

Implementing Innovations in Global Women's, Children's, and Adolescents' Health

Realizing the Potential for Implementation Science

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The launch of the United Nations Sustainable Development Goals and the new Secretary General's Global Strategy for Women's, Children's, and Adolescents' Health are a window of opportunity for improving the health and well-being of women, children, and adolescents in the United States and around the world. Realizing the full potential of this historic moment will require that we improve our ability to successfully implement life-saving and life-enhancing innovations, particularly in low-resource settings. Implementation science, a new and rapidly evolving field that addresses the "how-to" component of providing sustainable quality services at scale, can make an important contribution on this front. A synthesis of the implementation science evidence indicates that three interrelated factors are required for successful, sustainable outcomes at scale: 1) effective innovations, 2) effective implementation,

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and 3) enabling contexts. Implementation science addresses the interaction among these factors to help make innovations more usable, to build ongoing capacity to assure the effective implementation of these innovations, and to ensure enabling contexts to sustain their full and effective use in practice. Improving access to quality services will require transforming health care systems and, therefore, much of the focus of implementation science in global health is on improving the ability of health systems to serve as enabling contexts. The field of implementation science is inherently interdisciplinary and academic will need to respond by facilitating collaboration among scientists from relevant disciplines, including evaluation, improvement, and systems sciences. Platforms and programs to facilitate collaborations among researchers, practitioners, policymakers, and funders are likewise essential.

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With the 2015 launch of the United Nations Sustainable Development Goals and their commitment to "ensure healthy lives and promote well-being for all at all ages" by 2030, we are living in an historic moment in global health—one with profound implications for the health of women, children, and adolescents in the United States and around the world.^{1,2} Realizing the full potential for this great moment, however, will require that we succeed in putting life-saving and life-enhancing innovations in global health into practice and, to date, we have been far more successful in developing these interventions such as emergency obstetric and newborn care services than we have been in implementing them, particularly in low-resource settings.^{1,2} The imperative of achieving success in the context of these settings is evident from the fact that 99% of all maternal and newborn deaths now occur in them.³



As we transition from the Millennium Development Goals—launched in 2000 with a target date of 2015—to the new Sustainable Development Goals and related United Nations initiatives such as the Secretary General’s Global Strategy for Women’s, Children’s, and Adolescents’ Health, the imperative of addressing implementation challenges in global health has never been greater.^{1–3} The new Global Strategy includes ambitious targets of having no country with a maternal mortality ratio higher than 140 deaths per 100,000 live births or a neonatal mortality rate higher than 12 per 1,000 live births. Current maternal mortality ratio estimates range from 3 per 100,000 live births in Finland, Greece, Iceland, and Poland to 1,360 per 100,000 live births in Sierra Leone.⁴ Neonatal mortality rates range from 3.0 per 1,000 live births in high-income countries to 23.2 per 1,000 live births in South Asia and 25.9 in sub-Saharan Africa.⁵ Achieving the Global Strategy targets will require us to markedly improve our ability to deliver—effectively and sustainably—known evidence-based interventions to all those who need them in low- and middle-income countries. It is important to recognize, however, that the implementation challenges we face in global health also include those affecting the well-being of women, children, and adolescents in the United States—which continues to have major health disparities, large underserved populations, and among the highest maternal and infant mortality rates in high-income countries.^{2,4–6}

Accordingly, we need to improve our support for successful and sustainable implementation of health innovations at scale globally and, in the process, increase our knowledge and capacity for addressing the “how-to” component of providing quality health services. Implementation science, a new and rapidly evolving field that addresses implementation challenges in health and other domains in human services, can make a major contribution on this front, but realizing this potential will require a substantial enhancement of current efforts to develop the field and a commitment to embracing it as an essential discipline in global health. We join El-Sadr et al⁷ in calling on universities to make this a major priority and believe that implementing agencies, policymakers, and funders should do likewise. As stated by the President of the World Bank, Dr Jim Yong Kim, “Let’s finally decide that a science of delivery or implementation or quality or whatever we want to call it, is every bit as important as neuroscience or clinical epidemiology—and is every bit as essential for sustained impact on health outcomes.”⁸

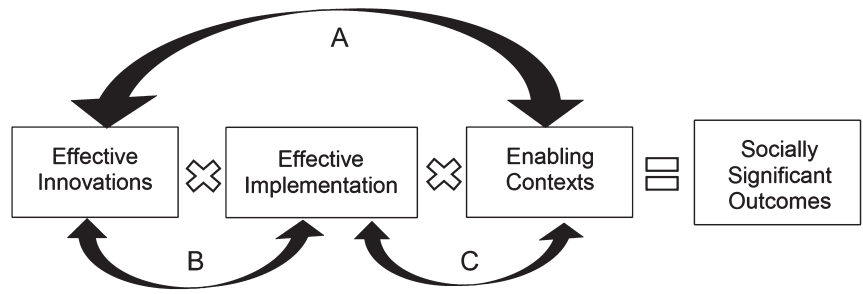
BUILDING THE DISCIPLINE OF IMPLEMENTATION SCIENCE

As we develop the field of implementation science, it will be important to determine our focus. The National Institutes of Health defines implementation science as “the study of methods to promote the integration of research findings and evidence into healthcare policy and practice. It seeks to understand the behavior of healthcare professionals and other stakeholders as a key variable in the sustainable uptake, adoption, and implementation of evidence-based interventions”⁹ Similarly, the National Institutes of Health Fogarty International Center states, “Implementation research plays an important role in identifying barriers to, and enablers of, effective global health programming and policymaking, and leveraging that knowledge to develop evidence-based innovations in effective delivery approaches.”¹⁰ By contrast, the National Implementation Research Network, now based at the University of North Carolina at Chapel Hill, defines implementation science as, “the study of factors that influence the full and effective use of innovations in practice” with implementation being “a specified set of activities designed to put into practice an activity or program of known dimensions.”^{11,12} The distinction between these definitions of implementation science reflects the fact that the scientific community is developing the field with at least two different but related lenses. The first views implementation science primarily as a research endeavor and the second sees it primarily as an applied endeavor. In our view, both perspectives are essential for our success in global women’s, children’s, and adolescents’ health.

The applied perspective, also known as “active implementation,” is informed by a synthesis of the evidence of implementation science, which indicates that achieving our ambitious new global health goals and objectives will require continued progress in the development of effective innovations as well as more effective practice-informed approaches to the implementation of these innovations. Furthermore, it will be essential that the contexts into which these innovations are being implemented, including the health systems, are strengthened to provide the organizational and system supports needed for successful implementation and sustainable use of the innovations.¹³ The synthesis led to the development of a formula for successful and sustainable outcomes that illustrates the importance of all three interdependent factors interacting synergistically to reliably produce and sustain desired results at scale such that, in the absence of one or more, the chance of effective outcomes is greatly reduced, if not impossible¹³ (Fig. 1).



Fig. 1. Formula for success and sustainable outcomes. All three interdependent components interact synergistically to reliably produce results at scale. **A.** Effective innovations developed for use in typical service settings. **B.** Effective implementation methods employed to support the full and effective use of innovations and reliably produce intended outcomes. **C.** Policies, funding, and procedures improved to ensure a context that will support the implementation effort and sustained use of the innovations. Adapted from Fixsen DL, Blase KA, Metz A, Van Dyke M (2015). *Implementation science*. In JD Wright (Ed.), *International encyclopedia of the social and behavioral sciences* (2nd ed., Vol. 11, pp. 695–702). Oxford: Elsevier, Ltd. and used with permission of Dean L. Fixsen and the National Implementation Research Network.



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The formula, and the synthesis from which it is derived, makes it clear that effective innovations and effective implementation are not separate entities. Rather, an innovation is effective if, and only if, it ultimately reaches and positively affects the intended beneficiaries. Implementation science provides support for this goal by addressing the interactions among innovations, implementation, and contexts to maximize the likelihood that 1) the innovation is developed and evaluated with implementation in mind, thereby assuring that it is implementable in the settings in which it will be used; 2) the capacity of organizations and providers is built to use the innovation successfully; and 3) the system context in which the innovation is being implemented is strengthened as needed to provide sufficient support for successful implementation and use of the innovation with fidelity (ie, as intended).¹³ Implementation science attends to these interrelated challenges concurrently, in contrast to traditional approaches in which an innovation is developed and decisions are made subsequently regarding how best to put it into practice. In so doing, it simultaneously addresses how to make an innovation more usable, how to build ongoing capacity to assure its effective implementation, and how to change policies, funding, and procedures to ensure an enabling context to sustain its full and effective use in practice.

How do we achieve effective implementation? The aforementioned synthesis led to the conclusion that effective implementation is dependent on three so-called “Implementation Drivers”: 1) competency drivers, 2) organization drivers, and 3) leadership drivers.^{13,14} (Fig. 2) The competency drivers focus on activities that develop, improve, and sustain the ability of professionals to put innovations into practice and they include selection, training, coaching, and

fidelity assessment (an indication of the extent to which an innovation is implemented as intended). There is now abundant evidence that training, although necessary, is insufficient to provide the competency needed to assure successful implementation. The organizational drivers—whose components include decision support data systems, facilitative administration, and systems interventions—develop the supports and the infrastructure needed to create an enabling context for innovations. Lastly, but most assuredly not least, the leadership drivers, which emphasize both technical and adaptive leadership, are foundational to successful implementation.^{13,14} All three are key to building the infrastructure and capacity needed for effective implementation and for initiating and supporting the changes required for the sustainable use of innovations with fidelity at scale. They are integrated and compensatory such that deficiencies in one can be at least partially overcome by enhancements in another.

The Implementation Drivers described are one of the five frameworks that, collectively, are called the Active Implementation Frameworks. These frameworks were derived from the synthesis and are accompanied by tools to facilitate their application. They, along with other applied frameworks and tools, can provide strong support to implementation efforts broadly, including those in global women’s, children’s, and adolescents’ health^{13,14} (Fig. 3).

The other four frameworks that comprise the Active Implementation Frameworks are:

- 1) Usable innovations, which focus on making innovations more teachable, learnable, doable, and readily assessable in the contexts into which they are being implemented;
- 2) Implementation stages with four functional phases in the process of implementation that



Implementation Drivers

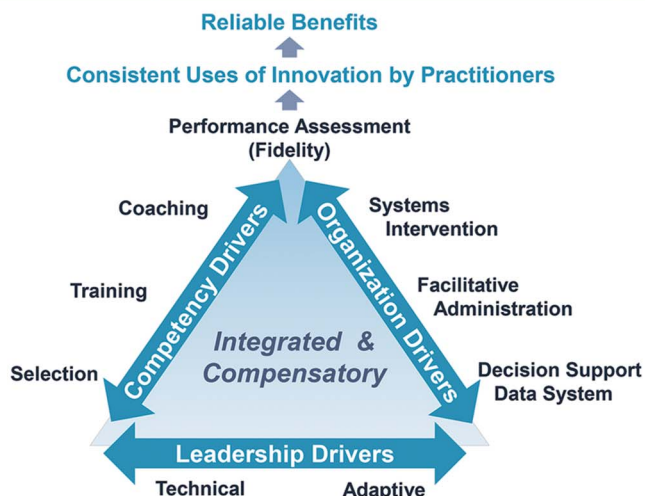


Fig. 2. The Implementation Drivers, one of five Active Implementation Frameworks, address key components of the infrastructure and capacity needed for successful implementation. Reproduced from Fixsen, DL, & Blase, KA (2008). Drivers framework. Chapel Hill, NC: The National Implementation Research Network, University of North Carolina. Used with permission from Dean L. Fixsen and the National Implementation Research Network. Peterson. *Implementation Science for Global Health. Obstet Gynecol* 2018.



include initial exploration, installation, initial implementation, and full implementation—with sustainability being considered in each phase;

- 3) Implementation teams, which play a key role in actively supporting the movement of innovations through the phases of implementation and which provide an internal support structure to help ensure that implementation infrastructure, as characterized by the Implementation Drivers, is used effectively; and
- 4) Improvement cycles, which are used by implementation teams to iteratively learn about and address barriers to implementation.

They include Plan-Do-Study-Act cycles and Practice-Policy Communication cycles, with both being useful in addressing the important link between improvement and implementation. Implementation is a process that must be initiated and then continuously improved throughout all four stages.^{13,14}

APPLYING IMPLEMENTATION SCIENCE TO GLOBAL WOMEN'S, CHILDREN'S, AND ADOLESCENTS' HEALTH

We will not achieve our goals and objectives in women's, children's, and adolescents' health without improving availability and access to quality services. This, in turn, will require transforming the health care systems that provide these services and, here again,

Active Implementation Frameworks

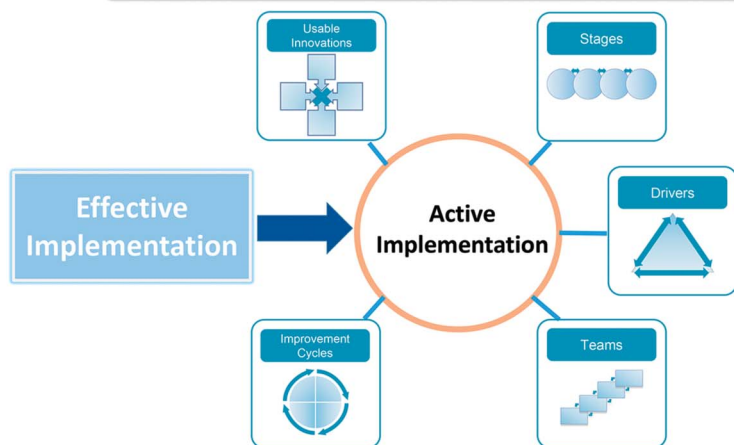


Fig. 3. The Active Implementation Frameworks support the full and effective use of innovations in practice. Based on Blase, KA, Van Dyke, M, Fixsen, D, & Wallace Bailey, F (2012). *Implementation science: Key concepts, themes, and evidence for practitioners in educational psychology*. In B Kelly & D Perkins (Eds.), *Handbook of implementation science for psychology in education* (pp. 13–34). London: Cambridge University Press. Used with permission from Dean L. Fixsen and the National Implementation Research Network.

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implementation science has an important role to play. As described earlier, with regard to the formula, an enabling context is essential for the successful implementation of all effective innovations. As a consequence, much of the focus of implementation science in global health will be on improving the ability of health systems to serve as such contexts. The approaches and tools contributing to this effort include the use of 1) a transformation process—in which policy changes support changes in the health system that, in turn, support improved service quality; the process entails a continuous cycle of feedback between practice and policy such that policy-informed practice and practice-informed policy are optimal for supporting the desired transformation; 2) a transformation zone—in which the introduction of an innovation is tested in real-life settings and knowledge is gained continuously regarding how to manage the change process as the innovation is being put into place; and 3) a transformation team—identical to the Active Implementation Framework implementation teams, comprised of members who represent the key policymakers and practitioners in the transformation process. The team uses Plan-Do-Study-Act cycles to continuously learn how to effectively develop the capacities and linkages needed in the system to support the transformation process.^{13,14}

The ongoing experiences in prevention and treatment of human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) in sub-Saharan Africa highlight how implementation science has already helped to address a major challenge in global health—one in which success was driven not only by the development of highly active antiretroviral medications, but also by innovations in the successful implementation of these medications in contexts that were initially far from enabling. In 2000, many individuals with HIV and AIDS in high-income countries were the beneficiaries of these life-saving drugs but few were receiving them in sub-Saharan Africa, where most of the people with HIV and AIDS lived. When the U.S. government's President's Emergency Plan for AIDS Relief program began in 2004, many considered the challenging contexts—including too few trained health care providers, lack of laboratory support, and insufficient supplies—as so daunting that success seemed unlikely, yet millions of people are alive today because of efforts such as those described by El-Sadr et al⁷ and Padian et al¹⁵ that drew on the use of implementation science to address those challenges. As Padian et al highlighted, the President's Emergency Plan for AIDS Relief program used an implementation science framework when it

transitioned from its first phase, which had a focus on meeting emergency health needs, to its second phase, which has a greater emphasis on sustainability.¹⁵ The prevention of mother-to-child transmission of HIV is an important goal of the President's Emergency Plan for AIDS Relief and the 60% reduction in new HIV infections among children in 21 countries in sub-Saharan Africa since 2009 is greatly encouraging.¹⁵ To continue progress in implementing effective interventions that can help eliminate HIV in children, the National Institutes of Health and the President's Emergency Plan for AIDS Relief created, in 2013, the National Institutes of Health–President's Emergency Plan for AIDS Relief Implementation Science Alliance, through which they bring together implementation scientists, implementers, and in-country policy makers to provide “a unique platform for exchange of ideas and learning to enhance the evidence base for translating effective PMTCT interventions into community- and population-level services and programs.”¹⁶

MOVING FORWARD

As the global health community becomes more mission-driven and solution-oriented, it will be important not only to maintain our historical focus on translating research into practice, but also to assure that our research solves practice-related problems.² We believe this is best achieved by creating a virtuous cycle in which research informs practice and practice informs research. To bridge the gap between having innovations and assuring access to these innovations in global women's, children's, and adolescents' health, this virtuous cycle will need to link implementation research—using the research perspective of implementation science described earlier—with active implementation, the applied perspective of implementation science (Fig. 4). We can thereby, through a mutually reinforcing relationship 1) enable implementation research to support active implementation by providing implementation strategies and theory-based methodologies and tools that inform, facilitate, and support practice; and 2) enable active implementation to identify and put into place the processes and structures needed for the innovations to reach the intended beneficiaries and, in so doing, support implementation research by identifying gaps in understanding that become implementation research priorities.

The field of implementation science is inherently interdisciplinary and academic institutions will need to respond by facilitating the collaboration of scientists from relevant disciplines—enabling an evolution



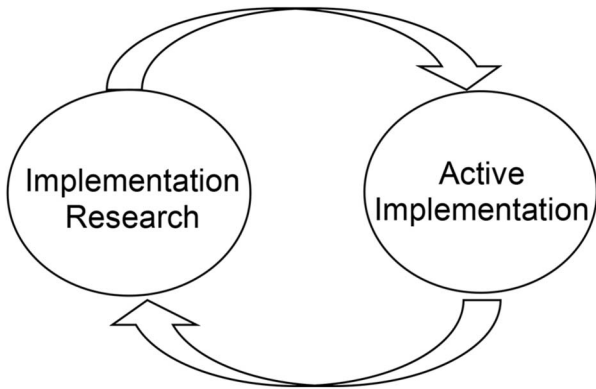


Fig. 4. A virtuous cycle in which research informs practice and practice informs research. It enables implementation research to support active implementation while concurrently enabling active implementation to identify gaps that become implementation research priorities.

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from the current multidisciplinary effort to an interdisciplinary and, ultimately, transdisciplinary one. In the process, implementation science must be linked

effectively to other related fields such as evaluation, improvement, and systems sciences because, increasingly, all are working in the same space and all need to be supporting each other. Indeed, we believe this integration will be essential for achieving our global goals and objectives in women’s, children’s, and adolescents’ health.

Collaborations within universities to strengthen our understanding of implementation will be necessary, but not sufficient. The lack of systematic approaches to implementation coupled with a dearth of skills at the intersection of research and practice requires that we also develop more effective collaborations among researchers, practitioners, policy-makers, and funders.³ Achieving this link will enable practitioners not only to contribute their understanding of the context to the development of innovations, but also to support investigators in testing and refining better methodologies and tools to support the delivery of innovations and measure their success.

We face at least three interrelated challenges moving forward: 1) stimulating and supporting the development and practical utility of implementation

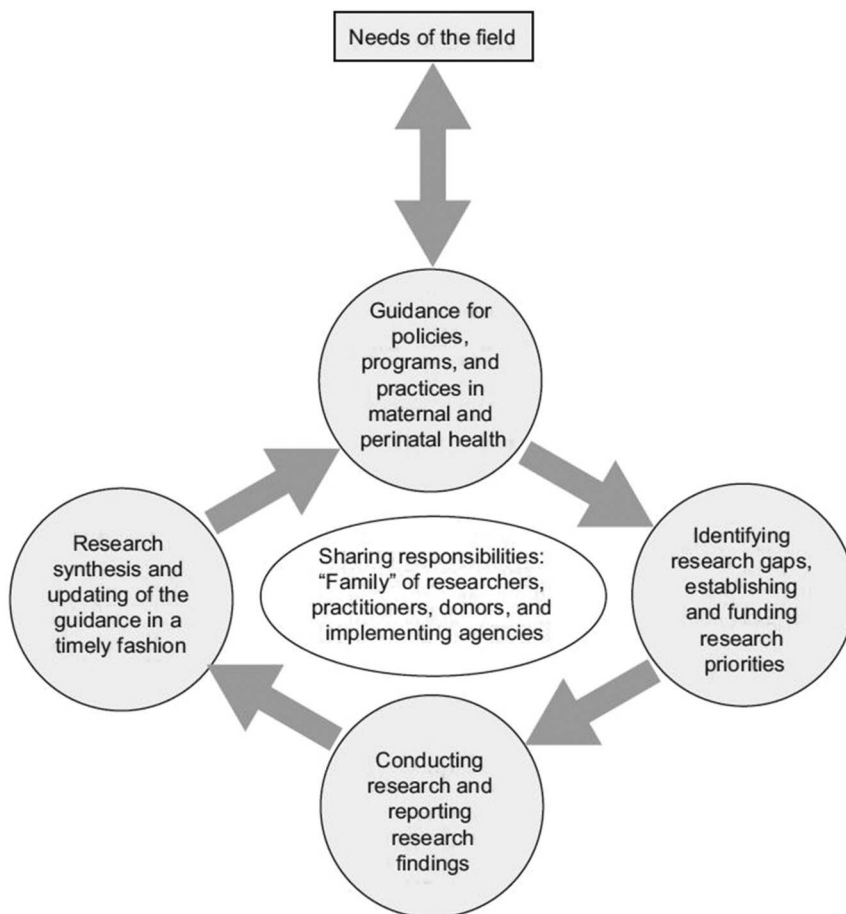
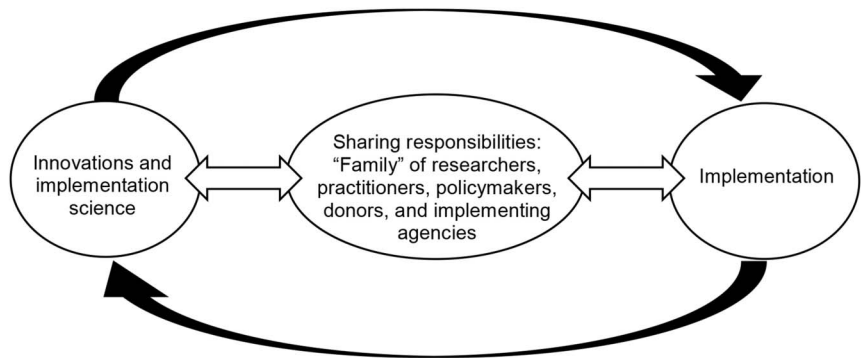


Fig. 5. The cycle for science-driven solutions for addressing priority needs in the field and shared responsibilities for its success. Reprinted from Peterson HB, d’Arcangues C, Haidar J, Curtis KM, Meriardi M, Gülmezoglu AM, et al. Accelerating science-driven solutions to challenges in global reproductive health: a new framework for moving forward. *Obstet Gynecol* 2011;117:720–6.

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Fig. 6. Using innovations and science to address challenges in implementing life-saving interventions for maternal and newborn health. This figure shares a common box with Peterson HB, d’Arcangues C, Haidar J, Curtis KM, Merialdi M, Gülmezoglu AM, et al. Accelerating science driven solutions to challenges in global reproductive health: a new framework for moving forward. *Obstet Gynecol* 2011;117:720–6. Reprinted from Peterson HB, Haidar J, Merialdai M, Say L, Gülmezoglu AM, Fajans PJ, et al. Preventing maternal and newborn deaths globally: using innovation and science to address challenges in implementing life-saving interventions. *Obstet Gynecol* 2012;120:636–42.



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science; 2) facilitating and organizing the interface among implementation scientists, practitioners, policymakers, and funders; and 3) applying implementation science to achieve sustainable solutions in global women’s, children’s, and adolescents’ health with reliability and at scale. In addressing the first challenge, we can take a cue from the business world’s recognition of the importance of research in solving real-life problems, which has led to the development of successful models for linking research to industry. For example, IBM played a key role in the development of computing science in the 1940s and 1950s and that new discipline, in turn, created business opportunities for industry and innovative products for consumers. Clearly, there will be no single public sector entity to play the role of IBM but, collectively, the public and private sectors working in concert with funders can unite to play this role for the public good. Existing models for stimulating research into innovations could be broadened to include innovations in implementation processes and practices.

Meeting the second and third challenges will require the global health community to build, sustain, and facilitate the use of structures, including new platforms and programs, to support the mutually beneficial interaction among researchers, practitioners, policymakers, and donors who, to date, have often worked in silos. Only then will we be able to operationalize the frameworks we described previously in *Obstetrics & Gynecology* for supporting United Nations efforts to assure science-driven solutions in reproductive health, including using innovations and implementation science to address challenges in implementing life-saving interventions in maternal and newborn health^{3,17} (Figs. 5 and 6). There is no

implementation science without implementation practice and expanding the knowledge base for implementation strategies being used in practice. Thus, the field of implementation science will be developed as we apply it, resulting in the aforementioned virtuous circle whereby implementation science informs implementation practices that, in turn, inform implementation science.

We are living in a moment in which the political will and priority for addressing the challenges in global women’s, children’s, and adolescents’ health have never been greater. Developing and applying the field of implementation science will help us to realize the potential of this moment and thereby improve the lives of those we serve in the United States and the world over.²

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