. Ironically, clinicians, researchers, and policy makers have yet to conclusively identify optimal strategies for implementing best practices. Furthermore, it has been well documented in multiple disciplines that significant gaps exist between what is known as effective practice (i.e., theory and science) and what is actually done, (i.e., policy and practice).

It has long been recognized that there is an urgent need for accurate reporting, monitoring, and evaluation strategies on evidenced-based MNCH interventions; both to advocate for resources and policy attention, as well as to track progress. In the field of global health a growing number of researchers are looking to the methods of implementation science and research to help bridge some of the perpetual gaps consistently seen in scaling up ‘contemporary strategies’ of effective maternal and child health interventions. There are many structural and contextual challenges facing researchers interested in using implementation science and research to improve program delivery. Effective methodologies can be developed and appropriately structured to evaluate and address the complex social interactions present in these interventions and successful change can be achieved. As there are numerous frameworks and contexts within the discipline of IS and IR, this paper will explore the varying definitions and strategies of its use, as well as, demonstrate how three different IS/IR frameworks could frame the scope of failed interventions. The evidence supports that rigorous and thorough process and impact evaluations are essential to improving program implementation. As such, IS and IR have the potential to further contribute to a more comprehensive evaluation tool. Hence, this paper will demonstrate, how consensus on fundamental elements of a more general IS framework could

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* Sub-Saharan Africa (50%) and South Asia (30%)
† Concentrated in sub-Saharan Africa and South Asia at an estimated 82% (UNICEF, 2012)
evoke a less disjointed approach to implementing ‘best-practices’ in global; therefore, decreasing why many MNCH programs fail.

**Setting the context, Implementation Science (IS) & Implementation Research (IR):**

Both terms of ‘implementation science’ and ‘implementation research’ are regularly and inter-changeably used throughout the literature. There are subtle differences between the two definitions and, as a result of this, the common intersections between the two create a continuum of overlap. For the purposes of this paper, it is essential to define the context for which these terms are used. Therefore, I define ‘implementation science’ as the culmination and/or results of ‘implementation research’. Implementation science, as defined by the National Institutes of Science (NIH), “is the study of methods to promote the integration of research findings and evidence into healthcare policy and practice.” The sub-division of Tropical Disease Research (TDR) at the WHO defines implementation research as “providing evidence on the best ways to support the adoption of, and optimize use of innovations.” Implementation research holds great promise for scaling-up quality and essential maternal and child health services. Furthermore, IR questions must be purposeful and clear on ‘what’ is being studied, ‘why’ it is being studied, and ‘how’ it will be studied. Additionally, IR provides the ability for researchers to test diverse implementation pathways and to identify ‘what works’ within real country settings.

**Defining our intervention & outcomes**

Implementation does not happen all at once; it is more of a recursive process focusing on the ecological progression and successes of the desired outcomes. Understanding the desired outcomes when conducting implementation research is important because it helps to distinguish between the clinical outcomes vs. the patient outcomes. There is discourse within the field of IS
for what constitutes an ‘outcome’ versus a ‘process output’. Yet, there is a difference between establishing clinical effectiveness, i.e. ‘is one pill vs. two pills more effective?’, and implementation effectiveness, ‘how do you get people to effectively and consistently deliver new drug therapy to patients?’ 36. However, this concept can become indistinct as field researchers and implementers utilize terms, such as ‘intervention’ and ‘implementation strategy’ to address the same thing. There is a large body of literature from the Cochrane Collaborative filled with systematic reviews on interventions to change provider behavior. However, opinion leaders and multidisciplinary teams could also be included as implementation strategies to encourage the uptake of evidence-based practices and these also could be deemed, ‘interventions’. Definitively, it is not the question of ‘what is right?’ versus ‘what is wrong?’, but more of a question concerning ‘what is the context?’ In light of context, a distinction arises, for example, that of a randomized control trial, for which the word ‘intervention’ is often used to refer to the very same thing that, outside of a randomized control trial, would be referred to as an ‘implementation strategy’. The tendency to use this latter term is because the intervention concerns the people who are engaged in program delivery or service delivery. Confusions can arise, and questions such as, ‘are cellular technology applications for family planning an intervention; or is it a dissemination strategy?’ continue to fuel IS/IR rhetoric. Much of this is dependent on the purpose of the study. Dissemination, interventions, and implementation/implementation strategies can differ, and it is essential to distinguish the context and purpose for which these terms are used.

Within the field of IS, some researchers focus on the importance of implementation outcomes, i.e. replicating successful processes of diffusion and dissemination, yet little is written about ‘how’ to demonstrate that an intervention was actually effective 37. Other forms of
program evaluation give much attention to the inputs and outputs of the implementation process; however, less on the impact outcomes. Interventions take time, and despite proper execution of a clinical practice, providers may not see the benefit to implementing them if the implementation of a new practice or innovation requires additional manpower and time with little to no added benefit.

**Implementation science frameworks:**

Implementation science frameworks aim to help researchers and program managers identify the steps needed to set a research question and then to work through the steps of research design\(^{34}\). As such, IS frameworks should provide a conceptual guide for utilizing effective implementation practices; therefore, there must be a clear differentiation between stages of implementation, 1) as it begins at baseline; 2) as it evolves throughout the process of implementation; and 3) as practices transition and change once a program or intervention is well established. Such frameworks are essential when considering the issues that a research agenda needs to address, and are urgently needed for addressing maternal and child mortality reduction strategies. Given the diversity in the field of global health research, inevitably, there is no one idea or universally accepted framework that fills all IS purposes\(^\text{38}\). Additionally, within the field of maternal and child health, there are few IS frameworks for which researchers and implementers can use to help bridge reoccurring gaps in service delivery.

As is the current mode of research, taking the ‘vitals’ of program implementation is essential; however, the results are diverse and contextually linked to the program’s host country; therefore a number of IS frameworks have arisen in effort to best frame ‘how’ to conceptually frame ‘what’ must take place for the translation of research to practice\(^\text{26,31,37,39-42}\). A comprehensive IS framework consolidating the common constructs found in the broad array of
published IS theories could possibly facilitate more a general consensus among researchers and implementers. Addressing deficiencies in the implementation and transfer of evidenced-based best practices into routine in-country clinical practice is high on the policy agenda; however, the lack of clarity between funding agencies and researchers as to what represents implementation science continues to slow this process. Moreover, the expectations and guidance provided to researchers vary from one agency to another.

**Methods:**

The paper’s methods were shaped around its overall aim, to capture the main programmatic failures using concepts from within current IS and IR frameworks and adapt them to a set of strategic recommendations aimed at maximizing the success of implementing maternal and child health interventions in developing countries. An initial review of the literature revealed several challenges. First, the terms ‘implementation science’ and ‘implementation research’ are described using a number of differing terms, many of which are used interchangeably. During this review, ‘implementation science’, ‘implementation research’, and ‘translational research’ were among the most common terms used, additionally, ‘scaling-up, evidenced-based research to practice’, ‘dissemination’, and ‘knowledge transfer’ were also widely used. Although many of these terms have subtly different meanings, they are, nonetheless, recognized as key terms in implementation science, meaning that this review necessitated a broad range of search terms. Additionally, very few academic articles framing IS/IR concepts within the field of maternal and child health exist, hence the literature search was expanded to include a broader scope of global health contexts.

Three experts in the field of IS/IR were consulted to identify key concepts on what implementation is and how best to frame it. Three literature searches were conducted. The first
search identified key IS/IR concepts and definitions. The second search reviewed recent articles on key initiatives and programs aimed at addressing priority maternal and child mortality reduction interventions but experienced barriers or programmatic failure. The third search identified key IS frameworks used in both domestic and global health implementation efforts. A number of databases were searched, with a particular focus on MEDLINE, PUBMED, and Google Scholar. Key search terms included ‘implementation science’ and ‘maternal and child health’, along with relevant synonyms combined with any of the following: maternal and child mortality reduction, innovations, scale-up, evidenced-based practice, translational research, dissemination strategies, priority maternal, newborn, and child health interventions, H4 countries, and IS/IR framework. Titles and abstracts were examined with particular attention given to backgrounds and methods framing implementation science and research strategies in addressing maternal and child health interventions. Additionally, information from relevant conceptual articles in the development of implementation science frameworks was included. Whereas, the primary focus was on implementation science frameworks in maternal and health, the key words “implementation, dissemination, impact evaluation, retrospective, and scale-up” broadened the scope by identifying studies and position papers that highlighted the ‘gaps’ within the field of IS, as well as further distinguished the complexities within terms used in implementation science. While clearly articulated models and frameworks could form the basis for describing implementation processes in more detail and evaluating interventions more robustly, the “sheer quantity and diversity of the literature makes it difficult for researchers to choose any one model. Because terminology in this field currently reflects widespread inconsistency, leads were followed beyond that of what initial keyword searches “hit” upon.
Thus, additional articles were found and read by authors whose work was found through the initial electronic searches.

In order to manage the challenges outlined above, three distinct approaches and frameworks were used to critically analyze cases of implementation failure. The first framework was adapted from Chen’s “Theory-Driven Evaluation” which captures concepts of successful interventions through a conceptual model designed for evaluating intervention effectiveness. The Theory-Driven Evaluation is comprised of three components: 1) holistic assessment, for which contextual factors and casual mechanisms are taken into consideration 2) program theory, stakeholders’ implicit and explicit assumptions on what actions or strategies are required to solve a problem, and why the problem will respond to the actions, and 3) evaluation strategy, which allows for stakeholders to clarify contextual factors and mechanisms essential for their program success. Chen’s theory proposes six applications of Theory-Driven Evaluation; for the purposes of this paper, the sixth application, ‘integrative validity model and bottom-up evaluation approach’ was used to retrospectively measure the success of the Accelerated Child Survival and Development Program (ACSD). Using the integrative validity model from Chen’s proposed ‘Bottom-up’ approach the ACSD program was analyzed using the six dimensions of integrative validity: 1) practicality; 2) affordability; 3) suitability; 4) evaluable; 5) helpful, to identify programmatic gaps.

The second framework used in evaluating the analysis was adapted from Glasgow and colleagues’ RE-AIM Framework, which was developed to help in evaluating the impact of public health promotion interventions. The RE-AIM framework was used as an evaluation model for measuring the reach and representativeness of both participants and settings in two rural districts in Uganda for which evidenced-based neonatal care practices were being implemented.
Through the *RE-AIM* model, the impact of the evidenced-based neonatal care practices was conceptualized and analyzed as a function of five factors: 1) reach, defined as the ‘individual-level’ measure, i.e. patient or health care provider; 2) efficacy, as in positive and negative consequences and outcomes of the intervention; 3) adoption, referring to the representativeness i.e. worksites, health facilities, and communities that adopt the policy or practice; 4) implementation, the extent to which a program was delivered as intended and 5) maintenance, the long-term maintenance of behavior change.

The third framework was adapted from one of the case studies used in this report. Baker and colleagues’ *Conceptual framework for cross-country comparison of clinical practice guidelines* conceptualized the implementation process of clinical practice guidelines in maternal health from development, to production, to utilization. The framework consists of four components: 1) usability, referring to the user-friendliness of the guideline; 2) applicability (represents the degree to which the guideline can be used and applied by health workers); 3) adaptability (describes the availability of different versions of a guideline and context were in program analysis); and 4) content, (refers to evidence-based material present in the guideline).

## Case Studies

### Case Study #1) The Accelerated Child Survival and Development (ACSD) Program in Central and West Africa

In answer to the September 2000 UN General Assembly, member countries, stakeholders, and advocates committed to: reduce the “under-five child mortality by two thirds (MDG 4) of their current rates” by the year 2015. In direct response to this declaration, the United Nations

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Tedford
Children’s Fund (UNICEF), in collaboration with national governments, implemented and supported the ACSD program‡ in eleven West African countries§ between the years 2001 and 2005 with a goal of reducing child mortality by at least 25% by the end of 2006 ⁸,¹⁴. The ACSD program aimed to accelerate reductions in mortality in children younger than five years by increasing coverage with three packages of interventions that are known to reduce child mortality (FIGURE 1). In four countries, sixteen focus districts worked to deliver all three packages; in remaining countries, ACSD focused on the delivery of vaccines, vitamin A supplements, and insecticide-treated nets (ITNs) for the prevention of malaria. The intervention was designed to reinforce activities in child survival that were already under way rather than to create a new program. There was a strong effort and emphasis placed on strengthening service delivery by health workers in communities.

Within a relatively short time, the ACSD program reported a ‘dramatic impact’ ²¹ on child survival from their integrated approach at implementing “low-cost key effective

| Figure 1: Accelerated Child Survival and Development Program Intervention Package(s) |
|---------------------------------|---------------------------------|---------------------------------|
| Immunization plus (EPI+) | Antenatal Care (ANC+) | Improved management of pneumonia, malaria, and diarrhea |
| Routine immunization and periodic measles catch-up and mop-up | Intermittent preventive treatment of malaria with sulfadoxine-pyrimethamine for pregnant | Promotion of exclusive breastfeeding up to six months, timely complementary feeding |
| Vitamin A supplementation to children twice yearly | Tetanus immunizations during pregnancy to prevent maternal and neonatal tetanus | Improved and integrated management (at the health facility, community, and family levels) of children with pneumonia†, malaria, and diarrhea |
| Distribution and promotion of insecticide-treated nets for children and pregnant women, and re-dipping of bed nets every 6 months | Supplementation with iron and folic acid during pregnancy and with vitamin A postpartum | Promotion of household consumption of iodized salt |

‡ Program cost, US $27 million, for which half was provided by the Canadian International Development Agency
§ Mali*, Benin*, Ghana*, Senegal*, Burkina Faso, Cameroon †, Chad, Gambia †, Guinea Bissau †, Guinea Conakry †, and Niger †
* countries that implemented immunization (+) & vector control activities with attempted full ACSD package scale-up
† countries that implemented limited intervention packages
interventions” 21. On the basis of “modeling and estimation” 8, the ACSD program suggested that between the years 2002 and 2004, increased coverage on selected high-impact interventions in focus districts in Senegal, Mali, Benin and Ghana with populations totaling to three million, reduced the under-five mortality rate by 20%, in contrast to comparison areas 21.

Real-world/real-time evaluations in maternal newborn and child health are needed. Successes and failures must be monitored and charted to identify the gaps in implementation 48. Additionally, donors, countries, and implementers must be able to attribute priority MNCH interventions to successful programs. As a result of these needs, as well as, the ACSD program’s suggested success, UNICEF contracted a team of researchers ** to undertake a retrospective evaluation, to link intervention strategies to program success and to further validate the final results of the program 8. In Bryce colleague’s evaluation of the ACSD program, The Accelerated Child Survival and Development programme in west Africa: a retrospective evaluation, they concluded that the ACSD project did not accelerate child survival to the extent for which it purported 8.

Bryce and colleagues concluded that there were four main reasons for why ACSD did not accelerate reductions in under-five mortality compared with comparison areas. A comprehensive list, presented in Figure 2 details program failures framed within the context of the five adapted dimensions of intervention validity 49.

** Institute for International Programs of the Johns Hopkins University
First, their results suggested that rapid reductions in mortality would not be achievable if emphasis on the resources needed to scale-up key interventions did not directly target major cases of child death. Secondly, country level policies supporting child mortality reduction strategies must align and are a prerequisite for effective child survival programs. Additionally, it was somewhat assumed that participating countries had already begun the roll-out of key interventions and strategies to promote essential treatments for childhood illnesses (such as pneumonia and diarrhea). However, in retrospect it was determined that the correct and proper treatment†† of pneumonia, as well as including zinc for the treatment of diarrhea had not been widely promoted when ACSD was designed. Particularly in the countries of Benin, Ghana, and Mali, task-shifting to community level health workers in case management of pneumonia

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†† per global standard clinical practice guidelines
(traditionally carried out by skilled providers) was not accepted as general government policy. An overall lack of collaboration between government officials and stakeholders in the form of supportive policies on child survival was detrimental to the rapid acceleration of key interventions, slowing the overall implementation and effectiveness of the ACSD project.

Lastly, the community component of the ACSD program was weak. There was little to no remuneration received by participating community health workers (CHWs), few non-financial incentives, and even less supervision. Incidentally, some of the most compelling gains in coverage were achieved by interventions that relied heavily on outreach or community-based strategies. Retrospective evaluations, such as the ACSD, provide researchers, countries, and implementers a more comprehensive snapshot of missed opportunities and gaps not bridged, as noted by the evaluation team. Thus, as emphasized by the team, “future programmes should learn from these results” However, program implementation, particularly, across multiple country settings and contexts is complex and a potential minefield for error. Hence, the use of prospective and concurrent evaluations throughout the life of a program are invaluable for managing bottle-necks in program implementation. The ACSD program’s failure to rapidly accelerate key child survival strategies highlights the need for the concepts of IS and IR. Despite the many limitations inherently attached to child survival strategies and interventions, there are many lessons to take away from a program such as this. Perhaps the most compelling is that success can be found in better understanding ‘why’ and ‘how’ programs fail.

Case Study #2) Acceptability of evidence-based neonatal care practices in rural Uganda-implications for programming

Much like the aims of the ACSD program, Uganda, has been motivated to rapidly accelerate under-five child survival strategies, specifically ones aimed at perinatal and neonatal
mortality. Interventions based on global recommendations which place emphasis on the importance of neonatal and perinatal mortality prevention strategies are just one component of efforts towards achieving the MDGs. Uganda has underlined the importance of integrating neonatal interventions such as these into current maternal and newborn interventions. Yet despite this stated commitment, one of the most striking aspects of maternal health care in Uganda is the wide discrepancy between the very high rate of ANC of more than 90%, and the much lower rate of facility-based deliveries, a little over 40%. In effect, this equates to over half of the pregnant women and their newborns in Uganda lacking key interventions that are necessary to their survival. The health and interests of the mother and child cannot be separated, yet despite the incomprehensible magnitude of avoidable premature deaths, neonatal health has historically been an area given little attention, and to some extent, remains as such. Therefore, it comes as no surprise that Uganda’s neonatal mortality rate (NMR) fell only from 29 to 27 deaths per 1,000 between the years of 2007 and 2011.

Widely viewed as committed to maternal and child health, the Ugandan government has supported a large number of policies related to strengthening and integrating maternal health, such as The Road Map for Accelerating the Reduction of Maternal and Neonatal Mortality and Morbidity. Furthermore, newer policies introduced in 2010, such as a newborn intervention framework and a child health strategy, were intended to further link these health areas. However, the government’s political and financial commitment to MNCH, as well as the recognition of challenges inherent in policies are not always sufficiently reinforced by strong implementation or financing. And perhaps, this alone, offers the single most important barrier to achieving MDGs 4 and 5, and that is the variability and inconsistency of resources employed to address them.

Development of strategies to improve access, implementation, and use of available and

---

Minimum of one visit
new interventions is needed. Additionally, within the development of such strategies, it is important for implementers to critically consider the representation of both participants and their respective settings—clinics, worksites, or communities. As noted by Madsen and colleagues, there are multiple barriers faced by both providers and patients. As a result of the growing attention given to barriers impeding further progress in MNCH care interventions, a study was conducted to review the barriers as well as the facilitators for implementation of globally recommended evidence-based newborn care interventions in two rural districts, Iganga and Mayuge, of Uganda. The study conducted by Waiswa and colleagues demonstrated that the scale-up of acceptable evidenced-based neonatal health interventions was restricted to the local health system and socio-cultural adaptability.

**Figure 3: Recommended Newborn Practices**

<table>
<thead>
<tr>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting the cord with a clean instrument</td>
</tr>
<tr>
<td>Maintenance of warmth</td>
</tr>
<tr>
<td>Delayed bathing</td>
</tr>
<tr>
<td>Maintenance of cleanliness</td>
</tr>
<tr>
<td>Exclusive breastfeeding</td>
</tr>
<tr>
<td>Seeking skilled care for danger signs</td>
</tr>
<tr>
<td>Clean cord care</td>
</tr>
<tr>
<td>PNC check-up with newborn at health facility after first week</td>
</tr>
<tr>
<td>PNC check-up for newborns at home by a CHW in the first week</td>
</tr>
</tbody>
</table>
The research team identified a number of key reasons why the implementation of evidence-based interventions failed to affect these two districts (FIGURE 4). First, it was found that few women reported having attended the recommended minimum of four ANC visits during their pregnancy, incidentally, these findings were representative of the national statistics which underlined the striking division in facility-based care along geographic lines (80% of urban women deliver in a health facility compared to the 30% of rural women) \(^{51,52}\). Secondly, community members reported gaps in service delivery that overlooked local customs and beliefs that viewed ANC attendance as “*okuhwa obulezi*” which literally translated is “*drinking medicine*” \(^{52p,3}\).

<table>
<thead>
<tr>
<th>Reach</th>
<th>Efficacy</th>
<th>Adoption</th>
<th>Implementation</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Policies prioritizing delivery of integrated MNCH programs as well had been developed and accepted, but not operationalized</td>
<td>• Interventions conflicted with local custom and tradition</td>
<td>• Aspects of evidenced-based practices that did not support cultural practices (e.g. bathing newborns or application of substances to the umbilical cord) were not widely accepted</td>
<td>• Lack of institutional support, resources, and commitment to overall implementation of integrated MNCH programming</td>
<td></td>
</tr>
<tr>
<td>• Did not include male involvement essential to linking mothers to health centers</td>
<td>• Dissemination strategies promoting ANC utilization throughout pregnancy failed due to community perceptions that such services were only needed for treatment of illness rather than prevention of illness</td>
<td>• Evidenced-based practices not practiced by skilled providers despite overall acceptance of practices</td>
<td>• Absence of health promotion promotional practices designed to meet the context of target populations</td>
<td></td>
</tr>
<tr>
<td>• Community outreach and capacity building was not emphasized; therefore inhibiting service demand and number of participants in intervention</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Additionally, the team found patterns reflective of previous reports citing gaps in service delivery \(^{22,51,56,58}\) throughout the two districts. This was indicative of significant limitations seen at the service delivery level for which integrated MNCH care was said to be provided \(^{52,57}\). Along with these deeply embedded issues of human resources and infrastructure, the team confirmed that competing priorities (at the national level) along with the lack of commitment needed to facilitate community engagement attributed to the lack of adoption of evidenced-based practices.
The team did find that there was, in general, a wide acceptance of the evidence-based maternal and neonatal care practices, with only a few exclusions. However, these evidence-based practices were not implemented due to both institutional and community barriers. There were compelling divides between the community’s perceptions of pregnancy and childbirth and the health care providers’. In essence, the viability of evidenced-based practices was not easily transferable into “real-world” settings. Additionally, campaigns educating women on what they needed to know and expect during their ANC visits were not in place, therefore contributing to the overall under-use of priority interventions. And while the government has adopted many new policies prioritizing MNCH programs and evidenced-based practices for country-wide use, many are not broadly or systematically operationalized.

**Case Study #3) Promotion of Clinical Practice Guidelines (CPGs) in Burkina Faso, Ghana, and Tanzania**

Initiatives to raise the quality of care provided to mothers have been given significant priority. The promotion of clinical practice guidelines (CPGs), particularly in SSA, where the maternal and child mortality rates remain low, is a primary and common strategy. In three countries a multiple case study was conducted to aid in understanding the implementability and use of national guidelines for maternal health and WHO recommendations. This study was part of a larger research collaboration, QUALMAT (Quality of Maternal and Prenatal Care: Bridging the Know-Do Gap), whose main objective centers around health worker motivation and quality improvement of care delivered through increased adherence to guideline recommendations.

While the technical aspects of services needed to promote maternal health have been identified and used, they ‘do not operate in isolation’. Baker and colleagues found that

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§§ Notable exceptions found in the study were delayed bathing and putting nothing on the umbilical cord

*** Examples of CPGs, see APPENDIX B
despite the large efforts made by countries and stakeholders, improving provider’s technical
skills and increasing the work force, alone, are not likely to improve the quality nor usage of
priority maternal health interventions. In further support of this, studies have suggested that
the ‘context in which staff work, the quality of human resources management, and the issues
surrounding healthcare worker motivation are essential to dissemination and implementation
fidelity.

The research team’s objective was to compare key factors related to CPG use compared
to that of the WHO’s CPGs, format, as well as, the development of CPG process. The findings
of their study are expressed through the Development and production of Guidelines
Implementation Framework, and were intended to provide an opportunity to better understand how to increase the potential of CPGs to improve the access and quality of care to
essential MNCH interventions. The adapted conceptual framework illustrates the key weaknesses in the implementation process that resulted in a loss of both internal and external
validity. From beginning to end, problems emerge, starting with the development of CPGs,
through the production of nationally relevant CPGs, to the dissemination of CPGs to health
workers’, and ultimately, their efficacious application in the clinical setting.

Baker and colleagues highlighted five key weaknesses in the current strategies focused on
promoting CPG adoption. First, there was little emphasis on the prioritization and formatting of
CPGs to increase usability and adaptability into daily practice. Overall, it was found that
guidelines were difficult to navigate, and algorithms associated with the recommendations were
not clearly specified. Secondly, varied-to-weak support in local adoption processes limited the
extent to which available CPG materials were distributed to service providers. This weakness
was also supported in another study in 2008, for which it was identified that the often lengthy
and cost-intense nature of methods used to produce and update CPGs was a significant weakness limiting the overall quality of up-to-date CPGs as well as the quantity produced and distributed at large to providers. Additionally, the study revealed significant variations in the content of the WHO Pregnancy Childbirth Postpartum and Newborn Care (PNPNC) guidelines. There were inconsistencies in the additional provisional documents, for which, were either outdated guidelines from past practices, or inner-country policies covering the same areas of content. The team argued that divisions such as these create contradictory effects.

Furthermore, Baker’s study also illustrated how the duplication of efforts by the multiple donors and stakeholders engaged in parallel interventions amplified the confusion around CPGs and impeded their successful adoption by providers.

Lastly, the study concluded that it was not poor quality of content or lack of evidence base that presented the major barrier for CPGs to positively impact the improvement in quality of

<table>
<thead>
<tr>
<th>Usability (the user-friendliness of CPGs)</th>
<th>Applicability (degree to which CPG was applied)</th>
<th>Adaptability (availability of modified versions of CPGs)</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall CPGs across countries, excluding Ghana, did not have clear algorithms for clinical decision making throughout the pregnancy continuum of care.</td>
<td>Varied and relatively poor fidelity in CPG implementation by providers</td>
<td>Marked variations in CPGs across settings and not always easily available to health workers</td>
<td></td>
</tr>
<tr>
<td>CPGs country guidelines for Burkina Faso and Tanzania were difficult to navigate and confusing for providers</td>
<td>Lack of decision making skills when using CPGs limited the extent to which providers could deliver services</td>
<td>Some providers trained in delivering CPGs only came into contact with them during training as dissemination of CPG materials is expensive and limited in resource poor settings</td>
<td></td>
</tr>
<tr>
<td>Language used in CPGs was not always easy to understand or apply</td>
<td>When clear algorithms for certain CPG interventions were available, small barriers in protocol application limited their effect</td>
<td>Costly and time consuming to produce updates to countries’ national CPGs</td>
<td></td>
</tr>
<tr>
<td>Overall providers complained CPGs were not ‘user-friendly’</td>
<td>Habit of providers to return to older standards of care, creating barriers to other providers who wish to use CPGs</td>
<td>Lack of specific section on management of ABC (airway breathing circulation) (Tanzania &amp; Burkina Faso)</td>
<td></td>
</tr>
<tr>
<td>Lack of coordination of multiple donors and stakeholders supporting parallel interventions</td>
<td>Negative beliefs about using CPGs during patient consultations, limited their use by providers</td>
<td>Deficiencies in guidance on how to respond to postpartum complications (Burkina Faso &amp; Ghana)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Local adaptation of CPGs not strongly supported</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Variability in CPG documentation used created contradictory effects in practice</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Content discrepancies between WHO and country specific PCPN CPGs</td>
</tr>
</tbody>
</table>
maternal health services. Rather, the barrier was the format of the guidelines and the deficiencies in their implementation. The study also revealed that these flaws in guideline format and implementation created major ‘bottlenecks’ in providing efficacious, accessible, and essential maternal health care.

Discussion

The emerging field of IR and IS is continually changing and emerging. Additionally, multiple concepts, theories, and frameworks are all created with the goal of better explaining how to improve the ‘uptake, implementation, and translation of research findings into routine and common practice’. Yet, while there is concurrence within the research community about the need for IS and IR, the divergence occurs in defining its perimeters. No one definition has been accepted as the standard for the field, only one journal purely dedicated to publishing IS and IR research currently exists, and there is a significant chasm between clinical, social, and health policy researchers on what constitutes IS and IR. What one expert in the field may deem IS another may deem parts of impact evaluation and operations research. However, IS is not only operations research, nor is it solely a glorified mechanism for evaluation. The field of IS is essentially about the overall need to create access to evidenced-based practices known to work. Its concepts have external validity and can and should be transferable between and within different settings. Moreover, there is a need for this field of research within global health settings as practical solutions to scaling up essential programs known to save lives must be actualized.

Scientists and researchers know ‘what’ works, as demonstrated throughout this paper. And as a result of this, countries and stakeholders are encouraged to rapidly accelerate or ‘scale-up’ gold standard interventions to meet the priority needs in maternal, newborn, and child health. Many times these interventions fail or fall short of promises and expectations, yet in contrast to
the dearth of literature on best practices and lifesaving innovations, there is a paucity of literature detailing ‘why’ and ‘what’ inhibited their success when applied in a different context or on a different scale. Cross-collaboration between research disciplines complicates the essential transfer of ‘what works’ to ‘how to make it work’ that program implementers need to execute. Retrospective evaluations highlighting ‘what went wrong’ are few and far between. As a consequence to this, mistakes made in intervention implementation and scale-up are not surprisingly replicated across the field in global health.

Furthermore, as discussed previously, the evidence supports that context significantly influences the ability to translate evidenced-based practices into appropriate interventions. IS and IR have the potential to help researchers and implementers alike discover the best practices for implementing priority interventions within different contexts. The science and knowledge of what is known to stop postpartum hemorrhage or child under-nutrition does not need to change; however, the ways in which it is delivered and implemented must. As such, if context is not considered, it has the potential of confounding the associations between service delivery of the intervention and its potential impact on the health and wellbeing of the mother and child. Context can and will modify the effects of essential MNCH interventions making it difficult to generalize its results based on any one particular population.

Ninety-eight percent of maternal and child deaths are preventable, scientists have discovered and proven that simple interventions, if appropriately and adequately dispensed in a timely manner, can and will saves lives\textsuperscript{62,63}. It is not enough to develop innovations to reduce maternal and child mortality if there is no strategy in place to see them successfully implemented. It is not enough to increase the number of providers delivering maternal care, if they are not appropriately trained. Additionally, training and deploying providers, as
demonstrated by Baker’s team, is also not enough, as appropriate and adequate clinical guidelines are needed on a day-to-day basis to assist providers in making decisions that affect the health and wellbeing of their patients. None of these strategies alone will equate to successful program outcomes if the context for which such strategies are implemented is not considered when program implementation is in its infancy. Building hospitals, providing life-saving medicines and distributing ITNs will not assure user buy-in, nor the desired outcomes of mortality reduction many programs within the field hope to reach. The unforeseen or inattention to barriers that arise in program implementation are dependent on the context and setting of the target area. Context is difficult to generalize and therefore, creates roadblocks to successful implementation of best-practices and interventions across different country settings.

Furthermore, technical interventions for maternal and child healthcare are implemented through a dynamic social process, yet there are tendencies within the field of IS/IR to compartmentalize such processes. The behaviors of individuals influence the overall outcomes, as noted by Victor and colleagues\(^{60}\). Given the complexity and unpredictability inherent in such dynamic processes, the proposed cause-and-effect relationships in any particular context cannot be directly transferred to another, thus the fundamental concept of IS, translating research to practice is filled with many contextual potholes. And yet, while this is true throughout many settings in global health, its significance is magnified in maternal and child healthcare because of the need to involve multiple levels of the health system, numerous types of care providers from a highly skilled specialist to a community-level volunteer, as well as multiple technical interventions to measure an outcome (reductions in mortality rates) that is not easily measurable nor without significant inaccuracies due to poor reporting practices\(^{60,38,39}\).
Limitations

This analysis is not without its limitations. Throughout the drafting of this paper, multiple experts were consulted to gain perspective and basic understanding within this field of research. However, each expert had a unique and slightly varied understanding of what was essentially fundamental to the field. Interestingly, all three experts came from the background of public health and two of them with extensive experience in the field of global maternal and child health. Yet the common theme was a general lack of consensus on the IS definition, framework, and intervention outcomes. This incongruence was reflective in the literature used in this analysis.

Another limitation to this study was the varying terminology used for the field of implementation science. During the initial literature search, the term ‘implementation science’ was limiting to the amount of peer reviewed articles and studies, most likely due to the existence of only one scientific journal, Implementation Science, and one central book, Implementation Research: a synthesis of the literature as coordinated repositories of current knowledge in the area. As a result of this limitation, the terms ‘translational research’, ‘dissemination’, ‘scaling-up’, ‘research to practice’, ‘evidence-based practice’, and ‘impact evaluation’ were all used in defining and detailing IS and IR practices and strategies to gain a better overall perspective.

Additionally, this field of research is fairly new, and therefore lacks the overall structure necessary to apply its concepts to the specific field of maternal and child health. There was an overall paucity in available literature that employed definitive aspects of IR and IS in their studies, and an even scarcer amount of frameworks detailing how to apply such a science to real-world application in MNCH programs.
Furthermore, there were significant limitations in finding case studies of scaled-up MNCH interventions that failed. Only one retrospective evaluation was available that underlined key failures to its’ programs implementation strategies. The overall lack of retrospective impact evaluations and case studies made MNCH specific programmatic gaps difficult to capture. Hence, this analysis lacks a breadth of real-world examples of failed scale-up programs.

Conclusion

Despite the growing body of literature in implementation science and research, scientists, providers, policymakers, and implementers continue to fall short in defining and framing it. This paper provides an overall general definition of the field of implementation science, as well as demonstrates how research within this field can provide a better understanding of how to put best-practices into action. However, the lack of conformity on terms, definitions, and frameworks creates overall barriers to advancing this field into real-world settings. Additionally, within the field of maternal and child health, there is a lack of conclusive evidence to support the effective or ineffective use of IS and IR in real-world settings. Yet, the interventions best suited for moving forwards towards achieving MDGs 4 and 5 cannot be actualized if attention to the processes in program and intervention implementation are not considered.

A clear understanding of implementation science is needed if implementers want to link successful outcomes to interventions. Available resources, supportive policies, best-available practices and science, and infrastructure are all essential components of translating research to practice. As found in the initial literature review, implementation science is complex and requires multiple processes and disciplines to actualize its purpose. The non-convergence of definitions and concepts along with the failures (FIGURE6) of priority maternal and child health interventions discussed in this analysis exemplify the growing need, as well as responsibility of
stakeholders to consider the context for which they apply evidenced-based practices to large populations.

**Figure 6: Key themes in case study failures**

<table>
<thead>
<tr>
<th>Lack of , or poor dissemination processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of consideration of service delivery burdens on providers</td>
</tr>
<tr>
<td>Lack of consensus on how best to use IS and IR strategies for improving program implementation and scale-up</td>
</tr>
<tr>
<td>Lack of clarity in CPGs and care management algorithms</td>
</tr>
<tr>
<td>Lack of resources (financial/human)</td>
</tr>
<tr>
<td>Lack of , or poor surveillance of integrated service packages</td>
</tr>
<tr>
<td>Lack of retrospective impact evaluations to track programmatic failures</td>
</tr>
<tr>
<td>Environmental, cultural, and political ‘context’ lacked appropriate consideration and attention</td>
</tr>
</tbody>
</table>

This analysis revealed a number of factors that contribute and influence the success of implementing priority maternal and child health programs and interventions. Additionally, a number of frameworks have been developed to better synthesize the fundamentals of IS and IR. A collaborative effort to create a more comprehensive framework with external validity has yet to emerge, hence, scientists, researchers, governments, and policy makers need to work together to reach general agreement on a more uniform framework and definition.
References


33. National Institute of Health. Implementation science and resources. [Implementation Science].


Appendix

**Appendix A. The Mother Baby Package**
<table>
<thead>
<tr>
<th>Priority Interventions</th>
<th>Level of Care (Community, Primary, Referral)</th>
<th>Community or Professional Health Workers</th>
<th>Key Commodities (Supplemented by Annex)</th>
<th>Practice Guidelines and Training Manuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate Essential Newborn Care (At the Time of Birth)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neonatal resuscitation with bag and mask for babies who do not breathe at birth</td>
<td>Primary Referral</td>
<td>Professional health workers</td>
<td>• Training aids and devices to maintain competencies&lt;br&gt; • Newborn resuscitation device (Ambu Bag, bag-mask and suction device)</td>
<td>• American Academy of Pediatrics Helping babies breathe - The Golden Minute &lt;br&gt; <a href="http://www.helpingbabiesbreathe.org/mastertrainers.html">www.helpingbabiesbreathe.org/mastertrainers.html</a>&lt;br&gt; • WHO Essential newborn care &lt;br&gt; <a href="http://www.who.int/making_pregnancy_safer/documents/newborncare_coursec/en/index.html">www.who.int/making_pregnancy_safer/documents/newborncare_coursec/en/index.html</a></td>
</tr>
<tr>
<td>Newborn immunization</td>
<td>Primary Referral</td>
<td>Professional health workers</td>
<td>• Vaccines, syringes, safety boxes, cold chain equipment</td>
<td>• WHO Vaccine Position papers &lt;br&gt; <a href="http://www.who.int/immunizationposition_papers/en/">www.who.int/immunizationposition_papers/en/</a></td>
</tr>
<tr>
<td>NEONATAL INFECTION MANAGEMENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiation of ART in babies born to HIV infected mother</td>
<td>Primary Referral</td>
<td>Professional health workers</td>
<td>• HIV testing kit + ARVs</td>
<td>• Rapid Advice: Use of antiretroviral drugs for treating pregnant women and preventing HIV infection in infants &lt;br&gt; <a href="http://www.who.int/publications/2009/9789241590693_eng.pdf">http://www.who.int/publications/2009/9789241590693_eng.pdf</a></td>
</tr>
</tbody>
</table>
## EMERGENCY SIGNS

### CONVULSIONS OR UNCONSCIOUS

- Convulsing (now or recently), or
- Unconscious
- If unconscious, ask relative “has there been a recent convulsion?”

### MEASURE

- Measure blood pressure
- Measure temperature
- Assess pregnancy status

### TREATMENT

- Protect woman from fall and injury. Get help.
- Manage airway
- After convolution ends, help woman onto her left side.
- Insert an IV line and give fluids slowly (30 drops/mm²)
- Give magnesium sulphate 0.5g
- If early pregnancy, give diazepam IV or rectally
- If diastolic BP >110mm of Hg, give antihypertensive
- If temperature >38°C, or history of fever, also give treatment for dangerous fever (below).
- Refer woman urgently to hospital* 0.17

### SEVERE ABDOMINAL PAIN

- Severe abdominal pain (not normal labour)
- Measure blood pressure
- Measure temperature

### DANGEROUS FEVER

- Fever (temperature more than 38°C) and any of:
  - Very fast breathing
  - Staff neck
  - Lethargy
  - Very weak/not able to stand

**Measure temperature**

- Insert an IV line and give fluids 0.17

### TREATMENT

- Insert first dose of appropriate IM/IV antibiotics 0.18
- Refer woman urgently to hospital* 0.17
- If systolic BP <90 mm Hg give 0.2

### SEVERE ABDOMINAL PAIN

- Insert an IV line and give fluids 0.17
- Give first dose of appropriate IM/IV antibiotics 0.18
- Refer woman urgently to hospital* 0.17
- If systolic BP >110 mm Hg give antihypertensive 0.14
- If temperature >38°C, or history of fever, also give treatment for dangerous fever (below).
- Refer woman urgently to hospital* 0.17

### DANGEROUS FEVER

- Fever (temperature more than 38°C) and any of:
  - Very fast breathing
  - Staff neck
  - Lethargy
  - Very weak/not able to stand

**Measure temperature**

- Insert an IV line 0.17
- Give fluids slowly 0.17
- Give first dose of appropriate IM/IV antibiotics 0.18
- Give antihypertensive (if not available, give quinine IM) and glucose 0.16
- Refer woman urgently to hospital* 0.17

### SEVERE ABDOMINAL PAIN

- Insert an IV line 0.17
- Give fluids slowly 0.17
- Give first dose of appropriate IM/IV antibiotics 0.18
- Give antihypertensive (if not available, give quinine IM) and glucose 0.16
- Refer woman urgently to hospital* 0.17

### DANGEROUS FEVER

- Fever (temperature more than 38°C) and any of:
  - Very fast breathing
  - Staff neck
  - Lethargy
  - Very weak/not able to stand

**Measure temperature**

- Insert an IV line 0.17
- Give fluids slowly 0.17
- Give first dose of appropriate IM/IV antibiotics 0.18
- Give antihypertensive (if not available, give quinine IM) and glucose 0.16
- Refer woman urgently to hospital* 0.17

* But if birth is imminent (bulging, thin perineum during contractions, visible fetal head), transfer woman to labour room and proceed as on 0.035.

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### Remove placenta and fragments manually

- If placenta not delivered 1 hour after delivery of the baby, OR
- If heavy vaginal bleeding continues despite massage and oxytocin and placenta cannot be delivered by controlled cord traction, or if placenta is incomplete and bleeding continues.

#### Preparation

- Explain to the woman the need for manual removal of the placenta and obtain her consent.
- Insert an IV line. If bleeding, give fluids rapidly. If not bleeding, give fluids slowly 0.17
- Assist woman to get onto her back.
- Give diazepam (10 mg IM/IV).
- Clean vulva and perineal area.
- Ensure the bladder is empty. Catheterize if necessary 0.17
- Wash hands and forearms well and put on long sterile gloves (and an apron or gown if available).

#### Technique

- With the left hand, hold the umbilical cord with the clamp. Then pull the cord gently until it is horizontal.
- Insert right hand into the vagina and up into the uterus.
- Leave the cord and hold the fundus with the left hand in order to support the fundus of the uterus and to provide counter traction during removal.
- Move the fingers of the right hand sideways until edge of the placenta is located.
- Detach the placenta from the implantation site by keeping the fingers tightly together and using the edge of the hand to gradually make a space between the placenta and the uterine wall.
- Proceed gradually all around the placental bed until the whole placenta is detached from the uterine wall.
- With the right hand, provide counter traction to the fundus through the abdomen by pushing it in the opposite direction of the hand that is being withdrawn. This prevents inversion of the uterus.
- Examine the uterine surface of the placenta to ensure that lobes and membranes are complete. If any placental lobe or tissue fragments are missing, explore again the uterine cavity to remove them.
- If hours or days have passed since delivery, or if the placenta is retained due to constriction ring or closed cervix, it may not be possible to put the hand into the uterus. DO NOT persist. Refer urgently to hospital 0.17

#### If the placenta does not separate from the uterine surface by gentle sidesways movement of the fingertips at the line of cleavage, suspect placenta accreta. DO NOT persist in efforts to remove placenta. Refer urgently to hospital 0.17

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### After manual removal of the placenta

- Repeat oxytocin 10 IU IM/IV.
- Massage the fundus of the uterus to encourage a tonic uterine contraction.
- Give methylergometrine 0.2 mg IM.
- If fever >38.5°C, foul-smelling lochis or history of rupture of membranes for 18 or more hours, also give gentamicin 0.17
- If bleeding stops:
  - Give fluids slowly for at least 1 hour after removal of placenta.
- If heavy bleeding continues:
  - Give ergometrine 0.2 mg IM
  - Give 20 IU oxytocin in each litre of IV fluids and infuse rapidly
  - Refer urgently to hospital 0.17
- During transport, feel continuously whether uterus is well contracted (hard and round). If not, massage and repeat oxytocin 10 IU IM/IV.
- Provide bimanual or aortic compression if severe bleeding before and during transportation 0.17
# RAPID ASSESSMENT AND MANAGEMENT (RAM)

Use this chart for rapid assessment and management (RAM) of all women of childbearing age, and also for women in labour, on first arrival and periodically throughout labour, delivery and the postpartum period. Assess for all emergency and priority signs and give appropriate treatments, then refer the woman to hospital.

**FIRST ASSESS**

<table>
<thead>
<tr>
<th>EMERGENCY SIGNS</th>
<th>MEASURE</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Do all emergency steps before referral**

## AIRWAY AND BREATHING

- Very difficult breathing or
- Central cyanosis

- Manage airway and breathing
- Refer woman urgently to hospital

This may be pneumonia, severe anaemia with heart failure, obstructed breathing, asthma.

## CIRCULATION (SHOCK)

- Cold moist skin or
- Weak and fast pulse

- Measure blood pressure
- Count pulse

- Measure blood pressure. If systolic BP < 90 mmHg or pulse > 110 per minute:
  - Position the woman on her left side with legs higher than chest.
  - Insert an IV line
  - Give fluids rapidly
  - If not able to insert peripheral IV, use alternative
  - Keep her warm (cover her).
  - Refer her urgently to hospital

This may be hypovolaemic shock, septic shock.

* But if birth is imminent (bulging, thin perineum during contractions, visible fetal head), transfer woman to labour room and proceed as on page 46.