Continuum of care for maternal, newborn, and child health: from slogan to service delivery

Kate J Kerber, Joseph E de Graft-Johnson, Zulfiqar A Bhutta, Pius Okong, Ann Starrs, Joy E Lawn

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Saving Newborn Lives, Save the Children, Washington DC, USA (K J Kerber MPH, J E de Graft-Johnson MD, J E Lawn MRCP); **ACCESS Program, Baltimore, MD, USA** (J E de Graft-Johnson); **Department of Pediatrics and Child Health, Aga Khan University, Pakistan** (Prof Z A Bhutta PhD); **Department of Obstetrics and Gynaecology, Nsambya Hospital, Uganda and International Federation of Gynecology and Obstetrics Committee on Maternal and Newborn Health, London, UK** (P Okong MD); **Family Care International, New York, USA** (A Starrs MPA); **and Partnership for Maternal, Newborn, and Child Health, Geneva, Switzerland** (A Starrs)

Correspondence to: Dr Joy E Lawn, Saving Newborn Lives, Save the Children-US, 11 South Way, Pinelands, Cape Town 7405, South Africa **joylawn@yahoo.co.uk**

The continuum of care has become a rallying call to reduce the yearly toll of half a million maternal deaths, 4 million neonatal deaths, and 6 million child deaths. The continuum for maternal, newborn, and child health usually refers to continuity of individual care. Continuity of care is necessary throughout the lifecycle (adolescence, pregnancy, childbirth, the postnatal period, and childhood) and also between places of caregiving (including households and communities, outpatient and outreach services, and clinical-care settings). We define a population-level or public-health framework based on integrated service delivery throughout the lifecycle, and propose eight packages to promote health for mothers, babies, and children. These packages can be used to deliver more than 190 separate interventions, which would be difficult to scale up one by one. The packages encompass three which are delivered through clinical care (reproductive health, obstetric care, and care of sick newborn babies and children); four through outpatient and outreach services (reproductive health, antenatal care, postnatal care and child health services); and one through integrated family and community care throughout the lifecycle. Mothers and babies are at high risk in the first days after birth, and the lack of a defined postnatal care package is an important gap, which also contributes to discontinuity between maternal and child health programmes. Similarly, because the family and community package tends not to be regarded as part of the health system, few countries have made systematic efforts to scale it up or integrate it with other levels of care. Building the continuum of care for maternal, newborn, and child health with these packages will need effectiveness trials in various settings; policy support for integration; investment to strengthen health systems; and results-based operational management, especially at district level.

Introduction

The continuum of care has recently been highlighted as a core principle of programmes for maternal, newborn, and child health, and as a means to reduce the burden of half a million maternal deaths, 4 million neonatal deaths, and 6 million children who die between the ages of 1 month and 5 years.[1–3] The continuum of care is a recurrent theme in the *World Health Report* 2005[1] and *The Lancet* Neonatal Survival Series.[2] The continuum also provides the foundation for the conceptual framework of the Partnership for Maternal, Newborn and Child Health (PMNCH)[4] and Opportunities for Africa's Newborns.[5] The Global Business Plan for Millennium Development Goals 4 and 5, which was called for at the World Health Assembly 2007, also emphasises the continuum of care.[6]

The goal of this approach is to avoid dichotomies, between either mothers and children, places of service delivery, or single health issues (table 1).[7,8] Within the continuum, all women should have access to reproductive health choices and care during pregnancy and childbirth, and all babies should be able to grow into children who survive and thrive.[9]

The continuum-of-care approach has been used as a rallying call for integration of programmes for maternal, neonatal, and child health, but often without a clear

Policy conflicts	Win–win strategies
Competing voices of advocates for health of women and children, with those for newborn babies not heard	Mothers, neonates, and children all benefit from essential packages in a continuum of care MDG 4 and 5, for child survival and maternal health, respectively, are both intimately linked with health of neonates More attention on health of mothers, neonates, and children, but need for financial investment Global health-policy shift; organisations with disparate agendas formed the Partnership for Maternal, Newborn and Child Health in 2005
Facility-based *vs* community care Vertical *vs* horizontal programming	Systematic, phased strengthening of health systems (including community-based care) with emphasis on universal coverage of essential packages for health of mothers, neonates, and children Integration between essential packages for health of mothers, neonates, and children and integration of these packages with other programmes, such as those for HIV, malaria, and vaccine-preventable diseases Community-based approaches to promote healthy behaviours and demand for skilled care; to deliver selected essential interventions to under-serviced populations; and to improve supply and quality of clinical care
Global tracking *vs* national and district needs	Tracking of MDGs, including deaths, funding for health, and the coverage and equitable distribution of essential interventions Promotion of accountability of governments and partners, with a focus on results National stewardship with decentralisation and district management
Competing interests of many partners, donors, and governments	Country-led action with support from donors harmonised to accelerate progress, and broader partner inputs such as professional and non-governmental organisations, in the spirit of the Paris Declaration[9]

MDG=Millennium Development Goal. Adapted from reference 7 with permission.

Table 1: **Paradigm shifts towards a continuum of care for mothers, neonates, and children**

application. Rapid escalations in investment, related to MDG 4 for child health and MDG 5 for maternal health, have increased the need for a solid framework for implementation and assessment. Who is the continuum of care for, and what are the essential service-delivery packages within it? What coverage does such care have? What are the challenges to building and tracking results for an effective continuum of care within existing health systems?

Defining the continuum of care

The term was initially applied in the 1970s to the integration of research and practice for provision of a continuum of care for elderly people.[10] In subsequent decades, use of the term has broadened, although it most commonly refers to individual patient care and case management, and to promotion of appropriately directed care with a series of linkages to ensure that no patient is lost to follow-up. A systematic review[11] showed that most of the 638 papers on the continuum-of-care approach between 1995 and 2002 focused on health systems for nursing, palliative care (58%), and mental health (19%). Others assessed the continuum within biomedical care (11%) and health-service administration (8%). Fewer than 1% of the identified papers related to public health or health promotion. These papers emphasised the connections between components along a continuum of care—including people, places, and times.[11]

We aimed to define a framework for the continuum of care for maternal, neonatal, and child health, in the context of developing countries. We searched with the terms "continuum of care", "continuum", and "continuity". These searches identified 412 articles of relevance to international public health, of which eight referred to integrated care for health of mothers, neonates, and children but did not define this in practical terms. Therefore, the policies, programmes, and information systems that are needed to guide an effective, integrated, population-level continuum of care have not been addressed in published work.

The health of mothers, newborn babies, and children consists of sequential stages and transitions throughout the lifecycle. Women need services to help them to plan and space their pregnancies and to avoid or treat sexually transmitted infections. Pregnant women need antenatal care that is linked to safe childbirth care provided by skilled attendants. Both mothers and babies need postnatal care during the crucial 6 weeks after birth; postnatal care should also link the mother to family-planning services and the baby to child health care. Adolescents need education and services for nutritional, sexual, and reproductive health. If women, babies, children, or adolescents experience complications or illness at any point, continuity of care from household to hospital, with referral and timely emergency management, is crucial.

To add to the complexity, patients are often targeted simultaneously by cross-cutting programmes (eg, those that promote nutrition) and programmes with separate funding and management streams (eg, those for immunisations, malaria, and HIV). Lack of integration between such programmes can result in fragmented service delivery, affect quality and continuity of care, and cause dissatisfaction for both clients and providers.[13] Each contact with the health system is an opportunity not only to provide promotional, preventive, or curative care, but also to amplify the effect of the subsequent contact. However, the challenges are apparent even in strong health systems, since each transition requires connections between care providers, programmes, and levels of care to ensure that a mother, baby, or child does not fall through the cracks of a weak continuum.

During the brief history of international interest in the continuum of care for maternal, newborn, and child health, a range of definitions have been proposed, mainly during the past 2 years (panel 1).[1,2,4,12–15] These definitions differ in scope, and address various levels and aspects of care for mothers, newborn babies, and children. Few, if any, of these definitions focus on reproductive health, and none incorporate the dimension of coverage of care. We propose a new definition that builds on this previous work:

> "The continuum of care for maternal, neonatal, and child health requires access to care provided by families and communities, by outpatient and outreach services, and by clinical services throughout the lifecycle, including adolescence, pregnancy, childbirth, the postnatal period, and childhood. Saving lives depends on high coverage and quality of integrated service-delivery packages throughout the continuum, with functional linkages between levels of care in the health system and between service-delivery packages, so that the care provided at each time and place contributes to the effectiveness of all the linked packages."

Figure 1 shows that the continuum can be defined over the dimension of time (throughout the lifecycle), and over the dimension of place or level of care.[4,5] The continuum of care over time includes care before pregnancy (including family-planning services, education, and empowerment for adolescent girls) and during pregnancy. During childbirth and the days immediately afterwards, mothers and babies are at highest risk of death; over half of all maternal and neonatal deaths occur during this period.[16] Of the estimated 3·2 million stillbirths every year,[16] 30% occur during childbirth, yet even now, every year 50 million women deliver at home.[17] An effective postnatal care package for mothers and babies would facilitate the transition between maternal care and preventive and curative care to improve child survival.

The continuum of care over the dimension of place or level includes the home, the first-level facility, and the hospital. An effective continuum would ensure that appropriate care was available wherever it was needed, and linked, where necessary, to other levels of care (figure 1). In many developing countries, most deaths of

Panel 1: Definitions of the MNCH continuum of care

"Programs succeed best when they provide a package of services, including community-based family planning, health and nutrition services. Substantial—and sustained—reduction of the risk of dying once pregnant, however, requires an effective continuum of care from the community to the first-referral level, supported by a public education program."

World Bank, 1993[12]

"The right person, at the right time, in the right place, providing the right care."

Centers for Disease Control/CARE International, 2001[13]

"The core principle underlying the strategies to develop MNCH programmes is the 'continuum of care'. This expression has two meanings. First it means care has to be provided as a continuum throughout the lifecycle, including adolescence, pregnancy, childbirth and childhood. Second it indicates that care has to be provided in a seamless continuum that spans the home, the community, the health center and the hospital."

World Health Report 2005[1]

"The time has come for these health interventions for newborn babies to be integrated into maternal and child health programmes...The continuum-of-care approach promotes care for mothers and children from pregnancy to delivery, the immediate postnatal period, and childhood, recognising that safe childbirth is critical to the health of both the woman and the newborn child—and that a healthy start in life is an essential step towards a sound childhood and a productive life. Another related continuum is required to link households to hospitals by improving homebased practices, mobilising families to seek the care they need, and increasing access to and quality of care at health facilities."

The Lancet *Neonatal Survival Series, 2005*[2]

"The household to hospital continuum of care approach provides pragmatic steps to ensure the availability of and access to quality maternal and newborn services at peripheral health facilities and district hospitals, while strengthening linkages in between."

Save the Children, 2005[14]

"The continuum of care that follows the life-cycle is part of a high impact program delivery, supported by enabling environment, encompassing strong political commitment and strengthened comprehensive health system, from community level to clinical services."

Mangiaterra and colleagues, 2006[15]

"This encompasses a continuum of essential interventions that should be accessible to mothers, newborns and children at household, community, district and national levels, as well as continuum that follows through the lifecycle of maternal, newborn and child health."

PMNCH, 2006[4]

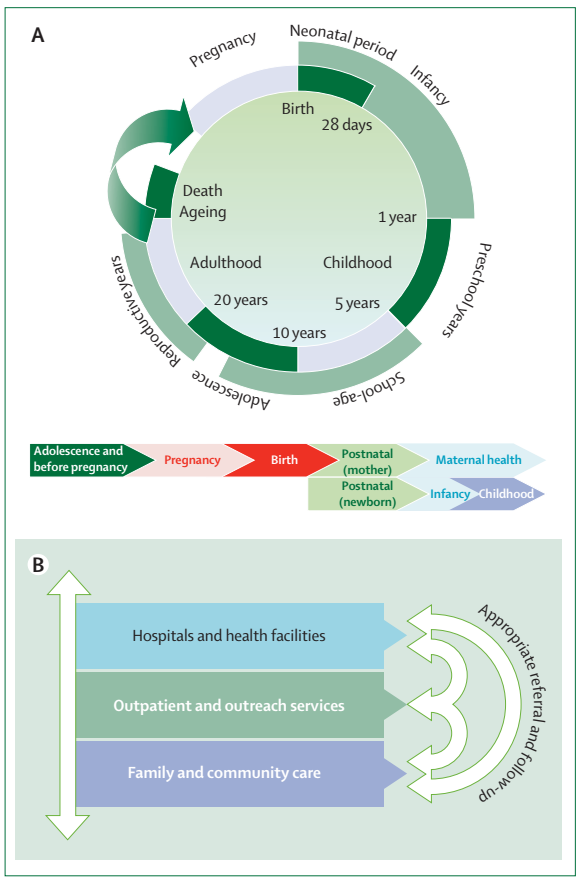

Figure 1: **Continuum of care**
Connecting care during the lifecycle (A) and at places of caregiving (B). Adapted from Partnership for Maternal, Newborn and Child Health, with permission.[4,5]

babies[18] and children,[19] and many maternal deaths[20] occur at home, commonly because of delays in reaching care.[21] Mothers and babies are especially vulnerable to death: a woman with postpartum haemorrhage or a baby with birth asphyxia, sepsis, or complications of preterm birth can die within hours or even minutes if appropriate care is not provided. Delayed attention to complications during labour leads not only to deaths but also to poor outcomes such as intrapartum stillbirths, neonatal illness and disability, obstetric fistula, and other long-term obstetric complications.[21] Long distances, financial constraints, poor communication and transport, weak referral links, and at times, low-quality care in health facilities, can limit access to care for those who need it most.

The place dimension of the continuum can be defined as the physical location where care is provided. The operational levels of different health systems vary widely, but three distinct approaches can be differentiated on the basis of the skill and intensity of service delivery and the obstacles to care.[22] The first approach—clinical care—consists of individual-oriented case management of mothers, babies, and children with illness or complications, which is typically provided through facility-based care at primary and referral sites. These

services, such as emergency obstetric care, are the most challenging and costly to provide, but also have the highest potential to save lives. Clinical care should therefore be available for 24 h per day, and providers must be adequately trained, equipped, and supervised. Normal childbirth also demands skilled clinical case management and continuous availability of health-care professionals.

The second approach—outpatient and outreach services—consists of population-oriented services, delivered on a routine scheduled basis, either through static clinics (for example routine antenatal or postnatal care) or through mobile services (for example immunisation campaigns or child-health days). These services are commonly standardised, in that clients receive the same care, and therefore the skills needed by providers are easier to learn than those for clinical case management.

The third—family and community care—consists of home-based care practices. Programmes to improve family and community care, by promoting adoption of healthy behaviours and empowering individuals and families to demand quality services, should be tailored to specific social and cultural environments through formative research. Community healthworkers need negotiation skills (eg, to promote breastfeeding or use of oral rehydration salts) and skills to address basic health needs across the lifecycle.[23] In some health systems, provision of clinical case management to communities might be the most feasible way to increase access to essential interventions, at least in the short term. However, synergistic connections between the three delivery approaches are necessary; none of them is sufficient on its own.

Building the continuum of care with health-service packages

Studies suggest that high coverage and quality of essential packages could avert about 67% of neonatal and child deaths in 60 priority countries worldwide.[24] These analyses have included packages for maternal and child health, basic and emergency obstetric care, and postnatal care.[24] A functional continuum can increase client and provider satisfaction.[11] At the public-health level, linkages between integrated packages can maximise the efficiency with which the scarce human and financial resources available for health care are used.[25]

The continuum of care is the basis of health care in many wealthy countries, especially those with government-funded health-care systems with near-universal coverage. The countries ranked as the ten best for maternal health all have an effective continuum of care for the health of mothers, neonates, and children, both in policy and in reality.[26] In many low-income countries, which have shortages in human and financial resources and inadequate health-system infrastructure, care is neither continuous nor integrated, although some, such as Sri Lanka, have reduced maternal, neonatal, and child mortality by bringing care close to families.[27] An effective continuum is especially important for maternal survival, since timely linkage to referral-level obstetric care is necessary to reduce maternal mortality. Monitoring implementation of the continuum of care for health of mothers, neonates, and children will also track the performance of health systems, since a functional continuum depends on public-health planning and strengthening of health systems.

Packages of interventions for delivery within the continuum of care

Several *Lancet* Series have dealt with periods along the continuum of care, such as sexual and reproductive health[28] and maternal,[20] neonatal,[18] and child[19] survival. Other Series will focus or have focused on nutrition[29] and the links between early-life events, poverty, and the environment of long-term development.[30] These Series have increased attention on the goals of universal coverage of effective interventions for health of mothers, newborn babies, and children and of reduction of preventable mortality. However, each Series seems to call for a different focus and a different solution. Countries could not possibly scale up all of the interventions listed in these *Lancet* series with a vertical approach. The continuum of care for health of mothers, neonates, and children provides a framework whereby single evidence-based interventions can be combined and delivered in packages in accordance with local needs and capacity.

A health package can refer to an entire national health package; to specific interventions designed to address a particular outcome (such as a child-survival package); or to a very specific package such as immunisation. A review of packaged services reported that interventions tended to be combined because of logistical convenience, donor directives, organisational expertise, or specific lines of scientific inquiry, rather than because of a specific service-delivery approach, biological or behavioural synergies, or cost-effectiveness.[31]

We propose service-delivery packages according to both common service-delivery strategies and common target populations throughout the lifecycle for health of mothers, newborn babies, and children (figure 2).[5,32,33] We reviewed more than 190 interventions that were described in the four relevant *Lancet* Series (webtable 1).[19,28,34,35] Both the Maternal Survival and Neonatal Survival Series suggested packages along the continuum of care, although with some differences in approach. We grouped these interventions into eight service-delivery packages which should be feasible in low-income and middle-income countries, and which are already provided by health systems in most countries (webtable 2).[35] Figure 2 sets out these eight distinct packages, which include an integrated family and community package; four outpatient and outreach packages (reproductive health care, antenatal care, postnatal care, and child health services); and three clinical-care packages (reproductive health care, childbirth care, and care of sick

See Online for webtable 1

See Online for webtable 2

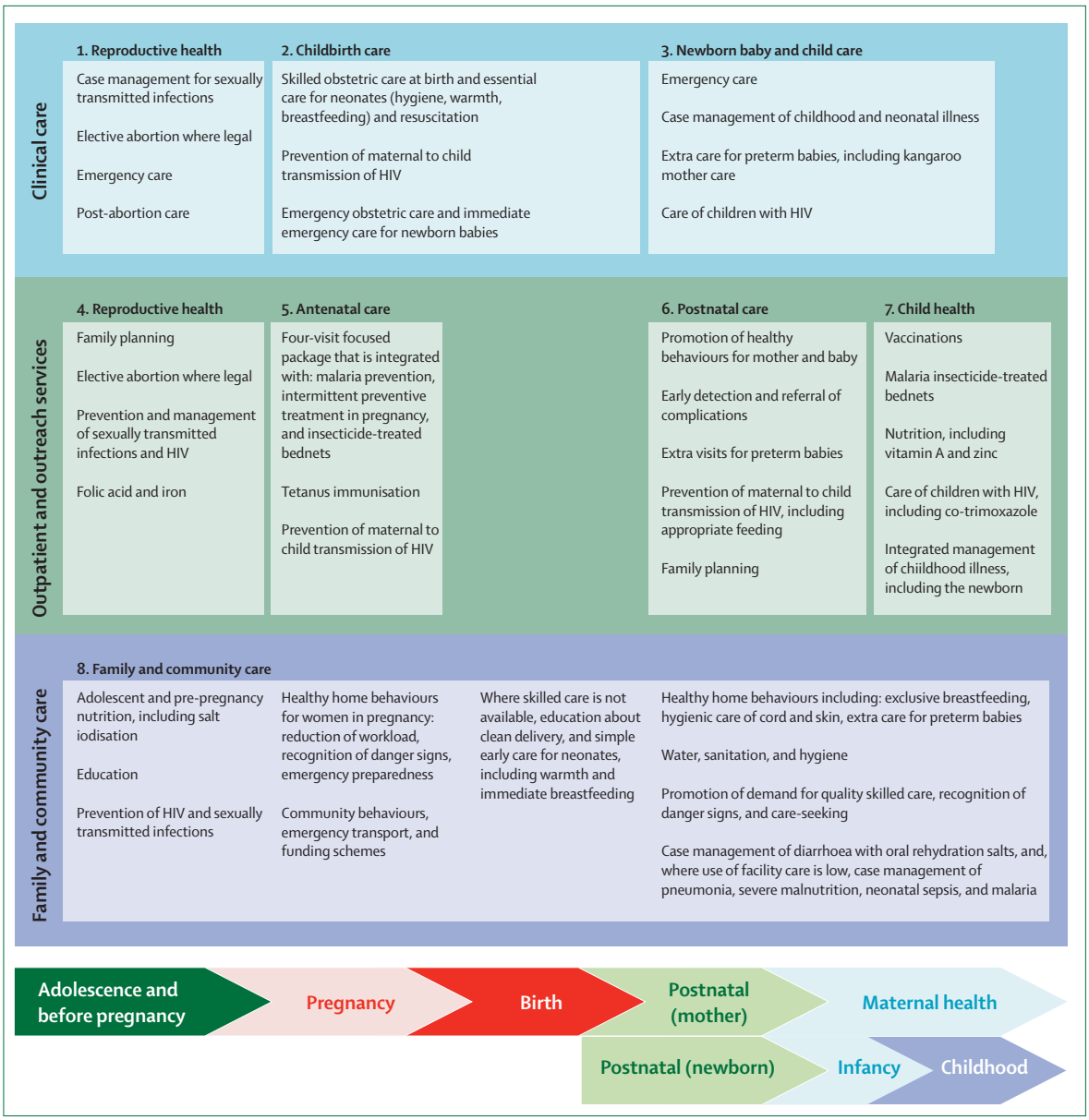

Figure 2: **Integrated packages for health of mothers, newborn babies, and children, with evidence-based interventions along the continuum of care, organised by lifecycles and place of service-delivery**
Adapted from references 5,32, and 33, with permission.

babies and children). These packages tend to be weakly implemented or integrated, especially during childbirth and the postnatal period, or might be missing some especially effective interventions. The family and community package tends not to be effectively linked with the health system, despite the fact that countries such as Nepal have achieved higher, sustained coverage by systematic efforts to define teams of healthworkers in the community and to link them to the formal health system.[23]

The content of the packages will probably vary by country and context. Some interventions will be necessary and appropriate everywhere; for example, during labour all women should be monitored with use of a partograph. Other interventions might be situational; for example, malaria prevention and treatment is necessary only in endemic regions. Each package can increase in complexity over time, with phased introduction of additional interventions; some interventions within a package might have a small marginal effect, and might therefore not be cost-effective until mortality has been reduced and health systems strengthened. For example, evidence shows that screening for bacteriuria in pregnancy is effective but is costly to implement; therefore, it could be

added to the antenatal package once coverage of basic interventions has been achieved and the capacity of health systems improved.[32,35] This phased selection of interventions, from more simple to more complex, is similar to the so-called diagonal approach implemented in Mexico.[36]

1. Reproductive health clinical-care package

Women of reproductive age might need clinical case management, especially for complications of sexually transmitted infections or HIV, other gynaecological emergencies, safe abortion, or post-abortion care (figure 2). Unsafe abortion is the fifth most common cause of maternal death globally, and accounts for 30% of all deaths in some Latin American countries.[37]

2. Childbirth clinical-care package

This package consists of skilled attendance for normal childbirth and availability of emergency obstetric care. Skilled care at birth and immediately after birth can determine the survival and health of both mothers and babies (figure 2). Rates of skilled attendance increased from 43% to 56% for developing countries between 1990 and 2004; however, in south Asia the improvement was small, and rates did not change in sub-Saharan Africa.[38] Women with complications during childbirth need access to facilities that provide instrumental delivery and caesarean sections. Surveys in more than 20 African countries showed that less than a third of pregnant women who suffered a life-threatening complication (haemorrhage, eclampsia, obstructed labour, sepsis, or unsafe abortion) received the necessary emergency obstetric care.[5] In some cases, however, women who lived within reach of a health facility went there for antenatal care but not for childbirth, indicating that geographical access is not the only factor that affects use of obstetric care.[5] Cultural beliefs or perceptions of service quality might reduce the acceptability of a facility-based birth, and the cost to families can be high for emergency obstetric services.[39] Clinical care should be made more accessible and culturally appropriate; necessary human resources and supplies for 24-h care should be made available; quality should be improved; emergency transport schemes should be promoted; and financial barriers for the poor should be removed.

3. Newborn baby and child clinical-care package

Primary-level clinical care should be readily accessible, most commonly through the programme Integrated Management of Childhood Illness, with communication and links to the referral level (figure 2). Continuous care must be available to manage acute child and neonatal illnesses including severe malnutrition. The case-management skills of healthworkers should be improved, and health system strengthened; for example, to provide drugs and equipment. For many of the world's 4 million neonatal deaths, the immediate cause is an illness that presents as an emergency, either soon after birth (such as complications of preterm birth and asphyxia) or later (because of neonatal tetanus or community-acquired infections).[18] Despite this, most low-income countries do not provide care for sick neonates, even in referral centres. Most clinical care will take place at a health facility, but if access is difficult, some case management of sick children and newborn babies can be delegated to other healthworkers (eg, management of pneumonia at community level).[23]

4. Reproductive health package delivered through outpatient and outreach services

Outpatient or outreach services can be used to deliver many interventions, including health education and

Panel 2: Implementing and testing the integrated continuum of care in Asia and Africa

Implementation of a community package for maternal, neonatal, and child health, in combination with strengthening of the health system, can create demand for care, and thereby improve health outcomes. In rural Nepal, almost all women give birth at home, and maternal and neonatal mortality rates are high. A randomised trial of a community-based intervention sought local solutions for health of mothers and babies by working with existing women's groups.[49] Female facilitators met women's groups about once a month for ten sessions over the course of a year to identify problems for local mothers and neonates. They used a participatory process, with games and interactive materials, to formulate solutions to these problems. Overall, the interventions brought care closer to home and improved linkages to the health system through structural renovations and in-service training at the local clinic and referral centre. More women in the intervention group received antenatal care, gave birth in a facility, and used a trained attendant and hygienic care than did women in the control group.[49] Neonatal mortality decreased by 30% over 4 years.[49] Though the study was not designed to reduce maternal mortality, and the numbers of maternal deaths were small, the intervention group had significantly fewer maternal deaths (69 per 100 000 livebirths) than the control group (341 per 100 000 livebirths). These results showed that birth outcomes and healthy behaviours in a poor rural population can be greatly improved through a low-cost, potentially sustainable participatory community intervention that empowers women to improve care and use available services.

Since much of the evidence for community interventions for maternal, neonatal, and child health has come from Asia, African studies are needed. A similar approach to that implemented in Nepal is being tested in Malawi.[3] This randomised controlled study, in a population of almost 150 000 women, will assess two community-based health-promotion interventions that empower women's groups to solve problems related to their own health and create demand for care.[3] The interventions also aim to improve service delivery at facility level.

promotion for adolescent girls and women (figure 2). Contraception and family planning make up a cost-effective and life-saving intervention that can improve both child and maternal health.[28] In countries where termination of pregnancy by manual vacuum aspiration is legal, this could also possibly be delivered as an outpatient procedure. Prevention, early detection, and management of sexually transmitted infections are crucial throughout the lifecycle, for both men and women.

Reproductive health is closely tied to the education, nutrition, and health services that girls and women receive throughout their lives. Many girls in low-income countries are underfed and undereducated, and experience gender-based violence and genital mutilation from a young age.[5] Many of these girls marry young, and they have little power to make decisions such as the timing of their first pregnancies or planning for the number and spacing of their children. Even when reproductive health interventions are delivered, whether through a static facility or outreach visits, poor quality of services can hinder their use. Most women who present at family-planning clinics have already decided which contraceptive method to use; failure to obtain that method can deter adoption and sustained use.[40] In many developing countries, social marketing has made contraceptives more available, but these schemes have tended to be vertically implemented, instead of linked to the broader health system.[40]

5. Antenatal care package delivered through outpatient or outreach service:

For antenatal care to be effective, all pregnant women need a minimum of four visits, at specific times and with evidence-based content (figure 2).[41] Care for women during pregnancy improves health by preventive measures, and by prompt detection and management of complications. Essential components of a focused antenatal-care package include screening for and treatment of disorders (such as anaemia, abnormal lie, hypertension, diabetes, syphilis, tuberculosis, and malaria); provision of preventive interventions (such as tetanus immunisation and insecticide-treated bednets); and counselling about diet, hygiene, HIV status, birth, emergency preparedness, and care and feeding of babies.[32,34,35] Since antenatal care has good coverage, it provides a platform to increase the interventions provided during antenatal visits, including HIV care for the mother, prevention of maternal to child transmission of HIV, and support for feeding choices. However, this opportunity must be weighed against the risk of overloading services that are already stretched.[42]

6. Postnatal care package delivered through outpatient or outreach services

Postnatal care is needed to reduce deaths of mothers and neonates, and to support adoption of healthy behaviours (figure 2). By comparison with the large trials and detailed guides for implementation of antenatal care, postnatal care has been neglected, or fragmented into postpartum care for the mother and newborn care for the baby. However, new evidence is shaping the development of the postnatal package.[31,32,43] The postnatal package for mothers and babies should include routine visits in the first days after birth, when risk is high, to promote healthy behaviours, to identify complications, and to facilitate referral. Some mothers or babies will need extra support, especially for preterm babies or HIV-positive mothers.

Delivery strategies for postnatal care should be context-specific. If a woman gives birth in a facility, she and her baby should receive a predischarge postnatal visit, with an early follow-up visit at home and return visits to the facility.[44] Even in settings where most births happen in a facility, most mothers and babies go home within a few hours and are unlikely to return in the first few days because of transport, costs, and cultural constraints.[44] If a woman gives birth at home, as is the case for 50 million women every year, a trip to the health facility on the first or second day after childbirth is even less likely. We need to investigate, test, and adapt integrated postnatal home visit packages in various settings, with appropriate healthworkers and linking referral care.[31]

7. Child health package delivered through outpatient or outreach services

High coverage of preventive child health care, such as immunisation, has advanced global progress for child survival (figure 2). However, nutrition in particular continues to be a major risk factor for child death. Some nutritional interventions have been integrated into child outreach packages, notably vitamin A supplementation; others, such as zinc supplementation, still have little or no coverage.[45] The effectiveness of breastfeeding has been well known for decades, but rates of early and exclusive breastfeeding are still low, at 44% and 30% coverage, respectively, in 46 sub-Saharan African countries.[38] Promotion of breastfeeding depends on interpersonal interaction in the immediate and early postnatal period—at childbirth, during postnatal home visits, and through peer-group support.[46] However, since countries cannot justify creation of separate teams of healthworkers for promotion of breastfeeding, this is an example of the need for integrated care.

Routine immunisations in the first year of life generally reach high coverage with low inequity.[5] Immunisation coverage has continued to improve since funding has increased. Similarly, investment in malaria programmes has enabled key interventions, such as provision of insecticide-treated bednets, to be scaled up in the past few years. Routine intermittent preventive treatment of malaria for infants is being assessed.[47] The UNICEF Accelerated Child Survival and Development Program has successfully used a child-health outreach package to increase coverage, especially for commodity-based interventions in Africa.

Traditionally, integrated management of childhood illness has focused on case management in an outpatient

setting, although community level care for integrated management of childhood illness and referral care are growing in importance. Until recently, integrated management of childhood illness did not include newborn care, but additional algorithms now include care of sick young infants. Care of children with HIV is also being incorporated into training for integrated management of illness in neonates and children.[5]

8. Family and community care package

This package aims primarily to improve healthy home behaviours and to increase demand for outreach and clinical services (figure 2).[14] Effective behavioural and preventive interventions that can be delivered through this package include promotion of hygiene; immediate and exclusive breastfeeding; reduced workload in pregnancy; demand for use of skilled childbirth care; recognition of danger signs for maternal, neonatal, and child illnesses; and care-seeking for those illnesses. This package can also deliver selected complex interventions such as community-based case management of malaria, pneumonia, preterm birth, and in some settings, neonatal sepsis.[23] Oral misoprostol has been shown to reduce the need for more complex interventions for postpartum haemorrhage, but the exact dose and treatment regimen have yet to be established.[48]

Specific strategies for delivery of the family and community care package include media and behaviour change strategies; mothers' groups (panel 2);[3,49] community mobilisation (eg, for emergency transport); and commodity distribution (eg, of contraceptives, oral-rehydration salts, and insecticide-treated bednets). Implementation of a more complex family and community package, including home visits and case management, will depend on availability of community or extension healthworkers, and their remuneration, supervision, and connection to the health system with referral back-up.[23,50] Sustainability has not been assessed or promoted (other than at a small scale) with systematic planning, human resource management, or supervision

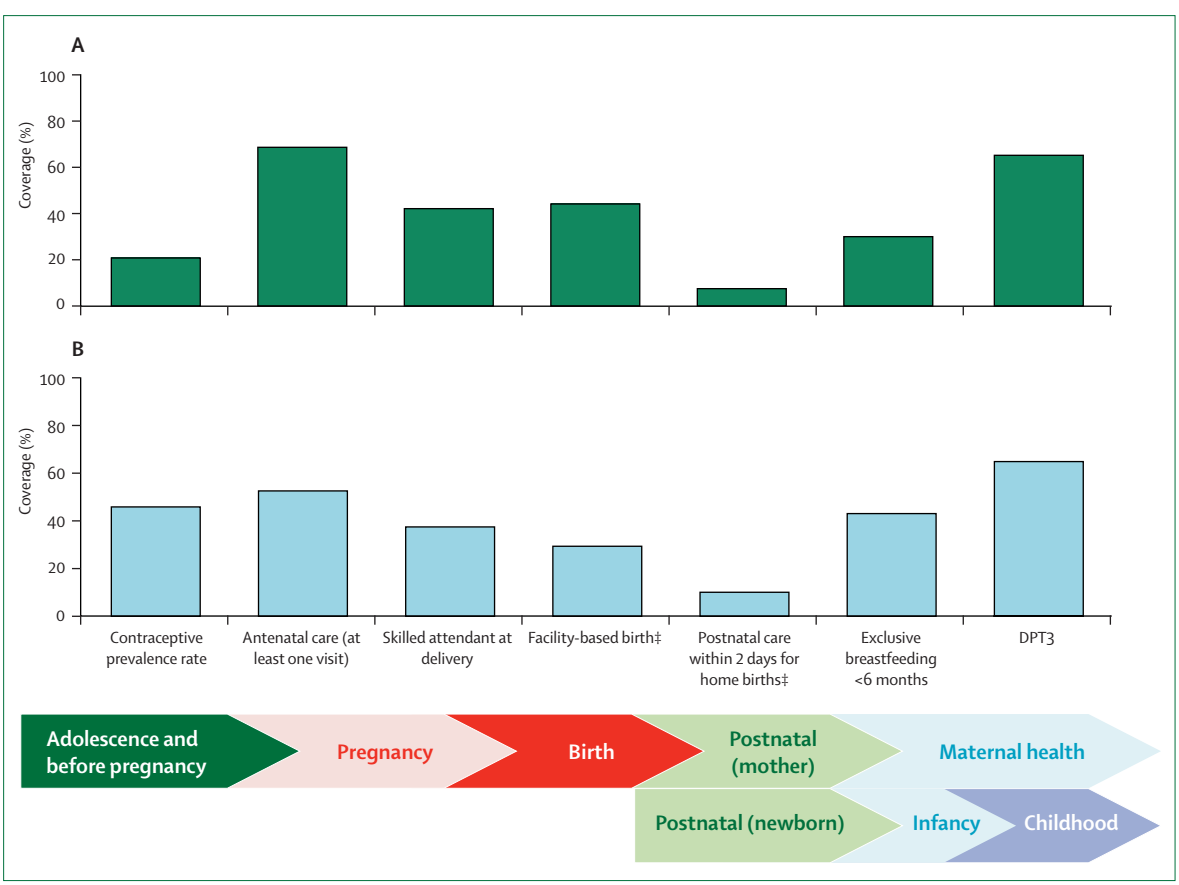

Figure 3: **Coverage along the continuum of care in sub-Saharan Africa* (A) and South Asia† (B) between 2000 and 2006**
Adapted from reference 5, which used data from Demographic and Health Surveys (DHS), 2000–2006,[51] with permission. *Sub- Saharan Africa includes Benin, Burkina Faso, Cameroon, Chad, Congo, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Tanzania, Uganda, and Zambia; these countries have 74% of the region's annual births. †South Asia includes Bangladesh, India, and Nepal; these countries have 82% of the region's annual births. DPT3=three doses of diphtheria, pertussis, and tetanus. ‡DHS have assumed that all women who had a facility-based birth received postnatal care; therefore, only women whose most recent birth was outside a health facility were asked about a postnatal visit within 2 days.

and assessment of community interventions. Community workers have often been employed for special interests or projects, rather than integrated as a part of a wider team with a range of skills for caregiving over a long period, or linked to the formal health system. The evidence base for integration of primary-care service and community-delivery strategies is under investigation (personal communication, ZA Bhutta, Aga Khan University, Karachi, Pakistan and A Costello, Institute of Child Health, London, UK, June 2007).

Operational strategies to strengthen care and linkages between levels of care

Both supply of services and demand for care need to increase. At the clinical-care level the predominant challenge is human resources. Table 2 outlines key barriers and operational solutions according to service-delivery approaches. Community mobilisation can increase demand for care and improve access through communication (eg, radios and mobile phones) and community referral solutions (eg, stretcher teams, transport cooperatives, and maternity waiting homes) to better connect households and health facilities (table 2).[3,50] Local accountability for delays in seeking care and for sharing successes can be promoted through audits of both facilities and communities. Underlying causes are wider than the health sector; for example education and empowerment (especially for women) and improved transport systems substantially benefit the health of mothers, neonates, and children.

Tracking and accelerating coverage along the continuum of care

Figure 3 shows coverage indicators for selected packages for the health of mothers, neonates, and children along the continuum of care for sub-Saharan Africa and south

	Underlying causes	Operational strategies
Clinical care		
Scarcity of trained staff	Inadequate human resource policies High attrition, low pay, and disincentives to work in rural areas	Introduce national human-resource plans including training, deployment, retention, skill mix, appropriate regulation Consider performance-based payment Consider hardship allowances for rural postings
Poor quality of care in public and private sectors	Inadequate standards of care, including for emergencies Non-skills-based training Lack of accountability or motivation Insufficient basic supplies and drugs	Adapt and implement clinical guidelines Strengthen preservice and in-service training, supervision, and quality assurance Do clinical and mortality audits of maternal, perinatal, and child health Improve supply and management of drugs and essential laboratory services
Delayed use of services and poor compliance with treatment	Delays in recognition of illness, slow decisionmaking, and inadequate transportation	Use a mix of appropriate strategies including birth and emergency preparedness, transport schemes, finance schemes, maternity waiting homes, and telecommunications technology for timely responses
Affordability barriers	Low income and resources Insufficient social security systems Corrupt practices by public sector providers High user fees (public and private sector)	Protect the poor with a mix of approaches including: user fee protection, community funds, health insurance, subsidised care, conditional cash transfers, and voucher-based reimbursements for providers
Outpatient/outreach		
Low quality of care	Lack of standards for care Failure to disseminate, adapt, or promote existing global guidelines Poor supervision and accountability	Promote use of evidence-based guidelines and standards Strengthen preservice and in-service training Provide supervision and incentives Include perspectives of women and communities when improving quality of care
Erratic supply of essential drugs and supplies	Poor management of supply chain Transport and cold-chain failures	Develop essential commodity policies Strengthen management and supply of essential drugs and commodities
Low demand for care, late use, and poor compliance	Insufficient information Negative experiences with health system Distant location of facilities Cost	Promote health Improve links with communities through dialogue and mobilisation Monitor use and follow up drop-outs, especially for immunisation and prevention of maternal-to-child transmission of HIV
Family/community		
Inadequate information about healthy behaviours and care-seeking	Scarcity of mechanisms for community participation Irrelevant or inappropriate messages Poor dissemination strategies Lack of legal framework for gender equality and status of women	Review policies related to family and community support for health of mothers, neonates, and children Strengthen existing community groups for community mobilisation Develop specific messages and use multichannel distribution Address cultural practices Promote intersectoral collaboration (eg, through sanitation and education)
Inadequate supply of affordable household commodities for health	Insufficient access and transport to communities Cost of commodities Deficient markets	Strengthen logistics, including community-based distribution Use social marketing Subsidise commodities if appropriate
Scarcity of community workers, ineffective linkages to the health system, or both	Inconsistent policies for primary health care Poorly defined roles and training, and lack of supervision Reliance on volunteerism Insufficient remuneration or other rewards	Revitalise existing community healthworkers' roles to prioritise high-impact activities and include remuneration or other rewards, and review relevant policies Design effective training packages, with continuous supervision and refresher training Create effective links to the health system

Adapted from references 3 and 50, with permission.

Table 2: **Obstacles to essential health services according to delivery approach**

Asia.[5] Even in the world's worst-off regions, population-based outreach packages of antenatal care and immunisation had good coverage (figure 3). Compliance with immunisation was reasonable, as shown by high coverage of immunisation for diphtheria, pertussis, and tetanus, which ranged from 83% at the first dose to 65% for the third in south Asia, and from 77% to 66% in sub-Saharan Africa.[38] However, existing programmes have missed opportunities for coverage of effective interventions which can be provided through antenatal care is often low; for example, programmes for prevention of maternal to child transmission of HIV reach an average of only 11% of those who need them, despite antenatal-care coverage of 69% in sub-Saharan Africa.[52] A policy and programme shift is needed to provide care for the mother in her own right, and to prevent transmission to her baby.[53]

Moving along the continuum of care, coverage drops off strikingly during childbirth and the postnatal period, which coincides with the highest risk for mothers and babies. Postnatal care in the crucial first hours and days after childbirth is poor or missing entirely, even for women who give birth in a health facility, since the predischarge check is often superficial. This gap indicates that linkages between maternal and child health services are inadequate, and that consensus has not been reached on a minimum package of postnatal interventions, with the strategies and mix of skills that are necessary for delivery. The higher coverage reached through outreach antenatal care and immunisation services can be used as a contact point to increase demand for skilled care at birth and postnatal care.

The indicators used to represent continuum-of-care packages are compatible with the "Countdown to 2015" tracking mechanisms,[54] but available data do not adequately measure the entire continuum, in particular the community package. Moreover, existing data could be used more effectively. Indicators for integrated management of childhood illness tend to focus on process (eg, districts with a trained staff member) rather than coverage, in terms of use of services. Even indicators that do measure use of services do not test quality or level of integration; for example, whether antenatal visits include management of sexually transmitted infections and counselling on birth preparedness, or whether postnatal care includes family planning. To strengthen the continuum of care, global attention must focus on tracking relevant data (eg, through the Countdown to 2015 process) and on country-level capacity to use such data to design and improve integrated services, especially at district level. Most data come from household surveys that are released every 5 years. Increased frequency of key coverage indicators and, ideally, mortality data, would help to accelerate action. The indicators also need to measure differing access to care between or within countries, to identify and target populations to reduce inequity.

We have selected interventions on the basis of evidence in the various *Lancet* Series; evidence of effectiveness was also available for several service-delivery packages (eg, antenatal care). Priority research questions should centre on how to adapt, deliver, and integrate these packages in different health systems. We need to assess the effectiveness of these packages against a range of outcomes, and the cost of implementing packages in different settings. Such studies should inform action and increase impetus for investment. We especially need evidence to guide design of community-based programmes in African contexts; however, lessons learned in Asia can be adapted and tested in Africa (panel 2).[3,49] Cluster randomised trials to test the effectiveness of various locally adapted packages for health of mothers, neonates, and children are starting in five African countries.[3]

Towards scaling up an effective continuum of care

Elements that affect the functionality of health systems—human-resource capacity, health-facility infrastructure, supply systems, financial resources, government stewardship, district-level management, and monitoring—will also impinge on efforts to scale up packages for health of mothers, neonates, and children within the continuum.[50,55] Systematic identification of local challenges; attention to underlying causes of ill health; and adaptation of package complexity in terms of healthworker skills will be necessary to accelerate scale-up of sustainable programmes (table 2). The artificial divide between vertical approaches, which focus on specific disease priorities and interventions, and horizontal approaches, which aim to strengthen the overall structure and functions of the health system, can be bridged. For example, health authorities in Mexico, one of the few countries on track to reach MDG 4 to reduce child mortality, used a so-called diagonal approach in the 1990s to implement a defined set of cost-effective outreach preventive interventions and to sustain high coverage.[36] Mexico then created increasingly comprehensive packages within the continuum of care to address maternal, neonatal, and child health with other interventions that have been shown to be cost-effective. As part of continuing health-sector reform, Mexico legislated access to maternal and child health services, and mobilised the necessary resources. Mexico has now approved use of emergency contraceptives, and legalised first-trimester abortion—both promising signs of commitment to MDG 5.

From slogan to saving lives

The continuum of care for maternal, neonatal, and child health is much more than a slogan. If the eight proposed packages could be implemented to reach most families worldwide, then every year the lives of up to two-thirds of

10 million babies and children could be saved,[35,45] and many of the half million maternal deaths and 3·2 million stillbirths prevented. This would accelerate progress towards MDGs 1, 4, 5, and 6: to improve maternal health; reduce child mortality; combat infectious disease; and improve nutrition. Many of the proposed clinical-care packages have very low coverage. Even for packages with greater coverage, some effective interventions have not yet been implemented; quality can be improved; and care can be better integrated. One gap is postnatal care, which especially affects the connection between programmes for maternal and child health. Reproductive health services are at risk of dropping off the continuum of care; they will need continuing focus. Supply of services must be increased; at the same time, demand for care and support for adoption of healthy behaviours should be systematically promoted.

The main barrier to increased coverage of integrated packages for health of mothers, neonates, and children in most countries is not insufficient knowledge, or even unsupportive policy, but inadequate operational management, especially at the district level. Successful implementation of integrated continuum-of-care packages within health systems will depend on systematic efforts to address this constraint, especially to improve human resources for integrated delivery of all packages, and to ensure planning for increased complexity within packages over time.

The Declaration of Alma Ata, the seminal statement on primary health care,[56] which nears its 30-year anniversary, incorporated many of these integrated concepts; ironically, international health policy and financing for maternal, neonatal, and child health is more fragmented now than it was in 1978. Competing investment demands mean that countries often fund the health of mothers, newborn babies, and children with leftovers from vertical programmes.[57] More investment in packages and integration for health of mothers, neonates, and children along the continuum of care should increase efficiency of scale-up for all effective interventions, including traditionally vertical programmes.

Contributors

JEL had the idea for the paper and developed the first draft with KJK. All the other authors contributed substantially to the content, writing, and finalisation of the paper.

Conflict of interest statement

We declare that we have no conflict of interest.

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