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Background

While under-five deaths continue to decline due to increased survival of post-neonatal infants and children, deaths among newborns less than 28 days old have not substantially reduced in many countries. Maternal health and newborn health are closely related, as interventions for mothers also benefit newborns. In addition, the linkage between these two areas of health is widely recognized through the Millennium Development Goals 4 and 5 (MDG 4 and 5) as key priorities in global health. However, lack of a complete civil registration systems and information on causes of newborn deaths in many low- and middle income countries (LMICs) makes tracking of interventions almost impossible. As we approach the 2015 deadline for the Millennium Development Goal target, availability of data on neonatal health has become a key global priority in LMICs, and the INDEPTH-Network can help to contribute towards bridging this gap.

Objectives

The key objectives of the workshop are:

1. Agree standard definitions and prepare the individual-level data for analysis
2. Conduct comparative analysis of maternal and newborn mortality based on existing data
3. Drafting of Centre-specific and multi-Centre papers based on identified research questions that will be supported by the existing data
4. Develop a newborn research agenda for INDEPTH Network and proposal for funding
5. Develop / Agree standardized tools for tracking of pregnancies and their outcomes including collecting verbal autopsy

Expected outcomes

The expected outcomes of the workshop include the following:

1. Draft manuscripts (country-specific, cross-site and cross-comparative analysis) to be submitted for publication in a reputable journal
2. Draft INDEPTH Network newborn research agenda and a proposal for funding
3. Drafted standardized tools for tracking of pregnancies and their outcomes

Welcome, introductions, objectives and expected outcomes of the meeting / introducing INDEPTH invitees / review of proposed agenda

Presentation by the Executive Director of INDEPTH-network Prof. Osman Sankoh: The ED welcome participants present and introduced expert’s and center leaders who have been invited to either facilitate or participate in the meeting. He expressed the hope that scientist from HDSS sites would have the opportunity to work with experts
and professor in the field of biostatistics and paediatrics to develop standardized methods for analysis and tools for data collection.

He gave a brief background to the workshop and the objectives for organizing it. He explained the demographic transition taking place in Africa where life expectancy at birth is increasing. While under-five deaths continue to decline due to increased survival of infants and children, deaths among newborns less than 28 days old have not substantially reduced in sub-Saharan Africa and southern Asia where HDSS sites are located.

He indicated that Maternal and newborn health are closely related, as interventions for mothers also benefit newborns. In addition, the linkage between these two areas of health is widely recognized through the Millennium Development Goals 4 and 5 (MDG 4 and 5) as key priorities in global health. However, research on maternal and newborn health has not been given proper attention compared to other areas of research, e.g HIV/AIDS, malaria, adult health and adolescent health. As we approach the 2015 deadline for the Millennium Development Goal target, availability of data on neonatal health has become a key global priority in LMICs, and the INDEPTH-Network can help to contribute towards bridging this gap.

This meeting is an indication that the network is taking its priorities now and will continue to peruse research that will improve the health of all population groups. He also outlines the expected outcome of the meeting including:

1. Preparation of draft manuscripts (country-specific and cross-site) to be submitted for publication in a reputable journal
2. Draft INDEPTH Network newborn research agenda and a proposal for funding
3. Drafted standardized definitions of key terms and tools for tracking of pregnancies and their outcomes

He also took the opportunity to highlight the successful launch of INDEPTH-Stats across member sites. He urged HDSS sites that were not part of the data repository to contribute data and be part of the project. He expressed appreciation to Save the Children for the financial support to organize the meeting.

Presentations and discussions

Series of presentations followed with comments, suggestions, clarification questions and answers. In all, there were a total of seven presentations all addressing the issue of neonatal and maternal health.

**Dr. Peter Waiswa -- “Newborn health and survival: opportunities for evidence based research through the INDEPTH Network working group”**: The presentation highlighted the global picture of Newborn health and particularly, the disproportionate burden of neonatal mortality in Africa and southern Asia. Dr Waiswa presentation established the epidemiological evidence and unique opportunities available to INDEPTH member centers to undertake newborn research. He indicated that over the 7.2 million deaths in 2011, neonatal deaths accounts for over 40% and constitutes the
greatest barrier to achieving MDG 4. The presentation shows that about 81% of neonatal deaths in Africa are due to three main causes of death, including prematurity, birth asphyxia, and Sipsis. He discussed the research priorities for newborn health and how INDEPTH could advance them.

He also gave an update on the INDEPTH Newborn working group, which was formed in 2010 and its role particularly in research including: improving estimates, understanding determinants, developing tools, improving data collection systems and strengthening local use of data.

He proposed three critical research questions that could be pursued by INDEPTH:

1. Are shorter course or switch course antibiotics, or oral-only antibiotic regimens effective? New multi-site study.
2. Can we develop an algorithm to screen newborns needing antibiotic treatment when identified through active surveillance?
3. What are the optimal, locally adapted delivery approaches for newborn infection management as part of community-based packages?

He said the overall goal of the newborn working group was to provide evidence-based information to inform policy and programs for newborn survival in low and middle income countries.

He added that 8 centers received funding from the secretariat to analyze existing data. The working group was able to develop a data analysis template which was further improved and circulated to members for the current meeting.

Dr. Peter Meissner “Evidence behind low cost interventions to reduce neonatal mortality and experiences and impact of a perinatal community health project in Kenya”: His presentation highlighted the global picture of neonatal and maternal health with particular reference to high impact hospital and community-based interventions that could address the problems of maternal and newborn health in low-income countries. Some of these research areas include:

- Community-based education for women groups on health seeking behavior
- Early breastfeeding
- Improved nutrition
- Keeping babies warm – kangaroo mother care

One important neglected challenge and an independent risk factor for newborn health is Hypothermia. He indicated that research in this area could have a huge impact on newborn survival in low-income countries. Similarly, home delivery still remains a major problem in parts of Africa, with particular reference to Kenya where the research was done. Therefore, understanding the determinants of home delivery and why women who first deliver in health facility decline in subsequent deliveries is an important step towards improvement in skill attendance at birth.

Their findings suggest that home births perform badly within the first 24hr compared to facility births. He recommended that simple, low cost community-based intervention
focus on home visit within the first 24hrs and 7 days of life could improve neonatal survival significantly. He concluded by suggesting that the INEPTH-network provides a unique platform to replicate and test community-based intervention cross multiple sites.

Prof. Albrecht Jahn -- “Linking community-based and health service data on maternal and perinatal health”: The presentation focused on what the HDSS data can be used for. He identified assessing environmental and socio-economic risk factor and assessing and improving health service with attention on coverage, outcome and impact.

One of the main highlights of the presentation was the issue of coverage, which he indicated that will be a major issue post MDG-2015. Coverage is defined as the proportion of the population or target group that needs a specific service and also gets it. Prof Jahn pointed out that the current INDEPTH template on Neonatal and Maternal Health research has some indicators on coverage such as vaccination, antenatal etc but more can be added.

There should be clear agreement and definition on what should be covered. This will allow for the computation of the level of coverage. For example: all women should attend and received antenatal care. The measurement of effectiveness of antenatal care could be done by measuring the level of coverage, for example (vaccination indicators or the various components of antenatal care). He also mentioned that coverage can be used to interpret data on outcome and impact.

Discussions and Question time

During the comments and questions and answers time, the issue of tracking of pregnancies was discussed. This is because it was identified that most sites do not know the number of pregnancies recorded. That is, what is the proportion of pregnancies that are captured in a year?

The DHS approach of capturing neonatal mortality was recommended as the DHS uses the birth history format where all births to the woman are captured and then the detail and status is recorded. There was also the call for the development of standard instrument to capture and validate stillbirth. This will help to reduce the misclassification of stillbirth.

Neonatal mortality is closely related to maternal mortality and therefore both should be considered together or studied alongside. It was suggested that, as part of the manuscripts to be prepared, HDSS sites could also analysis the correlation between maternal mortality and neonatal mortality. It was also recommended that the focus should be on what can be done with the HDSS platform rather that what everyone is doing.
Dr Ayaga Bawah - - “Maternal and Newborn Health”

The presentation focused on definitions and measurements. Live birth, stillbirth/foetal deaths were defined. The measures discussed are miscarriage, neonatal mortality, post neonatal mortality, foetal mortality, perinatal mortality, infant mortality and child mortality. Key measures of mortality in early life were also discussed. These include Infant mortality “rate” (IMR), Neonatal mortality “rate” (NNMR), Post-neonatal mortality “rate” (PNNMR) and Under-five mortality “rate” (U5MR).

Maternal mortality was defined and maternal mortality ratio and maternal mortality rate discussed as well as the various methods used in capturing maternal mortality. Methods such as Cohort, Period, Sibling History, and Verbal Autopsy were also discussed. The presenter identified possible bias that can occur and attributed them to:

- Omission of child deaths
- Misdating errors
- Heaping of dates of death (in particular infant deaths are heaped at 12 months)
- Selection bias (for example if children whose mothers have died are not included)
- Transference – reporting of ages outside the survey reference period (to avoid asking or answering extra questions)

Group sessions and data analysis -Saturday 13TH July 2013

After the welcome remarks by Dr Martin Bangha, the day session commenced.

Dr. Kate Kerber — “Counting every stillbirth and newborn death and making them count: opportunities for the INDEPTH Network”

Her presentation focus on three main questions, (1) why are the 3 million newborns dying each year (2) what are the major priorities for addressing this burden and (3) what is the potential role of the INDEPTH Newborn working group. She indicated that global progress for reducing maternal, newborn and child deaths has accelerated with the setting of MDGs in 2000. However, the gap between rich and poor countries are staging and will take several years of research and interventions for low and middle-income countries to reach current industrialized region Neonatal Mortality Rates (NMR) levels based on the regional average rate of reduction (ARR) from 2000-2011. She indicated that unless we achieve major acceleration for newborn survival, in these regions we cannot reach our goal of ending preventable child deaths by 2035.

On neonatal deaths, she indicated there has been improved classification and estimates of the cause of neonatal mortality since 2000. The three leading cause of neonatal deaths includes; (1) Preterm birth complication (2) Intrapartum-related and (3) Severe infections (pneumonia/sepsis/meningitis/tetanus). She emphasised that these cause
must be addressed and the INDEPTH platform provides huge opportunities to scale-up and test evidence based interventions.

Another major problem is the huge country variation in stillbirth rates. Current estimates show that 98% of stillbirths occur in low and middle-income countries – more than two thirds of which are among rural families. For instance, 10 countries account for 66% of the world’s stillbirths and also 66% of neonatal deaths and over 60% of maternal deaths. All these countries are in sub-Saharan Africa and Asia, including: India, Pakistan, Nigeria, China, Bangladesh, Dem Rep Congo, Ethiopia, Indonesia, Tanzania, Afghanistan.

What are the major priorities for addressing this burden? Newborn survival solutions: She indicated that there are known interventions for prevention and management of the main killer of newborns. These are summarized in the table below.

<table>
<thead>
<tr>
<th>Major cause</th>
<th>Management</th>
<th>Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preterm complications</td>
<td>KMC, preterm care</td>
<td>Management of preterm labour and ACS</td>
</tr>
<tr>
<td>Severe infections</td>
<td>antibiotics, supportive care</td>
<td>tetanus toxoid immunization, clean delivery, cord care including; chlorhexidine, hand washing, breastfeeding, and hygiene promotion</td>
</tr>
<tr>
<td>Intrapartum-related complications</td>
<td>Stimulation/resuscitation if not breathing at birth</td>
<td>Quality obstetric care and labour monitoring</td>
</tr>
</tbody>
</table>

In the area of developing and delivery research through testing known interventions and packages, INDEPTH is already in these areas with the example of home visit package for newborn care (Iganga-Mayugye, Kintampo, ICCDRB). Areas such as mHealth – verbal autopsy and linked facility mortality audit and costing interventions and service delivery should also be explored.

Data gaps for stillbirths: She indicated that data on stillbirths remains a major challenge due to data collection gaps. Most stillbirths are uncounted because up to half of them occur at home. Globally, 75% of child death data comes from Demographic & Health Survey data – but these survey data are unreliable for accurate estimation of stillbirth rates. Another challenge is data consistency gap, including definition confusion, multiple causes of death classification systems and lack of consistency in attributing cause of death.

On the question of what is the potential role for the INDEPTH Newborn working group. The role for INDEPTH sites to feed in to global estimates, help understand determinants, test and improve tools, improve data collection systems, and encourage local use of data for planning and action. She said one critical area that INDEPTH should address is complete pregnancy surveillance and their outcomes. These include early registration of pregnancies, gestational age and proper classification of stillbirths and neonatal deaths.
On cause of death data, INDEPTH should improve the classification of cause of deaths for neonate by adopting standard verbal autopsy tools and hierarchies. In addition few Centres are using social autopsy to understand the underlying factors influencing neonatal mortality. She noted that the research agenda for newborn health is clear and more partners are coming on board but attention is not commensurate to the global burden. Clear role for INDEPTH – particularly in description and delivery research but early outputs are needed to bring donors on board.

The presentation also talks about the global research agenda beyond the MDGs. There is an up-coming priority research question for reduction of stillbirths, neonatal mortality and morbidity through 2025, led by WHO and Saving Newborn Lives

**Suggested ideas for next steps for the Newbron working group**  
In conclusion she suggested some ideas for the way forward for the Newborn working group. Including  
- Standardise analysis plan across sites and reanalyse existing newborn data  
- Submit publication on multi-site findings as well as individual site write-ups  
- Present results at Global Congress on VA in Greece, October 2013 and Newborn Indicators Technical Working Group in DC, December 2013  
- Engage with the global newborn health community (eg. Healthy Newborn Network)  
- That global research agenda for newborn health is clear and more partners are coming on board. INDEPTH have huge potential role to play – particularly in description and delivery research but early outputs are needed to bring donors on board.

**Dr. Martin Bangha -- Maternal and Neonatal Mortality Data from Centres: Preliminary Assessment**

Martin indicated that the Secretariat prepared the template for data submission based on the Stillbirth and Neonatal Death Study (SANDS) Project conducted in Navrongo and from earlier efforts by the Newborn Working Group. He indicated the numbers of HDSS Centres that were able to submit complete data and some output from selected HDSS sites. He highlighted some of the problems that were identified during the data compilation and explained key definitions that may not have been clear to participants.

A graphical representation of maternal mortality rate and ratio and neonatal mortality rate from selected centres was displayed for discussion. Some results clearly show inconsistencies in the trend of the rates over time, which was attributed during the discussion to data quality. During the discussions it also came out that data quality and the number of rounds could affect the trends. Comparison of site data trends with regional, national and global trends was suggested.
Prof. Karen Hofman Wits University and Peter Waiswa on: Open discussion on key variables, their definitions and how they are captured or measured across participating HDSSs. Definitions of concepts: there were inconsistencies in the definition and misclassification of key terms including, gestational age, abortions, miscarriage, stillbirths and neonatal deaths and this need to be standardized across sites. There was a suggestion to add validation questions on the events forms for logical checks to improve on the quality of the data.

There were suggestions for the adoption of UN definition for key terms in other for HDSS data to be comparable with other sources of data. However, some also call for the adoption of operational definitions within HDSS context and closer to UN definitions. Immunization data: immunization rates are computed differently due to different data collection systems across sites.

**Definition of terms and key variables**
Capturing and measuring some key events were the main issues of discussions. How stillbirths, pregnancy, gestation age are difficult to capture and measure. It came out that estimating gestation age correctly when pregnancy is captured would aid in the classification of pregnancy outcomes.

Medical or skilled persons were recommended as the persons to be used by HDSS to capture pregnancies so as to capture gestational age. However, this came out that HDSS are not in the position to use medical persons due to capacity and resources limitations.

There are also difficulties in separating spontaneous abortion and induce abortion. Also, the difficulty is capturing and separating stillbirth and neonatal death resulting in over and under estimation. The United Nations definition of live birth was recommended to be the standard for comparison and also acceptability across regions and countries

**WORKING GROUP SESSIONS**

*Discussion and agreement on key topics for group work and distribution of participants into respective working groups led by Dr. Abraham Oduro, Director Navrongo HDSS:* Working groups were form to brain storm and develop workplans on four main areas including:

- Group one: Definitions on capturing and coverage of pregnancies and their outcomes (standard tools for capturing pregnancies led by Alex Manu).
- Group two: Manuscripts: “concept papers led by Paul Welaga, Kate Kerber and Jacques Emina”:
  - Replication of the Navrongo paper?
  - Rationale paper focusing on why should HDSS sites be used, what are the opportunities and challenges, what advantages?
  - Methodological paper: Reporting and under-reporting of data on, say, maternal mortality and possible biases presented by DHS/HDSS data
- Group three: Research agenda for the way forward led by Peter Waiswa
- Group four: Capacity building in MNCH led by Peter Meissner
At the end of the day’s activities, there was a plenary where working group representatives presented the progress of work of each group. The presentations followed with discussions.

**Manuscripts working group:** Three groups of papers was proposed including, site specific papers replicating the Navrongo paper, cross site papers and a rational paper. For the cross site paper, the group refined the tables developed by INDEPTH and came out with standard variable that were available and comparable across participating Centres. Background, objectives, methods, results and conclusions format were presented. The papers will focus on the last 7 years (e.g. 2005-2011) of available data. A template would be provided for the web material as supplementary information. The group presented 6 potential manuscript titles or topics. These are:

1. Multi-site replication of the Navrongo paper: “Trends in stillbirths and early neonatal mortality”
2. Rationale paper e.g why should HDSS sites be used, what are the opportunities and challenges, what advantages?
3. Neonatal cause of death overtime: interval-4 for analysis or other.
4. Maternal and neonatal co-morbidity and co-mortality: evidence from Health and Demographic Surveillance data
5. Interventions/packages - delivery research
6. Analysis of sites with pregnancy history data verse data captured during routine surveillance

In addition, preliminary results/data from the templates were discussed. It was observed that most of the templates were incomplete and therefore, could not be added in the joint analysis. The results show different patterns and trends cross member centres. For instance, it was observed that whereas neonatal mortality was declining in some sites, there were either fluctuating or increasing in other sites.

Another observation was that data from few sites shows that the proportion of infant deaths that are neonates was less than 40% (gold standard). This was inconsistent with the global estimates of neonatal mortality, even in countries with improved vital statistics. The consensus was that sites that have this problem will not be included in the cross site paper.

However, it was agreed that sites with this type of data should be given time to investigate and correct their data before resubmitting for the pool analysis. In addition those sites with proportions less than 40% of infant deaths attributable to neonatal deaths were encourage publishing their data if there are no problems with the quality of the data. There were also suggestions to prepare other papers looking at missed data for sites with low proportion of neonatal deaths and INDEPTH potential contributions to MNCH estimates.

Prof. Sankoh in his statement after the seemingly long discussion on the gold standard and the exclusion criterion said that participants should be proud of the fact that they are brave enough to provide the data and come to the workshop to evaluate the data. He posed a question to the house –
How do you want INDEPTH to help you in improving your data quality?
How do you want to incorporate some of the suggestions given here to improve data quality?

He indicated that having very low proportions of neonatal deaths in a given site should rather pose a challenge and opportunity to INDEPTH to improve the quality of the data. When participants move out of this workshop, they should go back home extremely pleased that they came to the workshop. The sites will get an opportunity again to go and look at the data over a short period of time and give feedback to INDEPTH. It is also fine for to see unexpected results and report on that so long as there is a credible explanation of what is happening.

Research agenda working group: The group was led by Dr. Peter Wiaswa with significant contributions from Dr. Cheikh Mbacke, Prof. Karen Hofman and others participants.

Rational for formulating a research agenda for maternal and newborn health working group: Over the years there has been no comprehensive and systematic research agenda for maternal and neonatal survival within the network. The need for the network to formulating a research agenda is as follows:
• Until we accurately quantify and clarify the burden of maternal and newborn mortality across member centers, it will be difficult for the network to find and implement effective solutions to address the problem. For instance, the patterns and trends within countries and between countries and the reasons for the slow decline in neonatal mortality in low and middle income countries are not well understood.

• Currently, there exist no accurate estimates or complete data on maternal and newborn health in the countries where the burden is greatest. Coincidentally, these are the same countries where INDEPTH HDSS Centers are located.

INDEPTH Comparative Advantage in maternal and newborn research: The team re-defined INDEPTH comparative advantages to conduct large scale and high impact research on MNCH including:
• All INDEPTH member Centers research is population-based within well-defined geographic areas.
• INDEPTH member Centers are located in poor populations in both urban & rural areas were the burden of maternal, stillbirth and neonatal mortality rates are highest.
• Member Centers have the capacity to conduct large scale longitudinal prospective studies and epidemiological studies that are able to established causality compared with other cross section surveys.
• Already exist is huge high quality data on vital events, (mortality, fertility, migration), morbidity data and cause of death data using verbal autopsy. In addition socio-economic determinants of health are well documented across sites.
• Regular updating of the above information is done routinely through HDSS rounds.
Capacities exist to link population and health facility data to better understand the epidemiology of diseases in member Centers.

**Primary Research areas:** The team proposed a research agenda along the research pipeline, including, description research, discovery, development and delivery research. In the short term the focus of the network will be along the following research areas.

Description/ Measurement/Epidemiology/Social determinants: It was agreed that it was important to standardized data collection tools, key terms, improve data collection systems/surveillance and measurement. The details of the requirements for this task were to come from the outcome of the definition and standardization working group.

- Maternal, Neonatal and Stillbirths
- Pregnancies and pregnancy outcomes (abortion, miscarriages, prematurity, live birth and morbidity)
- Determination of gestation age
- Improving methods for determination of causes of deaths for Maternal, Neonatal and Stillbirths and their determinants (Social autopsy) e.g
- Understand the coverage of interventions around pregnancy, delivery, neonatal and postpartum period (for newborn and the mother)
- Develop comprehensive data sets including high quality contextual data (education, marital status, household socio-economic data, environmental exposure, violence against women)
- Tracking of long term outcomes of severe maternal and neonatal morbidity such as the long-term outcome of selected newborn condition, including sepsis, birth asphyxia and prematurity.
- Identifying the determinants of uptake of different evidence based maternal and newborn interventions

**Secondary or long-term Research areas:** The group also proposed secondary or long-term intervention studies (including both preventive and curative) on the leading causes of death for preterm, neonatal and maternal deaths.

The network would develop algorisms and other simple tools for identifying babies born preterm and those with neonatal infections.

The network must work towards carrying out long-term and more rigor scientific research (e.g microbiological, genetic, pathological, new antibiotic trials) that will increase our understanding of the underlining factors killing mothers and newborns in sub-Saharan Africa and southern Asia.

It was however observed that some of these planned activities will depend on HDSS context and resources availability.

**Operationalization of the research agenda:** It was recommended that efforts be made to improve data quality across individual sites, defined key terms and concepts, standardized and harmonize data collection tools and systems for all participating member centres.

The Network would have to adopt the research agenda as key network policy, publish and disseminate it both internally and externally for potential funding. It was however, observed that this research agenda will constitute the broad framework to guide the network on maternal and newborn research.

Finally but not the least, capacity strengthening and training in MNCH will be pursued by the network in other to achieve the milestones set out in workshop.
The group agreed to write a position paper to be published in a peer review journal and came out with a title and an outline of the paper.

**Topic of paper:** *Potential INDEPTH Network Contribution to the Global Evidence Based Maternal, Newborn and Child Health (MNCH) Agenda: An Untapped Resource.* The main aim of the paper is to demonstrate the potential contribution of the INDEPTH Network to global evidence based maternal, newborn and child health research. The paper will demonstrate that, research at INDEPTH sites contribute to, and impacts on health and social policy across member’s countries and can be leveraged to improve maternal and newborn survival.

The paper will highlight the potential of the network including, having a significant, well established research population (3 million people) with MNCH data in 3 continents, 20 countries, 41 research centers and 48 HDSS field sites. Data covers poor populations in urban slums and rural areas in SSA and SE Asia, which have the greatest burden of maternal and child mortality.

Another objective was to make a compelling case for donor partner to buy into the research agenda and collaborate with INDEPTH to implement the research agenda to address maternal and newborn health issues in sub-Saharan Africa and southern Asia.

**Working Group on: Definitions and improving coverage of pregnancies and outcomes:** The working group was led by Dr Alexander Menu. The main task was to come out with standardized definition of key HDSS events, agree on key variables or indicators and recommend methods to improve data collection systems for pregnancies and their outcome.

**Definition of key terms**

**Life birth:** The complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy which after such separation, breathes or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached. This must be operationalized by asking the following questions- did the baby ever cry, or ever breathed or ever moved after the birth?

**Stillbirth/late foetal death:** Stillbirth is defined as foetal death corresponding to approximately 28-week gestation or more with no signs of life at birth. This will be operationalized by asking -was the woman pregnant for 28 or more weeks of pregnancy and gave birth to a baby that did not ever move, or ever breathe or ever cry after the birth?

**Abortions:** Premature expulsion of the foetus before the 28 weeks of gestation Categories: Miscarriage/spontaneous abortion and induced abortion.

**Early neonatal death:** referred to death occurring within 7 days after birth. This will be operationalized as (date of Death – date of delivery) < 8.
**Neonatal death**: was defined as death of a live-born child occurring within 28 days of life. This will be operationalized (date of Death – date of delivery) < 29. It was agreed that the first day of birth will be counted as day zero.

**Capturing Pregnancy**: In routine HDSS data collection systems, the most accepted practice has been using the household head as the respondent or any other credible respondents who is available at the time of interview. It is therefore recommended that data collectors should try to identifying the event by asking: is there a pregnant woman in the household. After establishing that there is an event, the pregnancy form should be administered to the pregnant women.

- Proposed two questions to ask every household visited to capture pregnancies:
  - Since the last time I visited your household, do you know if within the periods any of the ladies in this house is delayed/missed her period?
  - Since the last time I visited this household, has any of the following fallen pregnant – List all women in the reproductive ages (may be show their names differently in the HRB or generate a separate listing)?

**Strategies to increase capture of pregnancies**: The following strategies were proposed to increase the capture of pregnancies and their outcomes.

- Incentives; Giving ANC card for free to pregnant women
- Ask questions that target each woman by name (consider expanding age range to early teens or later age e.g. >49)
- Target the pregnancy questions to the women. That is pregnant women should respond to questions on the pregnancy form.
- Ask for/ use rumors on pregnancies, asking neighbor households if they observe any pregnancies in their community
- Establishing and strengthening Community key informants systems (including TBAs where applicable) to improve capture and monitoring of pregnancies. Incentives such per event pay status may be introduce.
- Use the ANC data from clinics- i.e. linking HDSS to health facility data

Think about using the ANC cards for reconciliation of data e.g. if mother says the baby died at birth and there are APGARS recorded, then we are clear it is an ENND

**Pregnancy outcome indicators**: The following indicators were proposed as standard indicators for pregnancy to be captured across sites. This was important to enhance cross site analyses of data.

Since the last time I visited, has anyone in this household had a delivery or lost a pregnancy?

- Stillbirth or live birth
- Multiple or single
- Miscarriage or abortions
- Death of the baby or mother

For known pregnancies, link to the permanent ids of the pregnant women and ask if the pregnancy has terminated:

- Stillbirth or live birth
- Multiple or single
- Miscarriage or abortions
- Death of the baby or mother
- Still pregnant
Other important variables to include on the newborn form are:

- Date of outcome
- Place of delivery
- Attendant at delivery
- Mode of delivery
- Indication for caesarean section
- SP, PMTCT, at least 4 ANC visits, birth weight (1st weight taken), TT, Initiation of breastfeeding, Sex, BCG, OPV0,

Questions to capture neonatal outcomes: For neonatal deaths, the emphases should be on deaths that occur within day zero to 28 days of life. This should not be limited to the VA data collection, but should be possible to be captured in HDSS data. Suggest variable on neonatal deaths and other pregnancy outcome:

- Number of neonatal admissions
- Danger signs as near miss
- Care seeking for neonatal illness
- Place of care seeking
- Any other feed in the first month after birth
- PNC contact for the mother (at least 1)
- Timing of the 1st PN care

Working Group on: Capacity strengthening and training in maternal, Neonatal and Child Health-
Present situation – sites have inaccurate/near accurate/accurate data. In some sites there is insufficient manpower/capacity, other are well funded. There is also high turnover of staff in some sites.

Challenges

1. It may probably be enough to do at least two rounds to collect standard data. What is the minimum pop size to get the necessary data? Agree with heads of DSS what capacity is needed.

2. Training at different levels of each DSS
   - Training demographers/DSS heads on the agreed standards of perinatal health data.
   - Training supervisors of field workers – by demographers and DSS heads
   - Training data managers how to analyze perinatal health data better.
   - Develop a standard curriculum for perinatal data.

3. Formation of regional perinatal health groups
   - A group of people from diff. DSS (same country/region) interested in perinatal health
   - How: - develop regional research interests – assist groups in proposal writing – support young scientists (Mentorships, Masters/PhD students etc).

4. Capacity building to test low-cost intervention packages
- How: - Identify 1 or 2 intervention packages at community level that can be tested in some sites.
- We can really contribute on multi-site interventions within INDEPTH.
- Not so much evidence on implementation of integration of service delivery with MNCH – INDEPTH opportunity

5) **Sustainability of the achieved capacity at the different sites.**
   - What motivates centers who bring in good quality data?
   - Monetary incentive
   - Funds for workshops (e.g. proposal writing, scholarships).
   - Do centers have difficulty in collecting the necessary data due to lack of manpower or commitment?

6) **What capacity do we need at the level of the INDEPTH Secretariat?**
   - To keep the contact to the DSSs and coordinate capacity building.

7) **Develop of a perinatal health curriculum**
   - Curriculum for perinatal health data collection (at diff levels)
   - Develop multinational curriculum (based on evidence low-cost interventions)

What should be taught?
- At community level (CW, health nurses) and at health centre level.

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**Minutes of INDEPTH Newborn Facilitators meeting 13th July 2013**

Facilitator met after the day one proceeding to evaluate the discussion and projection into the future. The first question was an assessment of progress or work. There was the feeling that the day has been productive and planned activities were achieved. It was also observed that the skeletons that need to be generated have been defined and clearly the workshop was proceeding well. There was also a clearer picture of proposals that need to be done.

There is the key question about what is the purpose of the HDSS and so thinking of linking neonatal death issues in this is great but we must define to which extent service data should be collected or not. To which extent should HDSS be using ANC in the data collection? The consensus was to constitute a smaller group to carry this agenda forward. We cannot be 100% correct but to make realistic approach to what is real and state our limitations.

Another important question was what is our goal? Do we want to get the data right or do we want to check those who are doing something right and build the other groups who are lacking behind? We want to get it right but also to go beyond this and move forward. It is a parallel track.

About SNL and the future: we are being hounded and so we must commit to produce outcomes. The UN commission for accountability and development may be interested as well as the Gates foundation in the proposed research agenda. The consensus was to form a core group experts and people who are passionate about MNCH and get people to contribute or support the group.

**Minutes of INDEPTH Newborn facilitators final meeting 15/07/2013**
In attendance: Anand, Alex, Paul, Peter W, Peter M, Jaques, Sam, Martin, Manda, Karen, Albert, Henry, Daniel. The meeting was convened to review what has been achieved at the workshop and discuss some of the key issues that need to be followed up by specific groups and individuals. The agenda was therefore a recap of events discussed and plan the way forward (plans and outputs).

1: Recap of the meetings: It was agreed that there might be the need for HDSS sites to present some information on what they are doing, what the challenges are, how the data is collected, especially tracking of pregnancies and its outcome.

Action items
- Martin to refine data template and circulate to working group members.
- HDSS sites to send data collection forms on pregnancy and pregnancy outcomes including newborn health outcomes.
- Identify people to do the analyses and lead manuscripts
- INDEPTH should develop standardized indicators, tools and data collection systems for HDSS sites to adopt.
- Request Centers for information on cost implication to implement standardized tools and improvement in data collection systems.

B. There was also discussions on the appropriate name to adopt for the working group. It was suggested that maternal health also needs recognition and visibility and so the group name should reflect both maternal and newborn health. It was agreed that the two are interdependent and should form the basis for the research agenda.

C. Post 2015 debate which is towards Universal Health Coverage: getting sites prepared to take up this agenda. For example, a meeting took place in the context of the MDGs.

D. All the working groups should have a TOR at the secretariat
E. What the meeting did
   - Showed challenges/gaps in data collection,
   - Provided basis for writing papers
   - Harmonizing definitions
   - Social autopsy

G. Documentation of changes I. The health system and interventions in our sites that might influence the data being collected

2. Way forward/Outputs

A. Preparation of the manuscripts: The group identified people to lead the manuscripts and send drafts to the team for comments and contributions. It was agreed that deadlines should be set for the delivery of output.
   1. Cross-site paper: Paul from Navrongo to lead and supported by Sam. Outline of manuscript already done by working group.
   2. Position paper: Sheru from Mbitha to lead the paper with support from Karen, Peter M and Peter W and the rest of the working group members.
   3. Local data use concept paper on getting research into policy and making our data talk to the health systems: Sam from the University of Ghana to lead the preparation of this paper.
Timelines: 1st to 16th August for HDSS site to submit data to be part of manuscripts. 31st August deadline for circulation of draft papers from lead persons. It was agreed that submission of final manuscripts to peer review journal should be done by the end of September, 2013.

B. Research agenda: Sites will be invited to submit proposal to implementing intervention in Community Kangaroo Mother Care (KMC). Two sites will be selected based on population size, NMR and capacity to conduct the study. The detail discussion on this study is on-going with the funder, the Gates Foundation. The Secretariat will also conduct qualitative studies around MNCH to complement quantitative studies.

- Secretariat to write out ideas for work to be done and circulate or to be discuss in Johannesburg during 2013 ISC.
- The INDEPTH scientific advisory board to advice on the MNCH activities and look at draft research agenda.
- Secretariat should set up an email list server for members of the working group to enable the sharing of ideas and information.

C. Upcoming INDEPTH Scientific Conference: yet to agree on whether the maternal and newborn working group will need a dedicated day (e.g pre-conference) for the NWG or a session be set aside for working groups as part of the main meetings.

RECOMMENDATIONS/Workshop achievement

The workshop demonstrated the challenges in data collection as well as the data gaps in the area of maternal and newborn health research in the INDEPTH Network. Challenge in the area of capturing of pregnancy and pregnancy outcomes. This was seen as a very critical area as the capturing of the events is the most important component in assuring quality data. Standardized definition were defined and agreed on by the whole team and indications for complete capture of maternal and newborn health were developed.

The workshop also provided the basis and developed template for writing the proposed manuscripts on maternal and newborn health. There was also harmonization of definitions across member centers which will allow for multi-center analysis and manuscript development.

Interventions in sites were identified as one of the factors that potentially affect the quality of data. Sites are therefore recommended to document all interventions in their sites and the timing of such interventions. This is because, apart from the number of round of data collections, interventions which will potentially have an impact on a particular indicator should be noted. This will help better interpret the data and results.

Given the objective of the workshop – to develop manuscripts for publication, it was recommended that sites present some information on what they are doing, what the
challenges are, how the data is collected especially tracking of pregnancies and its outcome (definitional document). This should include what questions are asked, how they are asked and the sequence of questing in the field. In this area, all sites should be requested to send to the secretariat all forms use in collecting maternal and newborn data. That is forms use to capture pregnancies and pregnancy outcomes.

There should be modification of forms if the need be to meet the current agreed definitions and also new questions to capture pregnancies and pregnancy outcomes. As this will mean the development and printing of new forms, cost consideration should be accounted for in the introduction of new modules.

Universal Health Coverage will be the next critical research agenda post MDG 2015. It is recommended that centers should prepare to be in a better position to take up this new research agenda.
# List of Participants and Institution of affiliation

**INDEPETH Maternal and newborn health Research Workshop at Ho**

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