Joint Frontiers Meeting
Wellcome Trust / Children's Investment Fund Foundation

Maternal and Early Childhood Health
4 – 5 March 2010
Wellcome Trust, London, UK

FINAL REPORT

Background

Current data show that child mortality has fallen by up to 27% worldwide. This can be attributed in part to increased immunisation coverage, use of oral rehydration treatment, malaria interventions, and improved water and sanitation among other interventions. However, maternal mortality rates have not improved since 1990 and decreases in child mortality have reached a plateau in some countries, as remaining mortality is concentrated in the neonatal period. Interventions to address maternal and neonatal mortality are distinct and will require specific inputs at the facility and community levels. Evidence of the effectiveness of family planning interventions and the impact of early life nutrition on health across the life-span, highlight the need to integrate these fields further. Furthermore, scale-up of interventions could have different drivers, with equity, access and quality of care playing central roles.

The context of global health, and specifically as it applies to women and children, is changing dramatically. There is increasing consensus on the need for greater impact, better coordination and integration of global disease initiatives, the more efficient and effective use of resources and the scale up of high impact evidence based interventions within a more coherent international health architecture.

Aims

- To consider whether there is a specific role/niche for the Wellcome Trust and the Children's Investment Fund Foundation (CIFF) to support research in the area of maternal and early childhood health and nutrition.
- To bring together researchers and other stakeholders, providing an opportunity for debate and networking, as well as fostering new collaborations.
- Feed into the Pacific Health Summit that will take place in London, UK in June 2010.

Objectives

- To define clinical and community-based research agendas to improve maternal and infant health and nutrition and decrease mortality, with a focus on low and middle income countries.
- To integrate related but often parallel fields such as family planning and early-life nutrition (preconception to 2 years of age).
- To discuss critical bottlenecks in the scale-up of effective interventions and identify opportunities for operational research to address them.

The programme for the meeting can be found in Annex 1.

1. Themes: Research Evidence & Gaps

1.1. Maternal health

Harshalal Seneviratne presented evidence from Sri Lanka which focused on identifying maternal health needs and assessing the impact of changing in-service delivery. He concluded that the most critical success factor to reducing maternal mortality required government commitment towards maternal and child health in general and investment in the health care workforce in particular. Based on an analysis of costs associated with increasing human health care capacity, the country at present spends a mere $48 per year per capita to deliver dramatically improved maternal health outcomes. However with increasing education the expectations of the public is to seek higher levels of care with the risk of "over medicalization" which places an extra burden on the capacity of the health care system to provide the essential care. For instance the caesarean section rates in some areas rose as high as 45%. Investments in the education system in the country from 1942 by the introduction of free education up to graduation has correlated very closely with improved health outcomes, particularly in relation to improvements in maternal health. Increased education also resulted in greater suspicion of the family planning messages extended to Sri Lanka as the individual health benefits had been submerged by the global concerns for population. This has resulted in the sub-optimal use of modern technological methods especially sterilization amongst the highest educated in the country.

Participants discussed the adaptation of guidelines, a process that in Sri Lanka involves the Ministry of Health, College of Medicine and other academics, who review evidence from international studies and provide a view regarding the need for further in-country research or implementation with or without adaptations. It was also suggested that a study currently being carried out in Gujarat, India where benefits of using cash transfers to encourage women to deliver in health facilities have been observed could be used as a basis for further rigorous evaluations.

1.2. Safe birthing

Carine Ronsmans focused her discussion on knowledge gaps and promising interventions in maternal mortality concluding that:

- The burden of maternal mortality lies in Sub-Saharan Africa where 50% of maternal deaths occur;
- Access to comprehensive emergency obstetric care is essential for maternal survival;
- There is limited evidence of what works to prevent maternal mortality;
- One size solutions do not "fit all"—context is essential in order to craft effective solutions; and
- Quantifying unmet need and substandard care (critical event audits) are promising tools to improve health system responsiveness.

She emphasised the point that most maternal deaths can be prevented during labour and delivery, and that women who comprise more than 70% of maternal deaths in African hospitals arrive in a critical state with problems that could not have been detected or prevented antenatally. More than half of the maternal deaths are due to bleeding, pre-eclampsia and genital sepsis.

Life saving interventions require skills and effective services to be delivered at both the primary and secondary care level which could include a health centre strategy with referral to

hospitals for emergency care. The key success factors for mitigating risk of maternal death include both political and technical considerations. The political or social factors include acceptance of midwifery, accountability of health professionals, commitment to regulate and invest in the health system and provision of cost free care. The technical factors include information about how to deliver care, timely access to referral care and professional midwifery care, as well as a clear strategy to ensure access to professional care. However, in order to prevent maternal deaths, she argued that what is needed, is a better understanding of the heath system arrangements that are required to finance and deliver skilled birthing care at the primary and secondary levels in the most efficient and equitable manner.

1.3. Neo-natal health

The extent of newborn deaths is underreported, argued Alexander Manu, as most newborns die at home, unnamed and uncounted. Up to 75% of the 20 countries with the highest neonatal mortality rates are in Africa, and more than 40% of the 3.7 million under five deaths each year are in the neo-natal group. The majority of these deaths are preventable as more than 80% are attributable to asphyxia, infection and preterm birth.

Given that the riskiest time of life for any child is the first week of life, the availability of care in that most vulnerable period is essential to reduce neo-natal mortality. Thus, two key priorities include increasing access to effective care at birth, and developing and testing integrated routine postnatal care packages. The Lancet Child Survival series in 2003 and the Neonatal Survival series in 2005 reflects the most important research on this subject.

While there are a number of single interventions with evidence of impact, the core principle around improving neo-natal health should be “continuum of care.” The continuum of care includes the pre-pregnancy through pregnancy stages, labour and post delivery care and it includes the community to facility care of the mother and baby through effective referral systems. These needs are currently grossly under-met with almost half of all mothers and newborns in developing countries receiving no skilled care at birth, and 72% of babies born outside the hospital receiving no postnatal care. There are success stories and evidence from South Asia to support this hypothesis, but the approach requires adaptation and assessment within the African context.

1.4. Post-natal health

Marie Louise Newell’s presentation focused on the Prevention of Mother to Child Transmission (PMTCT) of HIV. She highlighted that the definition of PMTCT had broadened to include: a) primary prevention of HIV infection in women, b) prevention of unwanted pregnancies, c) prevention of transmission of HIV from the mother to the infant, and d) providing support to infected women and their children. Data from the Africa Centre for Health and Populations Studies in Kwa-Zulu Natal, South Africa has shown that antiretrovirals (ART) are decreasing neonatal mortality, by keeping mothers alive for longer. Guidelines have now been changed to accommodate continued breastfeeding beyond 6 months, using ART and oral nevirapine for the first year of life to prevent transmission. The teratogenic effects of ART had not been investigated at the population level and require further research, probably using cohorts. However, preliminary findings have suggested that ART can lead to prematurity and low birth weight.

The discussion focused on the need to move PMTCT from a product focus to a programme one, with further integration with maternal health services. Although, in many cases integration happens automatically at service delivery, the challenge lies in the number of workshops and trainings that primary health care workers are required to attend. Integration needs to start at the international level, with national Ministries of Health playing an effective

coordinating role. The fact that HIV could be used as an entry point to carry out broader research on maternal and child health was discussed, particularly as it was considered a well-funded area. The need to adapt research tools to be used in operational research and to evaluate interventions at scale was highlighted as an important area that required development.

1.5. Reproductive health

Judith Stephenson highlighted that successful family planning programmes focused on removing barriers (lack of knowledge, social disapproval, fear of side effects), raising awareness and making smaller families more desirable, making methods accessible and available, as well as addressing any health concerns that may be associated with them. There is clearly an unmet need for family planning, particularly among the poorest. So far, research has focused on developing the technologies and encouraging uptake but there is a gap in terms of ensuring continued and suitable use beyond the initial uptake. There is also a need to bring other disciplines into reproductive health research such as social science and anthropology to carry out more integrated research. In addition, it was highlighted that no implementation trials with unwanted pregnancies as a primary outcome had ever been conducted.

The discussion highlighted the following areas of potential research:

- Need to involve men in research, as they often have a significant influence on decisions regarding contraception
- Integration of family planning with other maternal and child health services
- Moving away from technology and focusing on health service/systems questions
- The family planning field could learn from the HIV field, mobilizing civil society and taking more of a human rights approach.

1.6. Nutrition

Jose Martines' presentation focused on the infant and young child feeding guidelines. He explained that levels of exclusive breastfeeding worldwide are low (about 35%) with Europe having the lowest rate (17%) and South East Asia the highest (43%). In terms of interventions to promote optimal infant and young child feeding, WHO recommends: a) breastfeeding counselling (individual and group), b) complementary feeding counselling, c) behaviour change communication, d) the Baby-Friendly Hospital Initiative, and e) legislation such as Code of Marketing. The main research challenge was evaluating approaches for achieving and sustaining universal coverage of effective interventions to infant and young child feeding. In order to make research work, it was necessary to cchoose the right intervention and outcomes to evaluate as well as invest in design, size and sites. In addition, engaging policymakers and investing on the communication of findings were also crucial.

Sally McGregor discussed the importance of adequate iron levels for motor development, and the fact that the link was not as clear for mental development. In addition, stunting has been linked to lower cognition scores and school attainment. The COHORTS collaboration has demonstrated that there is a window of opportunity (0 – 2 years of age) when optimal nutrition can have an effect on decreasing stunting levels and the development of risk factors for chronic disease later on in life.

Constraints for exclusive breastfeeding were discussed and it was clarified that length of maternity leave has not been associated with levels of exclusive breastfeeding. However, most of the research in this area was done 15 – 20 years ago. Although the evidence around weight and growth monitoring as an intervention was not very robust, it has been recognisedas a good opportunity for counselling. The relationship between low birth weight

and maternal nutrition is complex given that food supplementation programmes have not proven to be very effective at reducing low birth weight, except in very extreme circumstances. Other risk factors were now considered important too such as smoking and infection.

2. Cross-cutting theme: Equity & Access

Dave Gwatkin made a case for the addition of equity analysis to epidemiological research. This should be done more frequently as it would allow researchers to evaluate whether any changes observed are benefiting the poorest populations. Adding economic indicators should be relatively simple but measuring the effects of other potential factors that influence equity such as gender and race/ethnicity could be more difficult. Some of the largest inequities exist within countries rather than between countries and even 'core' health services are often provided on a very unequal basis across different populations groups.

The limitations of equity analysis were discussed; particularly the fact that it will not measure impact on health status or provide a measure of cost-effectiveness, both of these would have to be measured separately. It was clarified, that not all equity analysis would add costs to research programmes. Options regarding targeting interventions, once the equity analyses have been done were also discussed. Geography has been used but is not always ideal given that it can lead to stigmatisation. For example, health insurance schemes in Mexico have tried to address equity issues by aiming for universal coverage but starting by providing it to the poorest first.

3. Facility and Community approaches

3.1 Women's groups

Anthony Costello described the Ekjut Trial, a randomised controlled trial in Eastern India aimed at reducing newborn mortality through community mobilisation, and women's groups in particular. Maternal depression and maternal mortality were also included as secondary outcomes. All women of reproductive age were enrolled into a women's group in each of the six study sites. Group activities included using visual aids to discuss and debate problems related to newborn and maternal health and prioritising the importance of each issue discussed. A participatory approach was used to include men and the larger community in some activities. Individual post-partum interviews were also conducted. Findings from the Ejkut trial demonstrate a significant reduction in neonatal mortality and an increase in health related home care practices such as hand washing and sterile cord tying. A marked decrease in maternal depression was also found in year three of the trial, which is attributed in part to the post-partum interviews and home visits. Notably, the greatest effect was seen in the most marginalised communities. No significant reduction in maternal mortality was observed, nor was there any effect on stillbirth rates or health care seeking behaviour. The trial was replicated in Bangladesh and contrary to the findings from India demonstrated no significant impact in any area. In addition to the role of cultural and contextual factors, it is hypothesised that the population coverage in Bangladesh may not have been correct and that women may not have been targeted effectively from early pregnancy.

3.2 Approaches to facility-based research

Jocelyn De Jong's presentation highlighted common approaches to facility-based research in developing and transitional countries, as well as some of the associated challenges. The need for such research was emphasised, as despite the positive global trend in increasing facility-based deliveries, major problems still exist with regard to poor management of maternal care. The most common research methods include: a) descriptive studies, b) observational studies, and c) randomised controlled trials. One of the chief challenges

associated with facility-based research when compared to community-based study is the relative difficulty of accessing health facilities, particularly in an evaluator capacity. Particular research gaps highlighted include the divide between hospitals and communities, as well as linking the structure and processes of care with actual maternal and neonatal outcomes.

3.3 Community health workers

Nancy Binkin provided a brief history of the use of community health workers and highlighted the importance of their environment and operating context for their success. Community health workers have been used with varying degrees of success in many developing countries. While effective in some settings, it was stressed that they cannot be thought of as a substitute for poor or non-existent health systems. The key feature of successful community health worker programmes is an enabling environment that is conducive to optimising their impact. This includes supportive communities, permissive legislation and adequate supplies of drugs and other materials. The question of what constitutes a realistic mandate for community health workers was raised, with discussion around the issues of training, pay, working hours and drug prescription responsibilities. The presentation closed by emphasising that future research into the use of community health workers must extend beyond a focus on ability alone to consider the contexts and environments in which they operate.

The first three presentations initiated discussion about scalability, replicability and sustainability of the work presented, with particular regard to women's groups and community health workers. Questions were raised about how to translate findings from such research into practice. Links to health systems are paramount, as even the scale-up of community-based approaches in most settings will rely upon commitment from the health sector at some level. The role of governments in supporting community health workers was discussed with regard to incentives, accountability and oversight. Several examples of government supported community health worker programmes were raised, including successful initiatives in Ghana and India, and a less successful model in South Africa. A key point raised regarding the gap between facility- and community-based research was that the difficulty in bridging the divide is largely due to the involvement of different government and non-government actors (e.g., oversight of health facilities may be led by a particular arm of the MoH, while community-based work is often led by the NGO sector). Discussion closed by stressing that 1.) scalability of research depends greatly upon political will. Such will now exists in the HIV sector but still requires improvement in maternal and child health and 2.) sustainability relies on co-ownership of projects by local communities.

3.4 Checklists for safe birthing

Priya Aggarwal presented an overview of a new checklist for safe birthing that is currently being developed by the Harvard School of Public Health in collaboration with WHO. The final product will be an evidence based tool for use in developing countries to ensure that basic, essential obstetric care is being provided. The checklist includes items that follow a woman's journey from admission through to discharge, concentrating on critical omissions (i.e., elements of care that, if missed, carry significant health consequences for mother and child). Development of the checklist has drawn, in part, from useful data on 'near misses', which are cases of severe maternal morbidity that could have resulted in death. The checklist will be piloted initially in a single-centre trial to test 'proof of principle'. This will be followed by a large-scale trial measuring impact of the checklist's implementation on reducing mortality, with future roll-out foreseen in all six WHO regions.

3.5 Media campaigns

Roy Head's presentation concentrated on the impact and scalability of media campaigns for communicating public health messages in developing countries. He focused on a 'new generation' of high-impact media work that is backed by research to evaluate its effect on measurable public health indicators. Due to their inherent scalability, media campaigns can be a unique tool for influencing health behaviour. They are able to target messages at a population level, providing a powerful communication mechanism for maximising the impact of public health campaigns. Three key components are necessary for their success: 1.) message precision 2.) strategy and 3.) delivery at scale. An example was presented of plans to conduct a trial in Burkina Faso that models its target groups by FM radio listenership. Other examples discussed of particularly successful media campaigns included television spots to promote hand washing and other household behaviours, as well as radio serial dramas that raise sexual health awareness.

The utility of mass media campaigns for different types of health interventions was raised during the group discussion. It was pointed out that their success to date has largely been with interventions that do not rely on health facilities, such as household behaviours. The question was raised about those that depend on facilities (e.g., HIV testing) and how already overstretched health facilities cope with increased demand for services as a result of media promotion. Roy Head agreed that roughly 60% of the impact of media campaigns is based on household behaviour, while only about 40% relates directly to health services. The impact of print media was also discussed. It can be useful for small populations but is too expensive for population-level campaigns. All media messages must be carefully pre-tested to ensure cultural relevance. It was also pointed out that socio-economic differences in media coverage must always be accounted for in evaluations of media campaigns. Regarding the safe birthing checklist, the point was raised that its success will be heavily dependent upon champions within hospitals. Local adaptation of the checklist was also discussed, as well as local desirability for accountability. It was pointed out that little mention was made of the long history of similar obstetric checklists and tools that have been developed and piloted (e.g., the partograph). The value of introducing yet another tool was questioned.

4. Operational research & scale-up

4.1. Case studies: Ghana & Nepal

Nana Twum-Danso described the "Fives Alive Project Ghana: Delivering Quality Improvement for Newborn Health". Despite recent improvements in child mortality in Ghana, rates of newborn deaths have stagnated. In response, the Ghana Health Service developed its "PNC" policy which comprises three packages designed to target pregnancy, labour and delivery and the early post-natal period. The "Fives Alive Project" was designed to test the feasibility, effectiveness and scalability of this policy. A key approach used by the project has been a collaborative network model which involves process mapping with health providers in order to identify delays and bottlenecks in service delivery. Findings from the project's testing of the draft postnatal care policy were communicated to the Ghana Health Service in 2009. The policy was finalized and officially launched in November 2009. The project is now assisting with scaling it up throughout the Northern Sector of the country (38 districts).

Dharma S. Manandhar's presentation focused on opportunities to influence policy from the research perspective. Several key examples were highlighted from Nepal. Most notable was the example of a long-term research project investigating barriers to facility deliveries in Nepal, and specifically, the cost of delivery care. The outcomes of this research encouraged the development of Nepal's Maternity Incentive Scheme, a scheme now in place to subsidize costs of delivery care in urban settings. Other examples included a Community Based

Newborn Care Programme and a separate initiative on Community Management of Newborn Sepsis. Both initiatives were developed on the back of findings from research projects.

The variable benefit of free health services was discussed with regard to the Maternity Incentive Scheme in Nepal. It was stressed that free services do not always correlate with equitable or high quality services. Quality of care was emphasised in particular, as initiatives designed only to improve access often fail to address this. Nana Twum-Danso added that cost is not the only barrier to accessing care; distance to health facilities and cultural barriers to seeking care remain critical issues in many countries. It was questioned whether the impact of some of these interventions may be disproportionately concentrated in higher socio-economic groups. It was recognised that impact does often begin in higher socio-economic groups; however evidence suggests that a 'trickle down' effect does occur to lower groups. There was more general discussion around the nature of policy research itself. It was pointed out that "policy-based evidence" is more often the reality than "evidence-based policy". Policy makers are often guilty of developing a policy first and then looking for evidence to support it. The case of the World Bank's experience with primary health vouchers in the 1980s and 1990s was raised as a cautionary example.

4.2. India case study: From efficacy to scale for newborn health

Abhay Bang presented details on the SEARCH programme which has been implemented in Gadchiroli, India and focuses on reducing neo-natal mortality by providing home-based newborn care. The main challenges for the implementation of SEARCH have been:

- changing the mind-set of medical staff who tend to be over-cautious and would rather not promote or advocate for home-based care
- maintaining the programme at a scale that allows the maintenance of adequate levels of training, supervision and financing, and
- developing the best organizational structure to sustain the programme.

This was followed by a presentation from Vinod Paul, on the scale-up of the Integrated Management of Childhood Illnesses (IMCI) programme in India. This included an adaptation process of the programme for the Indian context and the additional focus on neo-natal health so it is referred to as the Integrated Management of Neo-natal and Childhood Illnesses (IMNCI) programme. The programme is being implemented by Angawandi workers (AWW) and Auxiliary Nurse Midwives (ANM) all part of the primary health care system at village level. Some of the bottlenecks encountered in the scale-up on IMNCI included the slowness in carrying out training, maintaining proper supervision and monitoring levels, ensuring adequate supplies were available and engaging the ASHAs (Accredited Social Health Activists that act as the interface between the community and the public health system e.g. AWWs and ANMs) effectively.

Jose Martines described the evaluation of IMNCI being carried out in Haryana State, which is designed to measure the impact on peri-natal, neo-natal and infant mortality. It is a cluster randomised trial including 18 primary health care areas and covering a population of approximately 1.1. million. The interventions are delivered by District Health Workers and Integrated Child Development Services (ICDS) systems (i.e. AWW and ANM). More than 1,000 of these workers have been trained. Follow-up from the evaluation is expected to be completed by the end of March 2010 with publication of results in July.

This session highlighted clearly some of the difficulties of bringing programmes that have proven effective on a smaller scale to a larger scale. It was agreed that some of the key success factors of the SEARCH programme such as the use of cash incentives for health workers, rigorous staff selection procedures and supervision were unlikely to be sustainable on a large scale. There was also some discussion regarding the results from the Ekjut trial,

and the fact that a significant decrease in infant mortality was shown without the use of antibiotics. It was unclear whether this was due to high levels of infant mortality at the outset. The effort and achievements already involved in the scale-up (e.g. adaptation, training, etc) were clearly recognised and there was a lot of interest in the potential results of the IMNCI evaluation in Haryana State.

5. Conclusions and recommendations

Conclusions and recommendations were discussed under three broad themes as follows:

- **Development and improvement of methodologies for implementation research**
  There were differing views regarding the level of existing knowledge and need for a concerted focus on developing further methodologies. However, there was agreement on the need to clarify that in many cases implementation research will not necessarily evaluate health impacts but rather investigate bottlenecks for effective implementation, gather information to engage or answer policy questions, and inform longer-term sustainability. There was also a need to develop decision trees that helped in the planning of evaluations, and promote the use of time series evaluations drawing from routine data sources. Although resources for the implementation of complex interventions do exist, in many cases it was unclear whether the next step should be, for example a larger trial or large scale implementation with an impact evaluation.

  WHO has been doing some work in this area and is interested in developing it further and leading any working group or initiative.

- **Input for Pacific Health Summit**
  The following subjects were suggested as important to be included in discussions at the Summit:
    - Lack of information sources beyond DHS and INDEPTH. In particularly there is a need for routine information to be collected at the health system level, which could inform scale-up and implementation of maternal and child health programmes.
    - Transferability of effective interventions from Asia to Africa.
    - Impact of private health care providers and discussion of innovative mechanisms and opportunities to engage them
    - Carrying out scientifically robust implementation research, particularly regarding quality of facility-based care (e.g. treatment and diagnosis, HIV, malnutrition)
    - Developing innovative ways of reaching the urban poor
    - Exploring ways of increasing the value of evaluations and making governments accountable for the policies they implement.
    - Developing more a rights-based approach for this field, learning particularly from the experience with HIV.

- **IMNCI evaluation – Results**
  It was agreed that results from the evaluation could be presented at the Scientific meeting that will precede the Pacific Health Summit, which is currently being organised by the Wellcome Trust on 22 June 2010.

Annex 1: Programme

Thursday, March 4th

Chair: Jimmy Whitworth

6. Welcome: Aims and objectives – Jimmy Whitworth	**9.00 – 9.15**
7. Introducing CIFF – Jamie Cooper-Hohn	**9.15 – 9.30**
8. Themes: Research Evidence & Gaps *(25 minutes for presentations, 35 minutes for discussion)*	
8.1. Maternal health • Harsha Seneviratne	**9.30 – 10.30**
8.2. Safe birthing • Carine Ronsmans	**10.30 – 11.30**
Coffee break	***11.30 – 11.45***
8.3. Neo-natal health • Alexander Manu	**11.45 – 12.45**
Lunch	***12.45 – 13.45***

Chair: Peter Smith

8.4. Post-natal health • Marie Louise Newell	**13.45 – 14.45**
8.5. Reproductive health • Judith Stephenson	**14.45 – 15.45**
Coffee break	***15.45 – 16.00***
8.6. Nutrition *(30 minutes for presentations, 30 minutes for discussion)* • Jose Martines – Infant & young child feeding: Overview • Sally McGregor – Promoting child growth and development	**16.00 – 17.00**
Drinks	***17.00 – 17.30***
9. Cross-cutting theme – pre-dinner lecture *(30 minutes for presentation, 30 minutes for discussion)* Equity & Access – Dave Gwatkin	**17.30 – 18.30**
Dinner Wellcome Trust – Rooftops Restaurant	***18.30 – 21.30***

Friday, March 5th

Chair: Peter McDermott

10. Summary of Day 1 and introduction to Day 2 **9.00 – 9.15**
Jimmy Whitworth

11. Facility and Community approaches **9.15 – 11.00**
(30 minutes for presentations, 45 minutes for discussion)
- Anthony Costello – Women's groups
- Jocelyn DeJong – Approaches to facility-based research
- Nancy Binkin – Community health workers

Coffee break ***11.00 – 11.15***

Facility and Community approaches *(continued)* **11.15 – 12.00**
(20 minutes for presentations, 25 minutes for discussion)
- Priya Aggarwal – Checklists for safe-birthing
- Roy Head – Media campaigns

12. Operational research & scale-up **12.00 – 13.00**
(15 minutes for presentations, 30 minutes for discussion)
- Nana Twum-Danso – Fives Alive Project Ghana: Delivering quality improvement for newborn health
- Dharma S Manandhar – Opportunities to influence policy from the researcher perspective

Lunch ***13.00 – 14.00***

Chair: Anthony Costello

Operational research & scale-up *(continued)* **14.00 – 15.45**

12.1. India case study: From efficacy to scale for newborn health
(45 minutes for presentations, 1 hour for discussion)
- Abhay Bang – SEARCH Programme
- Vinod Paul – Development of national IMNCI programme
- Jose Martines – Evaluation of IMNCI programme

Coffee break ***15.45 – 16.00***

13. Conclusions and way forward **16.00 – 17.00**
Jimmy Whitworth and Peter McDermott