Asking different questions: a call to action for research to improve the quality of care for every woman, every child

Abstract

Despite decades of considerable economic investment in improving the health of families and newborns world-wide, aspirations for maternal and newborn health have yet to be attained in many regions. The global turn towards recognizing the importance of positive experiences of pregnancy, intrapartum, postnatal care, and care in the first weeks of life, while continuing to work to minimize adverse outcomes, signals a critical change in the maternal and newborn health care conversation and research prioritization. This paper presents “different research questions” drawing on evidence presented in the 2014 Lancet Series on Midwifery and a research prioritization study conducted with the World Health Organization. The results indicated that future research investment in maternal and newborn health should be on ‘right care,’ which is quality care that is tailored to individuals, weighs benefits and harms, is person-centered, works across the whole continuum of care, advances equity, and is informed by evidence, including cost-effectiveness. Three inter-related research themes were identified: examination and implementation of models of care that enhance both wellbeing and safety; investigating and optimizing physiological, psychological and social processes in pregnancy, childbirth, and the postnatal period; and development and validation of outcome measures that capture short and longer term well-being. New, transformative research approaches should account for the underlying social and political-economic mechanisms that enhance or constrain the well-being of women, newborns, families and societies. Investment in research capacity and capability building across all settings is critical, but especially in those countries that bear the greatest burden of poor outcomes. We believe this call to action for investment in the three research priorities identified in this paper has the potential to achieve these benefits and to realize the ambitions of Sustainable Development Goal Three of good health and well-being for all.

Keywords

Research priorities, maternal and newborn health, sustainable development goals, quality of care

Introduction and Background

We are an alliance of global stakeholders, comprised of academics, researchers, clinicians, policymakers, and service users who collaborated on a research prioritization study (1) with the World Health Organization (WHO) in response to the Lancet Series on Midwifery (1-5). This series started with a re-analysis of the evidence on quality care (1). Instead of examining the evidence from the perspective of the health system or workforce, this critical synthesis of quantitative and qualitative evidence examined the care and services that women and newborn infants need. This process, described in more detail below, identified a serious imbalance in the current evidence base; the great majority of existing research focuses on the treatment of complications when they occur, with very little on their prevention or the support of women, where most gains are to be made. This re-analysis demonstrated that care within the scope of midwifery has a critical contribution to make, with the potential to improve survival, health, and well-being, while reducing morbidity and resource use (1,2). Skilled midwifery was shown to be not only a question of workforce, but to be core to the provision of quality care. There is an urgent need to consider future research priorities in the light of these findings.

This paper reports on work that has followed on from that analysis, to identify research priorities to improve the quality of care for women and newborns, including the implementation of full scope midwifery. A research prioritization study was conducted to identify the most pressing research priorities aimed at addressing critical knowledge gaps in maternal and newborn health, including the perspectives of what matters most to women themselves (1).

Since publication of this research prioritization study, we have formed a research alliance, including funders and donors, to address and implement the priorities. Our aim is to improve and expand the knowledge base to support the United Nations/WHO “survive, thrive, and transform” agenda (6). The promotion of sustainable, context-specific, high-quality care holds potential for optimal physical, psychological, and social well-being for women, newborn infants, and families in both the short and longer term.

Despite decades of considerable economic investment of foundations, governments, and individuals in improving the health of families and newborns world-wide, aspirations for maternal and newborn health have yet to be attained in many regions (7). This may be explained in part by the fact that only an estimated 7% of these funds have been invested in women and girls (8). Additionally, the majority of studies have focused on reducing maternal and infant mortality and treating short-term morbidity, rather than building the economies, infrastructures, and skilled clinical workforces needed to reduce preventable death and suffering (9; 10). Some multicenter studies have generated new knowledge and improved outcomes, yet contrary to anticipation others have not demonstrated improvement. For example, one large multicenter trial found no significant difference in maternal and newborn care outcomes after implementing a safe birth checklist (11). In addition, there have been unanticipated consequences of implementing technology across settings before long term health implications were known (12). The near universal implementation of continuous electronic fetal monitoring in high resource settings has contributed to the cesarean epidemic and elevated maternal mortality associated with over-intervention (13). Nonetheless, electronic fetal monitoring continues to be investigated via funded randomized clinical trials, even though no benefit has been demonstrated in over 20 years of research (14-16).

Research resource waste and the length of time it takes for high-quality evidence to reach frontline health care and improve outcomes remain major concerns (17; 18). Many promising technological innovations in maternal and newborn care, such as video consultation in antenatal

clinics, are characterized by non-adoption or abandonment by individuals, or by failed attempts to scale up locally, spread distantly, or sustain over the longer term at the organization or system level (19). We contend that this reflects a lack of attention to implementation science, or inquiry which accounts for "the act to carry an intention into effect, which in health research can be policies, programmes, or individual practice" (20). Furthermore, what research gets funded and what findings get implemented can reflect gendered, cultural, and other power-laden hierarchies that privilege some voices and silence others (21; 22). Without understanding the contexts in which research is implemented and adapted, sustaining or generalizing the findings will be difficult and may too often result in what has been called the 'plague of pilots' wherein most projects fail or never go to scale, despite their initial promise for improving health (23).

For these reasons, ***the time has come to ask and answer different research questions***. The global turn towards recognizing the importance of prevention and of positive experiences of pregnancy, intrapartum, postnatal care, and care in the first weeks of life, while continuing to work to minimize adverse outcomes, signals what we see as a critical change in the maternal and newborn health care quality conversation and research prioritization (24-28).

The *Quality Maternal and Newborn Care Framework* (QMNC) (Figure 1) describes the full scope of care that should be accessible to all women and newborns (2). The evidence for the framework was drawn from data analyses presented in the Lancet Series on Midwifery (2-5). An extensive review of evidence included 461 Cochrane reviews of practice, 7 systematic reviews on workforce studies, and 13 meta-syntheses on women's views and experiences (2). Over 50 outcomes were improved by midwifery, including but not limited to decreased maternal and newborn mortality, fetal loss, preterm birth, low birthweight, and interventions in labor. Women were more likely to breastfeed, have improved psychosocial outcomes and birth spacing, shorter hospital stays, and to be attended by a known midwife. All the components of the framework, except the top right box (medical care for complications) are within the scope of midwifery practice and reflect not only how care is organized and delivered, but also the skill of

the practitioner and the philosophy and values upon which it rests, much of which is focused on prevention and strengthening women's capabilities. However, much of funding investment to date has been targeted toward research on complications of pregnancy and birth (29).

Modeling analyses presented in the Lancet Series on Midwifery demonstrated that if the model of care and philosophy described in the framework were widely applied, fewer women and newborns would require referral and treatment services for serious complications. The Lives Saved Tool was used to estimate the number of maternal and newborn deaths that could be averted if quality care, as described in the framework, were scaled up in 78 countries that bear the largest burden of maternal and newborn mortality (3). Scaling up midwifery care that includes family planning, could prevent 83% of all maternal deaths, stillbirths, and neonatal deaths. The third paper in the series presented extensive case studies of four countries that had sustained decreases in maternal mortality over two decades while increasing access to midwifery services, in order to understand interventions they used to strengthen their health systems (4). Across the four countries, they found an expansion of health facility networks, increased production of midwives and facility birthing, and decreased financial barriers. There was political will and commitment to improving maternal and newborn health, and midwifery was an integral part of the solution.

Collectively, the extensive body of good quality quantitative and qualitative evidence that informed the QMNC framework demonstrates that care focused on knowledge, skills, and positive interpersonal relationships results in optimal outcomes, especially when each level of care is well integrated between and across health and social systems (30). These findings support a system-level shift from the current primary focus on the identification and treatment of pathology for the minority. The evidence calls, instead, for a 'both-and' approach, which prioritizes skilled, tailored, respectful, preventive, and supportive care for all mothers and newborns and strengthens women's capabilities for normal reproductive processes, as well as identifies and treats pathologies for the minority requiring those services (Figure 2).

The QMNC Framework reflects the benchmarks of quality care needed by all childbearing women and infants. Further analysis shows that the majority of this care is provided best by midwives who are well educated, highly skilled in sexual and reproductive health, with effective professional regulation, and are integrated and supported within health care systems and who work in the context of interdisciplinary teams. However, a challenge in past research is the lack of specificity around what constitutes skilled midwifery care in many workforce studies. This has contributed to global confusion about the role and impact of midwives, in part because numerous studies have conflated care by midwives with care by non-professional health workers who not only lack adequate education and training, but sometimes must function in isolation and in the absence of even the most basic of resources (2; 31; 32). Are poorer than expected outcomes in some studies then a result of poverty, an under skilled workforce, a lack of systems integration, or a combination of factors that lead to low quality care? Without clear definitions and attention to a complexity of intersectional factors, outcomes of cross-country research are challenging to interpret. Thus, there is a clear need to prioritize future research to address these complexities.

Method for Identification of the Research Priorities

The research prioritization study was undertaken in collaboration with WHO (1). Researchers used a modified Child Health Nutrition Research Initiative method to ask global stakeholders across disciplines and populations relevant to maternal and newborn health to identify and rank future research priorities on quality maternal and newborn care, and the contribution of midwifery to that care. Participants (N=271) ranked priorities across the continuum of preconception, pregnancy, labor, birth, postnatal, newborn, and early weeks of life, taking into account short and longer term outcomes. They were also asked to consider what questions and approaches would matter most to childbearing women and families. Five criteria were used to

155 support the final scoring and prioritization of each of the topics (Table 1) See reference (1) for a
156 more detailed description of the method.
157 Eleven top research priorities were identified (1). We have combined them into three broad,
158 interconnected areas for future research (Figure 3). Below we discuss the relevance and key
159 components of each priority and propose some next steps for initiating a research-driven
160 approach to decreasing preventable global maternal and newborn death and suffering.
161
162 **Research Priority A:** *Evaluate the effectiveness of midwifery care as defined by the QMNC*
163 *framework and the contribution of its components, when compared to other models of care*
164 *across various settings, particularly on rates of maternal/fetal/infant death, preterm birth, and*
165 *low birth weight; and on access to and acceptability of family planning services*.
166 This priority is underpinned by the following assumptions
167 a. The evidence-informed QMNC framework provides a conceptual foundation to examine
168 and compare operational elements and mechanisms across a range of models of care.
169 b. All future research on models of maternal and newborn care should involve women,
170 communities, advocacy groups and clinicians in study design and conduct, and
171 interpretation of the findings.
172 c. We have found no randomized trials of skilled midwifery or midwifery models of care in
173 low resource settings, rather the focus has been on birth attendants with highly variable
174 levels of training and access to essential supplies and resources. The study of models
175 and philosophies of care is urgently needed in low and middle resource countries where
176 the potential benefits are greatest. In high resource countries, the need is particularly to
177 reduce the iatrogenic risks of over-treatment. In all settings, there is a need to
178 understand prevention, how to strengthen women's own capabilities, and how to
179 enhance positive well-being for mother and newborn in the short and longer term.

d. Given the evidence of cost-effectiveness and high levels of acceptability of midwife-led continuity of care from high-resource settings, and WHO recommendations for implementation of this approach where the health system is able to support it, there is a critical need to understand the mechanisms that underpin the effectiveness of these models (33). This should include the short and longer term outcomes subsequent to introducing these in low resource settings, and what underpins effective implementation and sustainability in all settings, using the QMNC framework.

e. Place of birth is also of increasing interest to policy makers, and there is evidence that community (home and birth center) settings are beneficial for some women and newborns in high income settings (34-39). There is also a need to study alternative models of care in settings where facility-based birth is problematic for those who cannot attend for logistical reasons such as distance or economic constraints.

There is high quality evidence, based on trials conducted in high resource countries that midwife-led continuity of care, compared to other models of care, improves a range of outcomes for women and infants including lower rates of preterm birth and fetal loss, higher levels of maternal well-being, and overall lower health care costs (40). However, similar data are lacking in low resource countries, particularly about how midwife-led continuity of care is delivered and in what settings. Despite the evidence on the benefits of planned home birth and community and hospital birth centers for healthy women and newborns (37; 39; 41-43) in high resource settings, these models have been minimally studied in middle or low resource settings, a gap that urgently needs to be filled. As described above, the addition of family planning services as part of the provision of quality maternal and newborn care has been estimated to markedly avert maternal and neonatal mortality (3), yet there are few studies that have examined integration of this component of care into the scope of midwifery practice.

Using the QMNC framework to design and inform analyses in future research will allow some level of consistency across models of care being tested and compared with other models,

and maximize the potential for substantial impact on outcomes. Future research should attempt to examine the full scope of midwifery care within the QMNC framework, including family planning services and care across the continuum of preconception, pregnancy, labor, birth, postnatal, breastfeeding, and the first few weeks of life.

We propose research designed to meet this priority should include, but not be limited to the following questions:

1. Using the QMNC framework, what are the features of models of care that provide optimal clinical outcomes and positive antenatal, intrapartum, postnatal, and early life experiences for women and newborns across all resource settings and within specific sociocultural contexts, and how can these be replicated or scaled up?
2. What are the short and longer term outcomes of different models of midwifery, including midwife-led care continuity of care based on the QMNC framework in middle and low resource settings?
3. In all resource settings, what are the unique barriers or facilitators to implementing midwifery models of care, including midwife-led continuity of care as reflected in the QMNC framework?
4. What strategies could be used to upskill midwifery workforces to provide the full scope of midwifery, including midwife-led continuity of care across settings through improvement and implementation science as determined by distinct contexts?
5. What kinds of community birth places are optimal for healthy women and newborns, and how should these be embedded in the wider health system to ensure right sizing and appropriate delivery of obstetric resources?

Research Priority B: *Identify and describe aspects of care that optimize, and those that disturb, the biological/physiological processes for healthy childbearing women and fetus/newborn infants and for those who experience complications*.

This priority is underpinned by the following assumptions:

a. Health and well-being for childbearing women and their newborns and infants is a continuum, with long term impacts, including for subsequent generations.
b. The health status of the mother from the preconception period and throughout pregnancy can be protective or hazardous for the subsequent childbirth and postnatal period and can impact the ability to breastfeed and care for the newborn and other children.
c. The majority of women across resource settings and contexts (including some who have complications) have the potential to labor and to give birth safely as a result of naturally occurring biological and physiological processes (25).
d. Behaviors, attitudes, care processes, birth environment, and interventions enacted by maternal and newborn care providers can actively optimize or disturb the naturally occurring biological and physiological processes of pregnancy, labor and birth, postnatal, breastfeeding and the early weeks of life, with short and longer term outcomes (44).

A woman's health and well-being before and during pregnancy, and how that has been supported, sets the stage for the labor and birth and beyond. Further challenges in conducting research include the interactions among psychological, emotional, and physical factors, including cognitive and cultural beliefs about pregnancy, childbirth and breastfeeding, the familial and social setting in which the childbearing woman lives, and where and how maternal and newborn care takes place. These include social determinants of health such as poverty, inequitable access to care, advertising, marketing, and social pressures, among many other factors. A positive or traumatic experience in pregnancy, birth, or the postnatal period also has the potential to affect future pregnancies; the woman's childbearing journey can have cumulative physical and psychological effects over her reproductive life time and beyond.

Much of what we currently understand about the naturally occurring physiology of the perinatal period and breastfeeding of the newborn, is based on animal models and population-

based studies. In the case of the latter, understanding of human physiological processes during the entire childbearing continuum is heavily confounded by commonly used procedures and interventions. Few studies have prospectively examined the effect of care models, procedures, attitudes, behaviors, and settings on short and longer term biological and physiological processes of pregnancy, birth, breastfeeding and the neonatal period. The Epigenetic Impact of Childbirth Research Group (45) posits that the use of interventions during the intrapartum period, such as synthetic oxytocin, antibiotics, and cesarean delivery, can impact epigenetic remodeling, microbiomial integrity, and subsequent health of the mother and children. There is also growing literature on the importance of breastfeeding on the microbiome and thereby on the immune system (46; 47).

Buckley has compiled an impressive body of work that examines the hormonal physiology of childbirth (44). She suggests that the perinatal period is a “window of heightened sensitivity, with potential longer-term impacts,” not only for the entire perinatal period, but also across the life course. ‘Optimality’ during the perinatal period has been defined as the, “maximal perinatal outcome with minimal intervention placed against the context of the woman’s social, medical, and obstetric history” (48). This suggests that in order to achieve best outcomes, there are complex intersections to balance care practices with the woman’s needs and those of her baby. All of the components of the QMNC framework directly or indirectly reflect this research priority; however, practice, philosophy, and values specifically address care that preserves normal physiological processes and is respectfully tailored to the woman’s individual needs.

We propose research designed to meet this priority should include, but not be limited to the following questions:

1. What are the biological, physiological, psychological, sociological, and cultural features of physiological pregnancy, labor and birth, postnatal, breastfeeding, and the newborn period (hereafter referred to as the childbearing continuum), and how are they influenced across care settings and models of care?

2. What specific practices, attitudes, and behaviors optimize or disturb biological and physiological processes across the childbearing continuum, in a range of health system, sociocultural, geographic, and commercial contexts?
3. How do organizational and birth environment factors, including setting, architecture, artifacts, policies, and access to care optimize or disturb biological and physiological processes across the childbearing continuum?
4. How do providers' attitudes and behaviors optimize or disturb biological and physiological processes across the childbearing continuum, and how are they influenced by disciplinary training and norms, experience, philosophy, and preparation?
5. How do the attitudes, behaviors, and pre-birth preparation activities of women, their partners, and families optimize or disturb biological and physiological processes across the childbearing continuum?
6. What are critical lifetime reproductive, life course, and inter-generational outcomes that are impacted by optimization or disturbance of naturally occurring biological and physiologic processes across the childbearing continuum?

Research Priority C: *Determine which indicators, measures, and benchmarks are most valuable in assessing quality maternal and newborn care across settings, including the views of women; and develop new ones to address identified gaps*.

This priority is underpinned by the following assumptions:

a. Most outcomes and instruments currently used in maternal and newborn care research are focused on mortality, morbidity, and short-term assessments. There is increasing recognition of the connection between positive maternal and newborn care experiences and clinical outcomes and growing evidence on what matters to women. Taken together, these indicate that the focus to date on pathology and short term outcomes has

excluded an extensive and critical area of outcomes assessment of positive childbearing care and experiences.

b. When involving trials research, we support the goals of the CROWN initiative (49); however, it is likely that the metrics and measures used in traditional and established research approaches, including randomized controlled trials, will fall short in capturing the complexity of care during the childbearing continuum and first weeks of life; outcome measures need to be tailored to individuals and their local context.

c. Mixed method approaches that include quantitative and qualitative data, and the active engagement of women and service users in the design and conduct of research, are more likely to capture the complex interactions between health services and experience of care and outcomes during the childbearing continuum and first weeks of life.

d. Most nations, states, provinces, health systems, institutions, professional organizations, and special interest consumer/service user groups have unique data needs that are context-dependent.

e. It is possible to develop shared data collection tools, databases, and analytic strategies that identify existing measures and instruments for optimal maternal and newborn outcomes in the short and longer term, and to address related gaps.

f. Facilitating access to a pool of standardized, validated instruments and metrics that can be tailored for local cultural, social and economic contexts, could promote cross-cultural and cross-setting assessment, and appropriate locally-relevant and evidence-informed recommendations.

This purpose of this priority is to optimize procedures and opportunities for identifying and developing indicators, measures, and benchmarks that may be used to assess and compare quality of care, as defined by service users, as well as by health systems (5). We propose that facilitation of coordinated data collection and databases, and open access spaces that can serve

as repositories for sharing validated measures, will substantially improve the ability of researchers and decision-makers to examine maternal and newborn care across settings and populations.

It is critical that existing instruments, benchmarks, and metrics are assessed for a high degree of context specificity. Funding could enable the synthesis of a set of methodologies for the adaptation and validation of tools locally that could be made widely available by Open Source type access. Where gaps exist, new instruments and methods should be developed, with particular regard to understanding what matters in the short and longer term, especially for underserved and vulnerable populations.

Transdisciplinary communities of colleagues with expertise on practice, philosophy, organization of care/health systems, and policy can help to define concepts that have not yet been adequately or reliably described and to create composite measures for complex phenomena such as inter-professional collaboration or maternal perceptions of respectful care, to name a few. Furthermore, it may be possible to develop an index to assess components of care that promote or detract from quality of care at the institutional level.

Future work in this priority should identify significant gaps in validated instruments that can assess the impact of models of care on maternal and newborn outcomes, measure quality and experience of care from a service user perspective, and evaluate components of care that optimize, or disturb, the biological/physiological processes of the childbearing continuum in the short and longer term.

We propose research designed to meet this priority should include, but not be limited to the following questions:

1. Can a culturally, linguistically, and socially relevant minimum data set be created to evaluate the “different questions” proposed by the Lancet Series on Midwifery global health stakeholders (1), taking into account positive experiences and short and longer term outcomes? Can this minimum data set reflect what matters to women and service users, including those most vulnerable and marginalized?

2. How do we create and make more widely available an item bank of existing, validated measures and indicators that align with the QMNC framework?
3. How do we best evaluate existing models of care using the QMNC framework, including short and longer term health outcomes and cost effectiveness?
4. How do we best assess gaps in measures and indicators and support targeted development of new ones to capture all components of the QMNC framework across the childbearing continuum and in the first weeks of life in all resource settings?
5. How can we best ensure and support community-led design, development and validation of new measures of the impact of the lived experience of care on quality and safety, as defined by the person?
6. How can these measures be used most effectively to support quantifiable improvements in both clinical indicators and maternal experiences? Are they more applicable to research, evaluation or quality assurance/quality improvement programs in existing form, or do they have cross-cutting value?

Discussion

Over the past decade the survival and health of childbearing women and their newborns globally has improved, but rates remain unacceptably short of the United Nations Development Programme Sustainable Development Goals (50). There is a growing recognition that high levels of mortality and morbidity are co-existing with excessive rates of intervention and failures in the quality of care across the childbearing continuum and into the early weeks of life. This is associated with iatrogenic damage in the short term, and possibly into the longer term and even transgenerational (51). There is also a global turn towards valuing positive outcomes of maternal and newborn care, as well as the reduction of negative outcomes (24-26).

New insights into mechanisms of effect generated by critical and realist research philosophies suggest that the kinds of questions that have been asked for decades by funders

and researchers may not be suitable for the complex adaptive systems under examination, such as maternal and newborn care (52-54). Researchers may not pay enough attention to the issues of what works, for who, in what contexts, or short and longer term outcomes that matter to stakeholders (20). They may focus on individual interventions and their effects, rather than on the broader picture of preventive and supportive care for all.

We argue that future investment in maternal and newborn health should be focused on "right care" - that is, care which is tailored to individuals, weighs benefits and harms, is person-centered, works across the whole continuum of care, advances equity, and is informed by evidence, including cost-effectiveness (33). The challenge is to find the right care that will help balance the "too little too late" phenomenon of poor access to safe, quality care, with care that is "too much too soon" in settings which often results in unnecessary interventions (34). Along with using well established research methods, we will need to evolve new, transformative approaches that consider the underlying social and political-economic mechanisms that function to enhance or constrain the well-being of women, newborns, families and societies within a complex global network marked by resource inequity.

Policy decisions should be informed by evidence, and for this we need more investment in implementation research to understand health systems and test solutions in a range of situations and contexts. The involvement of end users, and particularly the political will within system hierarchies in identifying problems and solutions provides vital insights and increases the likelihood that they will be relevant and appropriate for large-scale implementation (4; 5; 55). Policymakers' involvement should be part of the assessment criteria of any research proposal and policy-level implementation should be considered in the dissemination of research findings (20; 56; 57).

Future research programs must include new kinds of questions that involve local communities and are co-designed with women and other stakeholders. The questions should be designed to ensure that the resulting findings contribute to the achievement of health equity,

and therefore consider the needs of the most vulnerable. Ideally, studies should be undertaken across a range of centers, including low, middle, and high resource settings. Research programs should encompass biological, psychological, emotional, social, economic, cultural, and life course aspects of the childbearing continuum and the first weeks of life and should include settings where minimal intervention and optimal outcomes are the norm.

This effort will require a system-wide shift and a different lens. It will be critical to strengthen inter- and trans-disciplinary research capacity and capability building across midwifery, obstetrics, pediatrics and other fields, such as economics, epidemiology, engineering, architecture, and social sciences to fully examine the complexities of quality maternal and newborn care. This investment should be across all settings, but especially in those countries that bear the greatest burden of poor outcomes.

Conclusion

It is important to provide timely and effective treatment and interventions for the minority of women and infants who experience pathology. However, it is also essential to provide high quality skilled care for all women, infants, and families, and thereby to enhance health and well-being for all in the short and longer term. This can be done by the conduct of research and ensuring the provision of skilled, respectful, preventive and supportive care for all and by maximizing the benefits of physiological pregnancy, labor, birth and the postnatal and neonatal period, to ensure positive motherhood, parenthood, and early years of health and development. We believe this “call to action” for investment in the three research priorities identified in this paper has the potential to achieve these benefits and to realize the ambitions of Sustainable Development Goal 3 (50) and the “Every Woman Every Child Survive, Thrive, Transform” agenda (6).

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592 Figure 1.

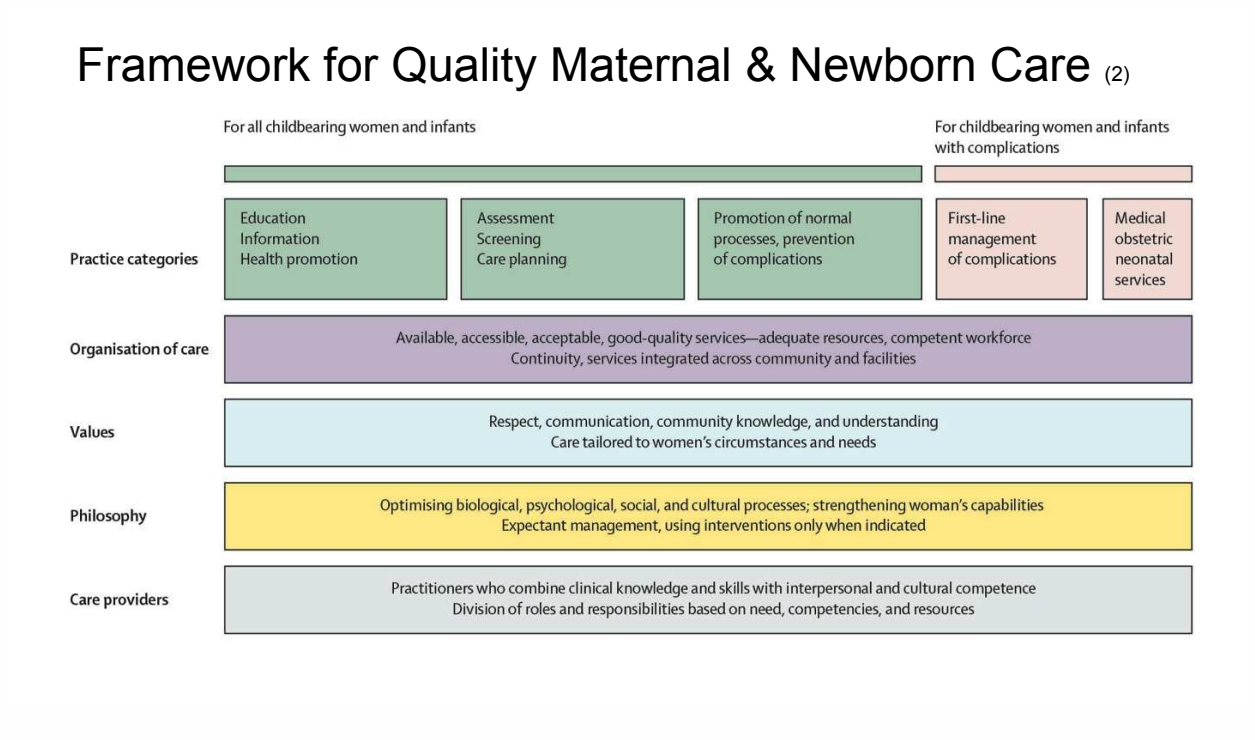

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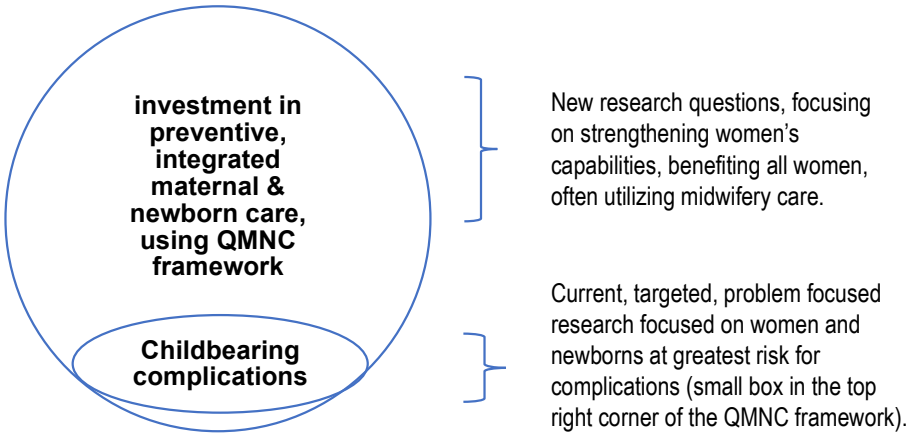
Figure 2. Emphasis for future research



598 Figure 3. Interconnection of the future research priorities to improve the quality of care for every
599 woman, every child
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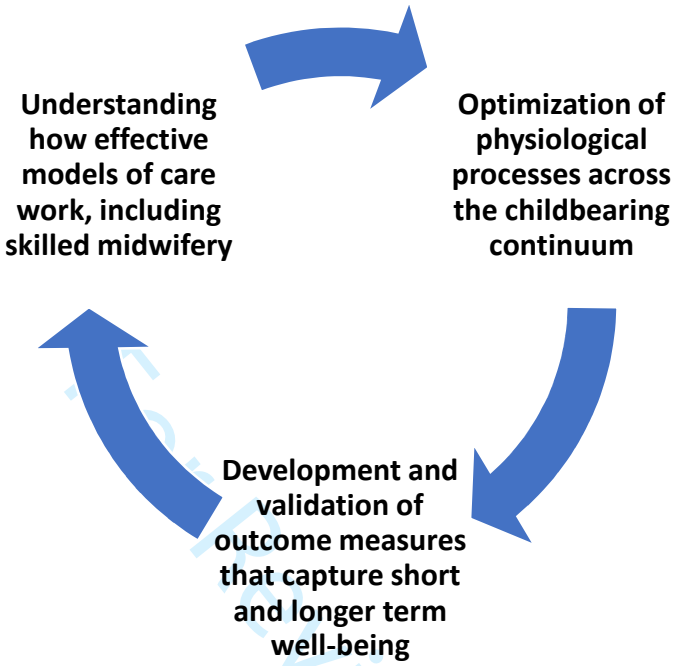

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603 Table 1. Definitions of criteria used for scoring research priorities (listed in order of rank)

Criterion	Definition
Maximal Impact	Is it likely the research will lead to high quality care for women, infants, and families; improve the short- and/or long-term physical, social and emotional health and well-being of women, infants, and families; and/or have an impact on the broad social conditions of people's lives that influence health and well-being?
Answerability	Can the new knowledge lead to an efficacious intervention or program? Is the research question clear and transparent about process and outcomes and respects ethical principles that protect human rights?
Community* Involvement **Community includes women, infants, girls, families, and the context in which they live, but could also include clinicians; user groups of services, policymakers, etc.*	Does the research have the potential to engage communities about topics important to them and/or include groups that are seldom heard, often excluded, or hard to reach? Are the proposed interventions or programs deliverable and acceptable to the community?
Sustainability	Is it likely that there will be adequate resources and commitment to the conduct of the research and/or that the implementation of the research results will be affordable over time in a variety of settings? Can the interventions or programs improve maternal and newborn health substantially over time?
Equity	Does the research have the potential to reduce inequities by including those most vulnerable to poor outcomes and/or enhancing the health and well-being of ALL childbearing women, infants, and families?

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Concept Paper Commentary – Response to Reviewers

Reviewer Comment	Response
Reviewer 1:	
I am not an expert in Global Women's and Children's Health, but I have spent 6 months in the publically-underfunded obstetrical trenches in urban and rural Kenya. I find this commentary too general, naïve, and over-encompassing in scope to be an interesting read or helpful in setting a research agenda.	*Thank you for your assessment. We have gone back over the manuscript to more thoroughly outline the findings from the Lancet Series on Midwifery and the gaps upon which the priorities were identified.*
Precis: We should study every physiological, psychological, social, familial, cultural, economic, and political factor at the local, regional, national, and international level that influences the continuum of pre-conceptual, antenatal, intrapartum, postpartum and newborn care in the context of a woman's life-cycle, with particular attention to the heretofore neglected areas of women's, children's and family's experiences and the expansion of a highly skilled midwifery care model to low-resource settings that currently struggle to pay for and provide basic, clean, obstetrical care for millions of poor women.	If we need a precis we would suggest the following: *Future research investment in maternal and newborn health should be on 'right care,' which is tailored to individuals, weighs benefits and harms, is person-centered, works across the whole continuum of care, considers equity, and is informed by evidence, including cost-effectiveness. It should also address the relatively neglected study of women's, children's, and family experiences and the evidence gap around the implementation of skilled midwifery, particularly in low-resource settings.*
Reviewer 2	
I have a more favorable view of the article, which is well written and makes a good case for reframing research priorities to reflect a larger set of societal goals in childbirth.	*Thank you.*
From an editorial perspective however, I think a midwifery journal would be a more appropriate venue as it is currently written-- as an interdisciplinary journal, I worry about Birth being perceived as a shill for any one professional interest. The authors and the working group that generated these priorities makes sweeping leaps in associating complex	*We have added more specific data from the Lancet Series on Midwifery to support the justification for the system issues needed in future research. In addition, we have added clarification that the evidence supports that midwifery is core to quality, dignity, and equity.*

Reviewer Comment	Response
systemic challenges with "midwifery models of care." (I suspect this may be in part, the "over-encompassing scope" that Reviewer 1 is concerned with as well).	
Editor	
I'm not quite sure what to do with reviews of this type. They are very general. I feel that setting an overall research agenda needs to be wide in scope, so reviewer 1's comment doesn't really bother me too much.	Great.
As far as reviewer 2's comment that the piece would be better placed in a midwifery journal, I disagree. Birth is at least in part about midwifery, and I want to keep it that way. We publish plenty of other articles more related to standard obstetrics, etc. As far as reviewer 2's comment about the "sweeping leaps in associating complex systemic challenges with midwifery models of care", I think the comment has some justification. Maybe some of the connections between systemic issues and midwife models of care need to be drawn more explicitly, particularly for readers less familiar with some of the midwifery literature on this.	*See our comments above on how we approached this.*
Bottom line - Please try to be responsive to the reviewers to the extent that you can.	