# Workshop Notes

## *"Strengthening Infection Prevention and Control (IPC) for mothers and newborns" Workshop*

*Photo Credit: Karen Kasmauski/ MCSP*

# Contents

**Gratitude** ..... 2

**Introduction** ..... 3

**Core Components and Infrastructural Elements of IPC for Mothers and Newborns** ..... 5

**WaSH Elements of IPC for Mothers and Newborns** ..... 9

**Adherence to IPC Behaviors for Mothers and Newborns** ..... 13

**Further Opportunities to Strengthen IPC** ..... 19

**Synthesis Cafés** ..... 24

**Annex 1: Agenda** ..... 29

## Gratitude

On behalf of the organizing team, we thank each of you who participated in the Strengthening Infection Prevention and Control for Mothers and Newborns Workshop, both in-person and remotely, in Washington, DC on June 11th and 12th. We appreciate you taking the time and effort to join us, as well as the sharing of your ideas and expertise regarding the burden of infection among mothers and newborns, the role of WaSH in IPC, barriers and challenges to adherence to IPC, and avenues for strengthening IPC.

We are so grateful to all of the presenters and discussants for enabling lively discussions throughout the day and a half. We would also like to thank Ayne Worku, Jematia Chepyator, Joanne Thomas, Jason Lopez, and Bhavana Upadhyaya for their detail-oriented diligence in the lead-up and execution of the IPC workshop, as well as their note-taking and collaboration after the workshop.

## Session 1:

# Introduction

### *1. What are the burden and sources of infection among mothers? And Preliminary Findings from Global Sepsis study (Mercedes Bonet, WHO)*

*Risks*

The global estimated incidence of puerperal infection/sepsis is 4.4% among live births. The risk factors include pre-existing maternal conditions, events during labor, birth, or abortion, and procedure- or provider-related conditions. Infections are a contributing cause (25-40%) to the underlying causes of 11% of maternal deaths. In terms of regional differences, Asia and Africa have the highest burden with increasing trends in developed countries.

The impacts on mothers and newborns include disruption in postpartum restoration, hindering of maternal infant bonding and breastfeeding, increased risk of neonatal infections, and chronic pelvic inflammatory disease, chronic pelvic pain, and infertility.

*Study Findings*

There is also an issue of secondary infection on top of primary infection. Most of the cases were caused by bacteria (68%) and malaria (18%). The use of infection prevention measures among women with indication show prophylaxis for caesarian-section (CS) among women with CS is 86%.

*Future Burdens*

Future considerations include the increasing trends of facility-based deliveries not accompanied by improvements in sanitation, increasing trends in CS, early discharge policies, increasing groups susceptible to secondary infection/sepsis (obese women, diabetes, maternal near-miss cases), and increasing antimicrobial resistance.

### *2. What are the burden and sources of infection among newborns? (Tedbabe Hailegebriel, UNICEF)*

*Burden of Infection*

The major causes of neonatal mortality include overcrowding, understaffed and underequipped labor and delivery rooms, and placement of healthy infants with sick infants. Neonatal sepsis has been classified into early-onset sepsis (EOS) and late-onset sepsis (LOS). EOS occurs in the first 72 hours after birth, usually considered to be from maternal carriage or at birth, while LOS is

often from community or hospital acquired infections, mostly gram negative bacteria. VLBW preterm infants are at high risk due to immaturity of immune system, prolonged hospitalization, prolonged mechanical ventilation, use of indwelling catheters, endotracheal tubes, and invasive procedures.

*Healthcare Facility Acquired Infections*

These types of infections are often due to shortage of space, lack of equipment, lack of IPC capacity, no handwashing or sanitizing, limited or no breastfeeding, and outbreaks of multidrug-resistant strains of bacteria.

***3. What are the key global IPC resources for mothers and newborns? (Chandrakant Ruparelia, JHPIEGO)***

*WHO Resources*

IPC resources for mothers and newborns from WHO include IPC Program Implementation Tools, Hand Hygiene Guidelines, SSI Prevention, IPC for Acute Respiratory Infections, Prevention of AMR, disease specific guidelines, Decontamination and reprocessing of medical devices for healthcare facilities, and Safe management of wastes from health care activities (2nd edition, 2014).

*CDC Resources*

Resources for IPC from CDC include IPC topic specific guidelines, surveillance of HAIs (more US specific), IPC Practices for Safe Healthcare Delivery in All Settings, and TRAIN: Infection Transmission Risks Associated with Non-sterile Glove Use.

*Additional Resources*

Addition resources include Coursera, mobile apps, professional associations, and Decontamination of resuscitation equipment.

**Session 2:**

# Core Components and Infrastructural Elements of IPC for Mothers and Newborns

***1. What are the Core Components of IPC? What is the global data on availability of IPC infrastructure for mothers and newborns? (Amy Kolwaite, CDC)***

*Core Components of IPC:*

The core components of IPC include 8 at the facility level, 6 at the national level, 11 evidence-based recommendations (mainly data from high income countries), and 3 good practice statements.

*Core Component 1:*

IPC programs should have clearly defined objectives, roles, and functions, dedicated and trained IPC professionals and multidisciplinary team, support from the facility leadership, and good quality microbiology laboratories. Critical linkages with other programs (MCH, waste management, TB/HIV, media, community engagement) is important.

*Core Component 2:*

Appropriate IPC expertise is necessary to write or adapt and adopt a guideline both at national and health care facility level. Guidelines should be evidence-based and reference international or national standards. Adaptation to local conditions should be considered for most effective uptake and implementation. Monitoring adherence to guideline implementation is essential. Guidelines should be prioritized locally based on the most frequent and/or risky practices and adapted to local circumstances.

*Core Component 3:*

IPC education and training should be part of an overall health facility education strategy, informed by behavioral change theories and methods, conducted for pre-graduate, post-graduate, in-service personnel, evaluated periodically, and in collaboration with local academic institutions.

*Core Component 4:*

Standardized definitions, appropriate methods, good quality laboratory support, training, expertise, and quality control are needed for HAI surveillance. Surveillance has to be coupled with timely feedback to influence improvements.

*Core Component 5:*

In order to have successful multimodal interventions, comprise of several elements of components (3 or more; usually 5) are implemented in an integrated way to improve and outcome and change behavior. This includes tools developed by multidisciplinary teams that take into account local conditions, association with overall organizational culture change. This requires coordination and teamwork, involvement of champions or role models, and linkage with national quality aims and initiatives.

*Core Component 6:*

The main purpose of auditing/monitoring practices is to achieve behavior change or other process modification to improve the quality of care and practice, with the result being the reduction in the risk of HAI and AMR spread. Monitoring and feedback are also aimed at engaging stakeholders, creating partnerships and developing working groups and networks. Sharing the audit results and providing feedback not only with those being audited (individual change), but also with hospital management and senior administration (organizational change) are critical steps.

IPC programs should be periodically evaluated to assess the extent to which the objectives are met, the goals accomplished, whether the activities are being performed according to requirements and to identify aspects that may need improvement identified via standardized audits.

*Core Component 7:*

Standards for bed occupancy should be one patient per bed with adequate spacing between beds. Health care workers' staffing levels should be adequately assigned according to patient workload. The WHO Workload Indicators of Staffing Need (WISN) method provides health managers with a systematic way to determine how many health workers of a particular type are required to cope with the workload of a given health facility and decision making. Overcrowding recognized as being a public health issue that can lead to disease transmission

*Core Component 8:*

Availability of equipment and products at the point of care leads to increased compliance with good practices and reduction of HAIs.

*Challenges*

Core components in low and middle income countries include limited access to qualified and trained IPC professionals, limited human resources, inadequate budgets, implementation challenges, need for adaptation or tailoring to the cultural setting and local context (according to available resources), availability of human resources and training, quality laboratory support, information technology, and data management. Implementation resources for WHO Core Components is available on WHO website.

**2. *Strengthening health systems of IPC: ONSE profect in Malawi (Rudi Thetard, MSH/Malawi)***

*Overview of the Malawian Context*

There is an inherent competition between verticalists (who maximize) and horizontalists (who optimize). In Malawi, there is a high level problem surrounding the cycle of population increase, increase in skilled birth attendance, but minimal increase in facilities and major resource envelope decrease. There are many practical consequences the high level problem including pressure on infrastructure, staffing shortage, and funding constraints. There is also limited maintenance around WaSH and electricity. Important policy trends have been decentralization, revisions of quality assurance policies, and performance-based financing. These policies have had impacts on health systems in Malawi as well as IPC maintenance.

*Lessons learned regarding strengthened IPC implementation*

Facilities have learned to cope with infrastructure failures. One such example in Malawi is the use of a readily available tub of water to maintain WaSH when coping with a major blackout (exacerbated by high costs of maintaining power backup systems – fuel for gensets). There are also localized challenges faced when trying to strengthen IPC. At the district level, inactive quality improvement support teams provide a challenge in supervision and support. In addition, there are ongoing funding constraints with competing priorities. Many districts only receive 25-40% of required funds for day to day operations. At the facility level there is a high staff turnover, which provides challenges in compliance with processes and procedures. Drugs and supplies are often out of stock, equipment may be scarce, and there may be infrastructure issues regarding water and electricity.
IPC infrastructure in BEmONC Sites often have no soap, low availability of sterilization, lack of electricity and a consistent water supply. Typical support requested by hospitals include (example May 2018, Large Hospital) drapes and theatre gowns, bed sheets, scrubbing equipment, laundry drying lines, IPC buckets, and stationary (labor charts, admission sheets, etc.). Despite the challenges, progress toward IPC has been demonstrated by no needle/glove reuse, greater availability of personal protective equipment, and quality assurance establishment.

*Moving Forward*

In order to have the IPC voice be heard, we need to provide evidence of unnecessary morbidity and high hospital expenses related to IPC breakdown, policy guidance, political commitment, a group effort of all departments at the service delivery point, and most importantly, advocacy with a joint effort by senior level personnel to champion policy implementation at the national level. The use of core quality insurance teams at the facility level is also needed to champion IPC practices. The Health Sector Strategic Plan II emphasizes improvement of facilities, expansion of staff capacity, availability of equipment, and implementation of QI approaches. Maintaining steady momentum toward improved IPC

practices and exploring and incorporating lessons from successful programs and implementation approaches is key in strengthening health systems in support of IPC.

**Session 2 Discussion**

To what extent are health systems-related barriers preventing optimal IPC in health facilities serving mothers and newborns?

*Training*

There may be resistance to trainings due to lack of per diem reimbursement. Then there will be decreased personnel in hospitals if 1 out of 2 nurses must leave for training. Subsequently, there is an expectation that since one person received per diem for training that they should be the one implementing what was learned.

*Facility*

More needs to be done to ensure funding flows to the facilities as it is intended. Patients should take charge of holding facilities accountable. It may be helpful to discuss with legislators regarding how they would feel if their family members were utilizing the facilities (bring in a personal lens to the issue) Is this where the future of the country should emerge? There is a high importance of partnerships as IPC becomes a cross-cutting issue. We need to work with other colleagues (Global Health Security Agenda, AMR) to figure out who has funding and discuss/collaborate and learn about other programs and accessing resources and energy. Finding out differences between health facility directors may be key to sustaining good leadership and champions. We need to have a standard and see the big picture to create initiatives within those contexts. It is important to keep in mind that IPC is largely about behaviors and attitudes.

It is critical to examine what is working and celebrate small successes with providers. We also need to narrow focus in on maternal and neonatal services in IPC. What level do we want to work at? The larger scale will be focused on global advocacy initiatives. The facility level will focus on IPC within facilities and in personnel training. Do we need to be working at multiple levels and where are the opportunities? We truly need ownership at every level.

## Session 3:

# WaSH Elements of IPC for Mothers and Newborns

***1. What are the WaSH-related elements and determinants of a comprehensive IPC program? (Steve Sara, MCSP/Save the Children)***

*WaSH and relevant Sustainable Development Goals (SDGs)*

Relevant Sustainable Development Goals specific to WaSh include SDG 6: ensure availability and sustainable management of water and sanitation for all and SDG 3: ensure health lives and promote well-being for all at all ages. SDG 3 is focused on reducing maternal and newborn mortality.

*WaSH in Healthcare Facilities*

JMP monitoring ladder system includes water, sanitation, hand hygiene, environmental cleaning, and healthcare waste. Services are categorized by no service, limited services, and basic level service. In terms of facilitating use, it is important to think through whether services are available in specific points of care. Safe drinking water should be conveniently located in outpatient wards, waiting rooms, labor wards etc. Functional handwashing areas with soap, functional sanitation and bathing facilities, cleaning supplies and water, and laundry services should be conveniently located at every point of care. There should be sufficient space to limit infection risk and prevent overcrowding.

It is essential to ensure that there are appropriate protocols and guidelines summarizing responsibilities of staff members for providing services. Furthermore, teams should work on assuring that there is proper ordering and restocking of materials. Adhering to IPC behaviors is one of the most common gaps identified and a key point to keep in mind. Power dynamics among staff is also a consideration that needs to be taken. Lower level staff are not adequately equipped and encouraged to help enforce compliance with IPC behaviors among clients and peers. Through a systematic review conducted by WHO on WaSH and quality of care, poor WaSH in HCF is a significant barrier to care seeking.

*Coordination Complexities*

Coordination among government bodies can be complex particularly in term sof management among various ministries. MCSP WaSH staff have been advocating for the Ministry of Health to take more leadership in ensuring coordination among other ministry bodies in the various country programs.

*Global Call to Action*

The UN Secretary General placed a call to action for improving water sanitation and hygiene services in all healthcare facilities. WHO and UNICEF are collaboratively working together to pull information to respond to this call to action. There is currently a draft proposed theory of change developed in response to the Global Call to Action.

***2. What is the global data on access to and quality of WaSH in health facilities? (Rob Quick, CDC)***

*Global Assessment of WaSH Coverage*

A global assessment on WaSH coverage in healthcare facilities from 78 low- to middle-income countries in 2017 yielded the following facts: 70% of HCF had improved water source within 500 meters of the facility, 50% of health care facilities had improved water source on premises, 60% of the HCF had soap and 44% had running water and soap. This demonstrates that IPC is not possible without WaSH.

Analysis of service provision from nationally representative samples of HCFs in 6 countries attempted to approximate service levels developed by JMP to monitor progress toward SDG 6. 2% of HCFs provided all 4 WaSH and waste management services.

*Global Response*

Global efforts to increase traction in improving WaSH in HCF are needed. The Global Action Plan developed by WHO in UNICEF in 2015 included a basic level for drinking water, sanitation, and handwashing. The Water Action decade (2018-2028) was launched during World Water Day to stimulate more action. Basic service levels for SDG monitoring purposes have been developed by JMP.

Additional elements required for adequate services for mothers and newborn are **water**: quantity, quality, supply, storage—**sanitation**: location, cleanliness, and **hygiene**: functionality of handwashing station, reliability of access to soap or alcohol-based gel.

*Hilton Foundation*

Through the Hilton foundation, there is an effort to roll-out a district-wide approach…how do we address these issues? First, we need to focus on health facilities and aim ofr 100% WaSH and waste management coverage. This should serve as a model for expansion. Next, staged intervention both short-term and long-term are needed. Short-term interventions include covered waste bins, hand washing stations, and drinking water where oral medicines are administered. Long-term interventions include WaSH infrastructure, improved water availability, sanitation, and handwashing facilities. In a district-wide approach, conduction of baseline assessment to quantify gaps in coverage is critical. We need to provide technical

support for partners to implement and address urgent needs. Follow-up interventions should also be conducted.

*Handwashing Coverage in Maternal Care Areas: 3 Woredas in Bahir Dar, Ethiopia*

Seventy-five maternal care areas were assessed. Out of 34 handwashing stations, four were functional, drinking water was not consistently available, and toilet coverage was 3% in maternal care areas. There are clear gaps in availability and use of WaSH facilities and ongoing engagement is needed.

Next steps include continuing to work with local partners to promote government ownership and expanding research activities. In this way, we can try to incorporate process indicators (use of interventions, satisfaction of providers and patients), conduct trials of novel interventions, assess changes in environmental cleanliness, measure health outcomes, and perform cost analyses.

### *3. Strengthening WaSH in Health facilities through the WaSH-Fit and Clean Clinic Approaches (Steve Sara, MCSP/Save the Children)*

*Similarities in Emerging WaSH in HCF Approaches*

Similarities in WaSH in HCF approaches include a focus on leadership and management trainings before addressing infrastructure at facilities, growing interest in incremental improvements and facility action plans, advocating for Ministry of Health ownership, and integration of WaSH and IPC into QI and HSS.

*WaSH FiT*

WaSH FiT is a for facilities to use internally to prioritize and maintain WaSH improvement, focusing on actions. In addition, it provides a framework for making infrastructural changes, maintenance and repair as well as behavioral changes, such as hand hygiene behaviors. It can act as a management and administrative component and incremental improvements (moving from no service to basic service).

*Clean Clinic Approach (CCA)*

The Clean Clinic Approach was developed in parallel with the WaSH FiT. However, the Wash FiT is considered an implementation tool, while the CCA is a process by which we can make incremental changes using the WaSH FiT and additional tools. The approach was rolled out first with the MCSP Haiti program. Here, they applied the same criteria to specific wards in the area through the use of a unique accountability scoring process. The approach consists of establish criteria for scoring and collecting data and comparing facility results in order to promote individual and collective motivation. MCSP in the Democratic Republic of the Congo provided

facilities with basic WaSH materials and orientation to the CCA process after seeing that only four facilities out of 35 implemented the CCA. After the intervention, scores increased rapidly and were maintained over time.

*Additional Assessment Tools*

The WaSH condition assessment tool is very useful in data collection and monitoring. The WaSH FACET tool is also similar and responds to JMP service ladders. FACET is a mobile application that can be used in healthcare centers and schools to define water, sanitation, hygiene, and waste management needs in accordance with recommended standards recently published by WHO and UNICEF.

*Challenges and Solutions*

There may be a redundancy in tools and approaches in addition to a lack in clarity among WaSH, WaSH in IPC, and IPC itself. It is important to address these issues in pre-service training and to integrate the WaSH service ladder into national service systems.

**Session 3 Discussion**

To what extent are WaSH-related barriers preventing optimal IPC in health facilities serving mothers and newborns?

*Cost Analysis*

What are the costs associated with WASH interventions? How much of an appetite is there among donors to respond to the call to action put out by the UN General? There isn't much of data collected around cost. For instance, a cost analysis for a WASH intervention in Kenya showed that it cost approximately $300-400 per health facility for water and hygiene short-term interventions and approximately $76, 000 to have brand new infrastructure. The MCSP DRC program results were accomplished through minimal financial contributions. It will be difficult to obtain specific cost data from the DRC program since MCSP is an integrated global program.

What is the cost of having cleaning personnel? It would be helpful to have an accurate idea of how much it would cost to have cleaners on-board. Cleaners have different benefits across various contexts. In most cases, cleaners are paid much lower than clinical staff. However, in alternative scenarios cleaners receive equal benefits. It is essential to evaluate whether or not cleaners are being trained appropriately.

Health sector fails to do a long-term planning method particularly when it comes to addressing WASH needs. It is also essential to think through how decentralized systems can be managed.

The appetite to advance WASH in HCF is improving, but the appetite to burden the costs associated with improving infrastructure is failing drastically.

*National Level Advocacy*

It is important to have incremental steps around addressing needs as most governments won't be able to take this on if it is a lump sum cost.

*Quality of Care*

What do we need to look at in terms of quality of care? There are currently efforts underway to include WASH indicators as part of quality care network, specifically indicators around sanitation and handwashing stations.

WHO together with Africa CDC are looking to identify minimum requirements for IPC and looking at costing around that (future work). This is critical in highlighting linkages across WASH in HCF and IPC.

In the MCSP MaMONI project in Bangladesh, one of the key lessons learned in this project is the engagement of government both at the local and central level. The project had incredible success of using IPC as a hook for engaging local government leaders. Local governments were able to contribute resources to IPC of facilities in their purview. The project conducted a facility readiness assessment on IPC and results have been used to inform national sector plans and strengthen facility infrastructure.

Tools focus on compliance to protocols and deal less with clinical IPC behaviors. In Nigeria, MCSP has started to work on developing strategies to increase compliance with basic hygiene practices to include promotional materials and monitoring factors. Risk assessment shows that IPC management is focused around asking ourselves why? It is important to know the 'Why's' around IPC management. For example: hospital staff in Georgia are changing gloves after each procedure but are not aware of why they are doing so. Therefore, it is important to inform and train staff of why they are doing certain things.

## Session 4:

# Adherence to IPC Behaviors for Mothers and Newborns

### *1. Exploring the links between WaSH infrastructure and IPC practices, environmental contamination, and neonatal sepsis in Cambodia, Ethiopia, and Uganda (Christine Moe, Emory)*

*Tale of Two Hospitals in Phnom Penh, Cambodia*

To set the scene of this study, both hospitals A and B had municipal tap water. Hospital A also had onsite chlorination, handwashing sinks near toilets, more functional sinks, and hand

sanitizer on each staff member, which Hospital B did not have or did not have as much as Hospital A.

This study of hand hygiene and environmental contamination focused solely on maternity wards. Hand rinses from staff for *E. coli,* Total coliforms, and *S. aureus* were tested. Hand rinse results indicated that staff in Hospital B had more frequent microbial hand contamination and higher numbers of microbes on their hands compared to Hospital A. In regards to surface contamination (handles, bedside rails, bed covers), Hospital A had twice daily routine cleaning; Hospital B had a haphazard cleaning routine. Analysis of surface swabs indicated more frequent microbial contamination on samples from Hospital B compared to Hospital A. For the quality of water samples, Hospital A had on-site chlorination that was regularly monitored. No E. coli were detected in any water sample from Hospital A. Total coliforms were detected in one sample. Hospital B had an old water storage tank and E. coli and Total coliforms were detected in water samples; no free chlorine residual was detected. The study showed a correlation between WaSH infrastructure and environmental contamination in the healthcare facility.

*Risk of Healthcare Acquired Infections*

New studies in Ethiopia and Uganda aim to examine WaSH, environmental contamination, and neonatal sepsis. A specific study aims to compare one pair of hospitals in Bahir Dar, Ethiopia and one pair of hospitals in Kampala, Uganda with contrasting WASH conditions. The goal is to detect healthcare-acquired sepsis due to hospital exposure at delivery, PNC ward, KMC and NICU. The inclusion criteria are normal birth weight and low birth weight (LBW), recruited in PNC ward, KMC and NICU. The exclusion criteria are babies born in other hospitals and babies born by C-section.

The methods consist of routine assessment of WASH every two weeks, structured observations, collection of environmental samples, and hand rinses (biweekly). Collection of blood specimens from neonates with symptoms of sepsis is used to look at etiology and AMR. The study design aims to recruit LBW and normal birthweight babies through the PNC ward and follow through 28 days of life. Home visit would be performed at 7 days with follow-up phone calls at 14 and 28 days. There should also be recruits from KMC ward and NICU followed until 28 days of life. If anyone else has advice on this study, please share, as this is the first study of its kind. We are looking for additional funding to increase study duration and sample size.

### ***2. Understanding the determinants of clean birthing practices in low-and middle-income countries: a systematic review of the literature (Robert Dreibelbis, LSHTM)***

*Literature review on adherence to and behavioral determinants of clean birth practices*

We know very little about what drives clean birthing practices. There are multiple behaviors of influence and most data comes from high-income countries. Effective interventions must be

informed by the requirements of the target population, current practices and preferences, and appropriate barriers ad enables of current practices.

Clean birthing practices include the "Six" Cleans (WHO) as well as pre-and post-natal care through clean birthing kids, improved hand hygiene among mothers and other care-takers, and clean cord care.

*Phase I Review: Understanding Effectiveness*

Clean birthing practices are associated with reductions in multiple health and mortality outcomes (NMR, MMR, neonatal sepsis mortality, neonatal tetanus mortality, omphalitis), but the quality of data is limited.

*Phase II Review: Understanding the drivers of behaviors*

A thorough understanding of behavioral determinants, which are a constellation of factors that influence a specific behavioral outcome (what causes the behavior to happen?) is crucial.

*Systematic Review Methods: Determinant Identification and Analysis*

In this systematic review, information about the specific behavioral determinant were identified and extracted. Behaviors of interest were mapped against determinants. The determinants were categorized according to the Capability, Opportunity, Motivation framework or known as the Behavior (COM-B) Framework.

The study characteristics from 109 references focused on clean cord care and clean and hygiene, but not other clean practices (ex. clean perineum). The key findings were: too many studies focused on "general clean practices", insufficient studies provided detailed or explicit information about behavioral determinants, findings are likely a reflection of research bias than impact on behaviors, psychological capability and physical opportunity studies are over-represented (these are necessary but not sufficient for behavior change), and there was a disconnect between determinants from intervention and non-intervention studies.

### *3. Adherence to infection prevention standards: surfaces, instruments, and hands (Giorgia Gon, SoapBox Collaborative)*

*Why is IPC challenging in the labor ward?*

The environment is similar to an emergency room: mother and baby, 24/7, a stochastic event (in terms of the number of women expected at any time in the labor ward, and how long each woman's labor will be), surgery, wounds, and bodily fluids. The focus of IPC should be focused on the maternity and neonatal wards in LMICs now because of increased facility deliveries and increased C-sections. There are three routes of transmission of infection: through ands,

instrument and equipment, and surfaces. The HSS approach, multimodal strategies, behavior change, and context specific evidence can help with improving adherence.

*Surfaces*

In LMICs, 39% of facilities lack waste disposal and 37% lack disinfectant. For example, seven maternities in Gujarat had 31% surface swabs that were tested positive for potential pathogens.

*Instruments and Equipment*

In LMICs, 75% lack sterilization equipment and 54% lack high level disinfection of equipment. For example, across 37 maternity units in Zanzibar, 50% did not have a working electric autoclave and 13% of vaginal wiping happened with unclean materials (ex. Kanga brought from home) based on 244 observations.

*Hand hygiene*

A systematic review of hand hygiene adherence, drivers and intervention in maternity ward in LMICs was conducted. In a time-motion study in Zanzibar, observation was conducted 24 hours a day in 10 high volume facilities. 781 aseptic procedures during birth were observed. Only 10% achieve WHO gold standard and in 25% of opportunities, birth attendants performed washing/rubbing hands. Failure to comply to hand hygiene according to the WHO audit tool could be due to lack of rubbing/washing or recontamination. Recontamination occurred in glove packs, during unclean drying (gown), touching the patient aside of the patient zone (pelvis or thigh of woman), birth surface (kanga), or in the personal bag of the personal attendant. Drivers of hand washing and rubbing are the lack of dry material, sanctioning, workload, and time since donning gloves. A driver of glove recontamination is the time since donning gloves. Hand hygiene pilots include alcohol hand rub (personal bottles v. common bottles and changing beliefs around hand rubs) and layout change (participatory) and introduction of delivery kits. 144 hand rubbing opportunities were observed after hand rub introduction with 71% compliance.

We are pursuing secondary data analysis to answer the question: "Will these transmission pathways reduce infection and AMR?". We are seeking funding for a maternal cohort to enhance evidence on this.

### *4. Hygiene practices and maternal and neonatal sepsis risks: an observational study in health care facilities in Nigeria (Robert Dreibelbis, LSHTM)*

This study was conducted in partnership with MCSP (MSCP IPC activities in maternal and newborn intervention). The geographic scope was Kogi and Ebonyi states in Nigeria. This was a mixed methods observation study with up to 6 hours of birth and 8 hours of PNC. The focus

was on hand and hygiene action in two primary HCF, two secondary HCF, and two tertiary hospitals.

*Challenges*

Childbirth is complex and requires extended observation. Assessments tend to focus on binary relationships between hand hygiene practices and specific events. We need better methodologies that capture dynamic risk.

*Observation Results*

In terms of WaSH and hygiene infrastructure and supplies, the delivery unit had handwashing stations compared to the handwashing facilities in the PNC ward. The hygiene scoring for HCF workers was based on: proper hygiene protocol (handwashing with soap, gloves), basic hand hygiene (hand washing with soap (HWWS), no gloves), hands gloved (no HWWS), hygiene risk (high risk vs. low risk). HCF worker's risk could change during periods of observation (time sensitive analysis). Scores were calculated and matched against times when aseptic procedures were performed (vaginal exam, insertion of catheters). In regards to labor and delivery, the average time was approximately 4 hours, vaginal exams were frequent, glove changes were observed twice as often as handwashing, only 3% of aseptic procedures occurred after propoer hygiene protocol (3% after HWWS), and hygiene scores during labor and delivery related to procedures on the mother and get worse as labor continues.

No difference based on provider type, state, or facility type was observed with association to hand hygiene compliance. Differences were seen during shifts (better performance during morning shift).

In PNC observations, hand hygiene events were observed five times. On average, each mother was visited by a caregiver during the PNC period 7 times. Contact between newborn and visitor was often frequent.

*Key Findings*

Glove use was being used as hand washing with soap. Conveniently placed hand washing infrastructure with both water and soap is necessary but not sufficient to ensure and hygiene compliance. Knowledge around hygiene protocols is high and training only reinforces knowledge (accountability and supervision). Visitors and auxiliary staff play a large role in maternal and newborn care (which is largely absent form most IPC training).

*Next Steps*

MCSP Nigeria is developing new training programs focusing on supervisory support and critical moments for handwashing. It is important to integrate findings into a large literature review for facility observations and global key informants.

**Session 4 Discussion**

To what extent do providers, mothers, and other family members adhere to IPC behaviors and what are the factors affecting adherence?

In PNC wards, do we expect HCWs to wash hands each time after touching the baby? What is pragmatic in recommendations? When we have such low performance, do we want to focus on prioritizing interventions in terms of high vs. low-risk?

It is one thing to know something is happening; it is another to provide documentation. Whether or not an intervention is necessary is another issue. A wide range of people come into contact with a newborn (an entire audience) that have been left out of intervention strategies. There is a need to emphasize that the focus should not just be on the mother and the newborn. There are a set of people touching the people who are a "risk category". The aim of the Clean Birthing Practices study in Nigeria was to see if the MCSP interventions produced were sufficient to observe a change in behavior. There was insufficient funding to determine/study health outcomes. Guidance on categorizing interventions into "high-risk" and "low-risk" would be appreciated for the future.

What is needed in hand hygiene is implementation science - not necessarily the benefits (high-risk/low-risk), but how to make it more accessible. We don't have guidance from WHO on what to do with newborns after they are taken home. There is very little research and guidance on what information to give the parents once the baby is taken home. What are the messages to give to parents to take home? Why do 69 people really visit a baby and shouldn't you have systems in place to "keep the family out"? What do we expect from families and visitors and should these expectations be different from instructions provided to/expectations from HCWs/providers?

Clean births is a framework to use to determine adherence. There was no data on PNC hand hygiene for newborns. For high-risk events, might we conceptualize high risk events around hand hygiene (risk stratification)? It is sometimes easier to have a standard precaution than to use the risk stratification method. Consider the numbers of hands/people that interact with the children outside of "immediate family". There is good evidence to show that mothers that practice good hygiene have newborns with fewer infections (good infant and child health). It isn't that mothers should never have to wash hands, but mothers shouldn't be contaminating hands with feces, for example, and then attending to the baby.

We need to remind ourselves that babies are at risk of viruses. We know that Noroviruses and other enveloped viruses are not affected by alcohol hand-rubs. Advise people to use HWWS. Watching positive provider behavior leads to/reinforces positive changes/practices in personal behavior. We need to be very explicit about who is included under the label of "health care provider" - are cleaning staff included? What is the behavior? Who is expected to perform the said behavior? How is it done? If we connect a healthcare provider to a desired behavior, that is the point for the start of behavior change

## Session 5:

# Further Opportunities to Strengthen IPC

### *1. Positive Deviance as the Cutting Edge of Common Sense: a Strategy for Social and Behavior Change (Monique Sternin, Tufts University and PD Consultant)*

*Positive Deviance (PD)*

In every community or organization there are certain individuals or groups whose uncommon strategies or behaviors enable them to prevent or find better solutions (hidden in plain sight) to problems than their neighbors or colleagues while having access to the same or less resources. Positive deviance is used in many public health areas.

*Approach*

Identifying the problem is often data driven with a strength-based problems solving strategy that creates measurable and sustainable results by leveraging existing solutions in the community. The participatory PD methodology includes defining the problem, determining the presence of PD, discovering uncommon successful strategies and behaviors, and developing an action plan to implement. PD tries to bridge the gap between knowing and doing through self-discovery and practice.

PD behaviors and strategies are linked to and contribute to a better outcome, are indigenous, culturally acceptable, contextually specific, easy to adopt, affordable, and sustainable. It is important for the PD strategy to have a direct impact on positive outcomes, enable stronger adherence, do no harm, strengthen horizontal networks, and have leadership support.

There are a few challenges in implementing PD as a social and behavior change strategy. There is a paradigm shift for practitioners (i.e. from expert to facilitator) and challenges to the status quo or existing protocols.

*The VAHS MRSA Bundle*

The MRSA Bundle consists of active surveillance, hand hygiene, instrument hygiene, and contact isolation precautions. To promote adherence to guidelines, a positive deviance approach should be encouraged. The PD process in US hospitals starts with a "kick off" of bringing together an array of hospital personnel who were invited to learn about the PD approach. Subsequently, discovery and action dialogues are produced, a design and implementation scheme is carried out and reported back, the unit staff monitor the progress and a 6-month review is done.

*Recommendations*

At the policy level, adding specific wording to guidelines such as "need review at all levels" and "need adapting to local context through problem solving and decentralized decision making" is

encouraged. At the diagnosis level (via solutions-based research), there is a need to identify what is working or where the guidelines are working in resource poor districts (PD Inquiry). At the implementation level (via PD Process), we need to encourage problem solving and decision making and enable empowerment and ownership of guidelines via feedback from frontline workers and district staff, families, and communities.

### *2. Strengthening IPC in a neonatal ICU in Zambia (Susan Coffin, Children's Hospital of Philadelphia)*

*Background*

There is an increased volume of deliveries in health facilities, but resources have not gown with demand. This shows weaknesses in IPC. Bloodstream infections (BSIs) are the most common hospital-acquired infection.

The study location was a University teach hospital NICU in Lusaka, Zambia. The average mortality rate is 33-43%. The staffing ration is 1:10 and 1:30 at night. There is also a high incidence of sepsis (25-49% of blood cultures are positive).

The SPINZ study, a prospective cohort study, measured the impact of low cost-prevention bundles on rates of suspected sepsis, BSI, and mortality among neonates admitted to the NICU. The data collection included blood cultures done for clinically suspected sepsis, maternal interview and chart reviews, and historical data from admission/discharge log.

*Interventions*

The interventions that took place in this study was IPC training for NICU and labor and delivery staff, introduction of alcohol-based rub, 2% CHG bathing at admission and weekly thereafter for all babies over 1.5 kg, targeted cleaning of potential environmental reservoirs, and SMS reminders of IPC practices.

*Results*

For late mortality by birth weight, there was a reduction in mortality from 1-1.49 kg and 1.5-2.49 kg babies. The seasonal mortality coincides with dry periods. The monthly rate of suspected sepsis started to go down from the start of the intervention period. This multi-component intervention resulted in significant reduction in mortality, suspected sepsis, and confirmed BSIs.

### *3. Strengthening IPC to Promote Family Centered Care (Arti Maria, Ram Manohar Lohia Hospital and PGIMER)*

*Family Centered Care*

Family Participatory Care (FPC) is now accepted by GOI as a national program in India with plans to scale up FCC from currently about a 100 to even more number of districts in India. The tertiary NICU at Dr. Ram Manohar Lohia Hospital in New Delhi India, where family centered care as a model, was originally researched and developed. FCC requires the mother/family members to enter into NICU and then engage in processes of care for their own babies. Hence the entry process is a critical pre-step to implementation of the FCC approach.

*Present QI Initiative*

In the year 2016 we were in a stage of strengthening the implementation framework of the model of FCC through iterative learnings at our institution to be sure that the entry process of mothers'/family members into NICU is associated with a good compliance of hand hygiene before they enter into the NICU. This may have relevance because as such the only fear fraught with implementation of FCC as a strategy, is that of possibly increased rate of infections accruing out of allowing the mother/family members to the NICU, which otherwise is considered as a restricted area. Hence we carried out the present quality improvement initiative with an objective to closely observe the practice, identify and overcome gaps associated with practice of hand hygiene among mothers who participate in FCC at our institution. The learnings may have implications to strengthen the implementation model of FCC especially while it is under process of wider scale up through the country.

The problem statement in this setting was poor hand hygiene compliance among mother/parent attendants (P-A) accompanying a sick neonate under FCC program. The aim was to increase hand hygiene compliance by P-A entering NICU from 20% to 80% in 8 weeks. HH compliance was defined as 30 seconds hand washing and gowning to follow HWWS. The baseline data was 10 observations (4 at night) per day for 3 random days.

*Fish Bone Analysis*

The fish bone analysis looked at policy (no policy with regard to HH for P-A), procedure (trainings not happening as per schedule to train the new P-As in a regular manner), place (spatial organization of entry place was haphazard and not in any particular orderly sequence), and person (knowledge gap, lack of supportive supervision, lack of role designation, lack of motivation among provider, associated work pressure).

*Serial PDSAs*

Cycle 1ensured regular and adequate availability of supplies and consumables and the impact was positive. Cycle 2 involved understanding process flow and revisited the nursery entry protocol. The process flow revealed random sequence existing at the entry area. The PDSA

involved a spatial reorganization and the impact was positive. Cycle 3 had regular trainings scheduled along with rotational change of trainers to address the problem of filling the knowledge gap and work pressure among providers. The impact was positive. Cycle 4 was supervised by peer mothers to provide feedback to a target mother, but the impact was negative. Cycle 5 used Glogerm as a teaching aid to overcome knowledge gap, and the impact was equivocal/inconsequential. Cycle 6 presented CCTV footage specifically targeting a defaulter mother and the impact was negative. Cycle 7 presented the select CCTV footage, not defaulter mother specific but "random" CCTV footage and the impact was positive.

*Results*

80% of hand hygiene compliance among mothers/parent-attendants (who participated in family centered care at Dr RML Hospital NICU setting) was achievable over the 8 weeks after serial PDSA cycles. Compliance to HH among P-A participating under FCC is feasible and can be sustained. Simple sequential spatial reorganization of entry area is important & effective towards improving compliance of HH among mothers/P-As participating under FCC. There is a need of regular trainings by the providers to achieve HH compliance among participating mothers under FCC.

*Key Messages*

Attention to hand hygiene compliance among accompanying P-A of sick babies is critical as an essential component of safe implementation of FCC for sick, newborn care. Compliance to HH among P-A is feasible and can be sustained. Attention to HH compliance among P-A accompanying a sick neonate offers an opportunity of action and this is likely to have multi-faceted benefits such as empowering mothers and parents while they are otherwise at a high state of vulnerability with parenting skills, and imparting knowledge and skill of hand hygiene among primary care providers of the high risk neonates for a better post discharge care at home, likely to translate into better preventive health care and survival outcomes of these vulnerable babies.

### *4. Empowering Cleaners (Giorgia Gon, SoapBox Collaborative and Joanne McGriff, Emory University)*

*Cleaners*

Findings from Gambia, India, Bangladesh, Zanzibar, and Myanmar (about 100 facilities) have shown that cleaners/orderlies often have no formal training, shortage of staff, lack of policies and protocols, and multiple responsibilities. From existing surveys from Tanzania, 70% of facilities did not have a system for safe final disposal of infectious waste.

A training package includes an intro to infection prevention control, personal hygiene and dress code, hand hygiene, PPE, housekeeping/control of environment, and waste and linen handling.

This package is based on international and national guidelines in consultation with NHS Grampian and TOT (cleaning champions). It was piloted in Gambia and subsequently increased knowledge, cleaning practices, and empowerment for cleaners.

*Theory of Change of the CLEAN Pilot Trial*

The input of the trial is the training of champions. The process consists of training and supervising cleaners and facilities. The output is knowledge and beliefs about cleaning behavior. The impact involves surface microbiology cleanliness and HAIs.

The aim is to assess the effect of the intervention on cleaning behavior and microbiological cleanliness. The unit of measurement are key surfaces. Measuring behavior and environmental contamination was through gel dots (removed or not).

*Beyond research*

Implementation and advocacy are critical in empowering cleaners. The Soapbox cleaners' package is free and ready for use via an app (www.soapboxcollaborative.org). The environment poses an infection risk to mothers and newborns and evidence points to generalized neglect of cleaning staff.

*WASH and IPC Training for Cleaners in Cambodian Hospitals*

The objective was to address identified gaps in WASH knowledge, attitudes and practices. The Center for Global Safe WASH at Emory and Cambodian Ministry of Health developed, implemented and evaluated a training for 290 clinicians and 70 cleaners based on the national IPC guidelines and training curriculum in 10 GE Foundation-supported referral hospitals.

The assessment consisted of a training needs assessment (TNA) that was conducted and examined WASH/IPC KAP in 250 clinicians and 40 cleaners. Training included pre- and post-training quizzes, and evaluation at 3 months and 6 months post-training. The identified gaps from the TNA showed that 60% of cleaners never trained in IPC, 96% did not know how to properly dilute chlorine, and 48% held the belief that "most patients are not infectious".

Training for cleaners were onsite, hands-on, all-day, and separated from clinicians' trainings. Trainings were conducted in collaboration with members of the MOH (and local HCF) infection control committee. Sustainability of training outcomes were supported by refresher training materials and monitoring checklists given to the hospital infection control committee.

*Evaluation Results*

The first round of scores at 3 months showed 67%-78% compliance rates. The second round of scores at six months showed 55%-73% compliance rates. The final top 3 scores ranged between 63%-66% at six months. Exclusive of hand hygiene scores were not shown on the slides.

All cleaners wanted to be trained and saw themselves as integral participants in maintaining IPC. Cleaners are not necessarily transient employees at HCF. Cleaners trainings need to be on-site,

hands-on, practical vs. didactic and evaluated. Strong hospital management needed to ensure cleaner trainings occur and to monitor that safe WASH and IPC behaviors are sustained

***Session 5 Discussion***

IPC behaviors need to impact the community and household levels. What is the evidence around hair covers and shoe covers in NICUs? Are we expending resources for measures that don't have as much evidence behind it? Data does not support either of these processes, although these are universal. Even in ORs, the data is not present and measures are under debate. Entry processes should be seen as a "sanctity laden" process - the very act of going through various entry process protocol restricts access given that it is both time and labor intensive. This task in FCC is not to task-shift. The bottleneck was found with providers and the need to address change in provider mindset. This will ensure QED.

## Synthesis Cafés

### *1. Measuring IPC for Mothers and Newborns (Lindsay Denny, Emory University)*

When looking at the intersection between IPC and WaSH in healthcare facilities, key behaviors include hand hygiene, environmental cleanliness, medical equipment processing, and healthcare waste management. The resources required for these four behaviors often affect the safety, efficiency and effectiveness of care.

An article published in January 2018 by Ryan Cronk and Jamie Bartram looked at the environmental conditions in low-and middle-income countries, as well as WaSH and IPC practices. Keeping in mind that the global data from the Cronk article did not cover quality, equity, and consistency of access, a review of 6 countries showed only 2% of the requirements for WaSH and healthcare waste management. The data show major gaps in coverage and availability of resources needed for the key behaviors listed above.

In order to start collecting information on WaSH and IPC in HCF, the JMP Service Ladder listed 4 key indicators (water, sanitation, hygiene, healthcare waste), and three main service levels (no service, limited, basic). Countries can define their own advanced service level. There is likely to be a fifth indicator on environmental cleaning practices.

There is a set of indicators specific to birthing settings that should be used in tandem to the core indicators listed in the previous paragraph. The first indicator is **water**, defined as the proportion of facilities in which delivery rooms have running water. The second indicator is **sanitation**, defined as the proportion of facilities which have a functional improved toilet accessible to women during and after labor, as well as privacy. The gap here is the non-inclusion of hygiene management *post-partum*. The third indicator is **hygiene**, defined as the proportion of facilities in which delivery rooms have a functional handwashing station with water and soap (note: not including alcohol rub), access to a bathing area, and basic sterile equipment. The fourth indicator focuses on **waste management** (both for infectious waste and placenta

disposal). The **environmental cleaning practices** indicator is in draft form, including written protocols for cleaning and training. This is the most difficult to monitor.

Additional WaSH and IPC indicators include WHO's Six 'Cleans' for Delivery, quality and quantity of indicators, laundry, management (need for IPC Committee, training, supply chain for materials), control access points, and additional behaviors (hand hygiene practices, sterilization, cleaning techniques). Monitoring these practices will help identify where the largest gaps might be and how to move forward with strengthening measurement of indicators in the delivery room.

## *Synthesis Café #1: Labor and Delivery*

What can feasibly be done to address structural barriers for IPC for mothers and newborns?

*Risks*

There are multiple risks to labor and delivery such as inadequate birth spaces and settings, lack of tools or instruments regarding infection transmission, and poor management overall. With inadequate birth settings, there are different routes of exposure to infection. Sometimes beds are shared for delivery and not cleaned, which can lead to risk of infection for both mother and child. Cleaning of tools before and after exams, especially those that enter the uterine canal may lead to infection. In addition, a lack of accountability or preparedness induces a risk for higher prevalence of infection for mothers and newborns.

*Interventions*

One way to combat structural barriers for IPC would be to boil or steam instruments, which was started by the Program for Appropriate Technology in Health (PATH). Next, having clear roles and responsibilities during each step of childbirth is extremely critical. Each unit needs to have clear responsibilities written out at each step of the labor and delivery process. Since Rwanda has started moving toward the accreditation process, perhaps we should look to Rwanda for possible solutions.

*Research*

In terms of research and or implementation science needed to carry out any type of intervention, a few question need to be answered: What materials are needed for intervention and in what quantity?, Do existing programs include IPC for labor and delivery?, How do healthcare workers learn proper IPC?. We may need to look at private organization practices for compliance. Identifying successful models, accountability systems, and positive deviants will be important in moving forward. Having an IPC focused individual on staff may help IPC become a priority in labor and delivery. Either way, reviewing current guidelines through an IPC lens will be critical in making progress.

*Priorities*

Top research priorities include orienting people's roles and responsibilities with their corresponding attitudes and motivator, power dynamics that influence IPC enforcement among health workers, behavioral economics, and identifying successful accountability systems. Other priorities start with the quality training and education of healthcare workers, patient centered recommendation, and consolidation of resources. There needs to be an investment in providing a balance approach to healthcare, which means that services need to match what is promised. We need to get to a point where WaSH and IPC are always integrated into quality of care frameworks and efforts.

## *Synthesis Café #2: Postnatal care of mother and newborn—Facility to home continuum*

What can be feasibly done to address deficiencies in the enabling environment for IPC for mother and newborns?

*Risks*

In this space, there are multiple infection risks for both mother and baby including medical issues such as postpartum bleeding, surgical wound infections, cord care, and maternal anemia. Another risk is the number of visitors who touch the baby and perhaps bring in a whole slew of pathogens near the mother and baby. This includes facility visitors and home visitors. Hygiene practices both in the facility and at home need to be established, otherwise the baby may be at risk for infection. Duration of stay in the facility provides opportunities and challenges to ensure IPC and postnatal care practices.

*Interventions*

Maintaining the mother and baby pairing during the stay in the facility and at home is critical. It is also important to make sure that mothers know the implications of infection for both herself and the newborn (this could be integrated into the discharge process). In addition, documentation and surveillance of certain procedures around maternal and newborn care could be very useful data. Maintenance of supplies and infrastructure, improving ownership for IPC, and having some sort of community platform can help with reducing infection in the postnatal care of the mother and newborn.

*Research and Priorities*

A top priority of IPC for mothers and newborns is a complete synthesis of guidelines. In addition, integrating IPC along the continuum of care will need better data on cost/cost effectiveness, behavior change, and quality collaboratives. Empowering health providers to be in control of IPC can help create change and balance in integrating IPC into facilities.

## *Synthesis Café #3: Small and sick newborn care*

What can be feasibly done to address adherence to IPC behaviors among providers, mothers, and other family members?

*Risks*

Unique risks that present themselves with small and sick newborn care include space needs with transmission risks for both baby and mother, following norms and standards of care, breastmilk, equipment safety, invasive procedure, separation from the mother, antibiotic overuse, AMR, crowding, and limited handwashing spaces. Expressed breastmilk requires special handling and protection that isn't always properly dealt with. Humidification of incubators pose vulnerability to infection. Invasive catheters, umbilical catheters (anything that breaks the barrier of intact orifices and comes into contact with the baby) poses great risk for infection.

*Interventions*

Interventions for sick and small newborn care and IPC include providing standards, family friendly spaces to encourage health provision, surveillance, stronger lab capacity, multiple handwashing stations within reasonable distance, and clustering of care. Strong lab capacity is needed to manage requests and surveillance. Hand hygiene needs to be addressed between all people who have access to a unit instead of segregated facilities for health care providers and family members. Making HCW and families understand the "why" behind the "do" is equally as important in initiating some sort of behavior change.

*Research and Priorities*

In terms of research, how can we ensure IPC standards are being practiced while being mindful of/encouraging respectful care and the importance of bonding between mom and baby? We need to build on existing indicators to clarify whether unnecessary separation from mothers will increase risk of infection. What are these circumstances? Looking at the most common sources of outbreaks within NICUs, we can try to tag moments when IPC is breached and readdress the flow of NICUs. Formal risk assessment may be needed to prioritize IPC needs in low resource settings. Do we see a breach of IPC if babies are cohorted (systematic segregation of babies who were referred vs brought in) – is cohorting necessary? Revisitation of existing IPC tools to determine one main reference document is critical (objective measurement of tools to guide healthcare providers).

## *Discussion and the Way Forward*

*Potential knowledge products*

This workshop should begin the talk of synthesis of existing guidelines and what they include. Advocating to larger groups for IPC for mothers and newborns is essential (USG, WHO). We need everyone to recognize that IPC is part of maternal and child health, especially at the government and local level.

*Technical working group*

The potential utility of a working group or community of practice focused on IPC for mothers and newborns is important so there are larger conversations happening specific to IPC and maternal and newborn health. Researchers should be committed to filling in gaps and providing evidence. We have to find a way to integrate the working group into existing platforms.

*Research and Implementation Science*

It is critical to find out what the most necessary for IPC for newborns and mothers. What is the best language? We also need cost effectiveness data to find a clear package to do this. Health outcomes are expensive to study? Do we use intermediate outcomes? Who would pay for it? We need an integrated package for newborn care that includes IPC, nurturing care, etc. A study could be conducted of what information in current guidelines work for IPC (positive deviation) and improve them. It is important to find out what works in low-resource setting and design built environment to enable IPC. We need a costed package to strengthen IPC for advocacy with district health officials.

## Annex 1: Agenda

Day 1:

| Time | Activity | Motivating Question(s) and Contributors | Moderator |
|---|---|---|---|
| **Introduction** | | | |
| 8:00 – 8:15 | Registration, breakfast | | |
| 8:15 – 9:20 | Welcome, purpose, anticipated outputs | Welcome<br>*John Borrazzo, USAID (5 minutes)*<br><br>What are the burden and sources of infection among mothers? And Preliminary Findings from Global Sepsis study *Mercedes Bonet, WHO (12 minutes)*<br><br>What are the burden and sources of infection among newborns? *Tedbabe Hailegebriel, UNICEF (12 minutes)*<br><br>What are the key global IPC resources for mothers and newborns? *Chandrakant Ruparelia (Rupe), JHPIEGO (10 minutes)*<br><br>How we will know if we have had a successful workshop? *Pavani Ram, USAID (5 minutes)* | Pavani |
| **Core Components and infrastructural elements of IPC for mothers and newborns** | | | |
| 9:20 – 9:35 | Core Components of IPC | What are the Core Components of IPC? What is the global data on availability of IPC infrastructure for mothers and newborns? *Amy Kolwaite, CDC (12 minutes)* | Rupe |

| | | | |
|---|---|---|---|
| 9:35 – 9:50 | Health systems strengthening to promote IPC | What are the health systems elements of IPC and how does a health systems strengthening program promote IPC? *Rudi Thetard, MSH / Malawi (12 minutes)* | |
| 9:50 – 10:20 | Discussion | Synthesis: to what extent are health systems-related barriers preventing optimal IPC in health facilities serving mothers and newborns? | |
| 10:20-10:40 | Coffee break | | |
| **WaSH elements of IPC for mothers and newborns** | | | |
| 10:40 – 11:20 | WaSH for IPC | What are the WaSH-related elements and determinants of a comprehensive IPC program? *Steve Sara, MCSP / Save the Children (10 minutes)*<br><br>What is the global data on access to and quality of WaSH in health facilities? *Rob Quick, CDC (10 minutes)*<br><br>Strengthening WaSH in Health facilities through the WaSH-Fit and Clean Clinic Approaches *Steve Sara, MCSP / Save the Children (10 minutes)* | Steve |
| 11:20 – 12:00 | Discussion | Synthesis: to what extent are WaSH-related barriers preventing optimal IPC in health facilities serving mothers and newborns? | |
| LUNCH (12 – 1 pm) | | | |
| **Adherence to IPC behaviors for mothers and newborns** | | | |
| 1:00 – 1:50 | Adherence to IPC behaviors among health workers, mothers, and family members | Exploring the links between WASH infrastructure and IPC practices, environmental contamination, and neonatal sepsis in Cambodia, Ethiopia, and Uganda, *Christine Moe, Emory (12 minutes)*<br><br>Understanding the determinants of clean birthing practices in low- and middle-income countries: a systematic review of the literature, *Robert Dreibelbis, LSHTM (12 minutes)*<br><br>Adherence to infection prevention standards: surfaces, instruments, and hands, *Giorgia Gon, SoapBox Collaborative (12 minutes)* | Mary Ellen |

| | | | |
|---|---|---|---|
| | | Hygiene practices and maternal and neonatal sepsis risks: an observational study in health care facilities in Nigeria, *Robert Dreibelbis, LSHTM (12 minutes)* | |
| 1:50 – 2:40 | Discussion | Synthesis: To what extent do providers, mothers, and other family members adhere to IPC behaviors and what are the factors affecting adherence? | |
| 2:40 – 3:00 | Coffee break | | |
| **Further opportunities to strengthen IPC** | | | |
| 3:00 – 4:00 | Novel strategies to strengthen IPC for mothers and newborns | Positive Deviance as the Cutting Edge of Common Sense: a Strategy for Social & Behavior Change (SBC), *Monique Sternin, Tufts University and PD Consultant (12 minutes)*<br><br>Strengthening IPC in a neonatal ICU in Zambia, *Susan Coffin, Children's Hospital of Philadelphia (12 minutes)*<br><br>Strengthening IPC to promote Family Centered Care, *Arti Maria, Ram Manohar Lohia Hospital and PGIMER (12 minutes)*<br><br>Empowering cleaners, *Giorgia Gon, Soapbox Collaborative and Joanne McGriff, Emory University (12 minutes)* | Theresa |
| 4:00 – 4:50 | Discussion | Synthesis: Which approaches are promising for strengthening IPC for mothers and newborns? | |
| 4:50 – 5:00 | Plan for Day 2 | | |

## Day 2:

| | | | |
|---|---|---|---|
| 8:00 – 8:30 | Breakfast | | |
| **Synthesis cafés (coffee available throughout):** | | | |
| 8:30 – 8:45 | Measuring IPC for mothers and newborns | Measuring IPC for mothers and newborns, *Lindsay Denny, Emory University (pre-recorded)* | |
| 8:45 – 10:15 | Participants rotate to each café to discuss. | What can be feasibly done to address structural barriers for IPC for mothers and newborns? *Steve Sara*<br><br>What can be feasibly done to address deficiencies in the enabling environment for IPC for mothers and newborns? *Tedbabe Hailegebriel*<br><br>What can be feasibly done to address adherence to IPC behaviors among providers, mothers, and other family members? *Robert Dreibelbis* | |
| 10:15 – 10:30 | Coffee break | | |
| 10:30 – 11:15 | Full group discussion on synthesis cafés | How can we strengthen IPC for mothers and newborns? | |
| 11:15 – 11:50 | The way forward | What are the potential knowledge products to result from this workshop? What is the potential utility of a technical working group or community of practice focused on IPC for mothers and newborns? What is the research and implementation science agenda for IPC for mothers and newborns? | |
| 11:50 - 12:00 | Gratitude | | |