Deciphering the Determinants and Impacts of Rising Rates of Caesarean Section and Offering Potential Solutions

Based on a Workshop held on the 12th & 13th April 2016
Taj Deccan Hotel — Hyderabad, Telangana
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Foreword

Every major advance in medical science and technology brings high hopes of improving the health and wellbeing of people across the world. It also places a great responsibility upon the medical profession and health system managers to optimally utilize the new knowledge and tools to confer the greatest benefit and the least harm. The choice of when, where and how to deploy a medical procedure depends on evidence of efficacy, cost effectiveness and budgetary affordability, as well as considerations of ethics and equity. Without such a framework, it is easy to misuse, even a highly beneficial procedure, to impose unacceptable health and economic burdens on individuals, families and the overall health system that is charged with the responsibility of providing appropriate care of assured quality at affordable cost to all who need it. This negates the intended social benefit of science and technology.

Sadly, the caesarean section has emerged as a glaring example of a valuable medical procedure having undesirable social consequences because of inappropriate utilization. It is particularly painful that a procedure that is primarily intended to protect the lives and health of pregnant women and newborns, by ensuring safe child birth under difficult circumstances, should paradoxically result in harm to both because of unwarranted profligate use. The adverse effects during that birth, as well as subsequent pregnancies, can outweigh the benefits if guidelines are flouted and an irrational decision is made to perform a caesarean section, even when a normal vaginal delivery is judged to be appropriate and safe. New evidence is also emerging that an unnecessary caesarean section also deprives the newborn of the protective maternal gift of the vaginal 'microbiome' that builds immunity and protects against a host of diseases later on.

The proliferation of such unscientific practices is due to a confluence of poor professional standards, misguided pressure from patients who opt for the 'easy way' and payment systems that make the procedure lucrative. All of these drivers need to be addressed if caesarean section rates are to be brought within the limits of rational use. It is an affront to human sensibility when current practice presents us with a picture of healthcare mismatch, where several women who genuinely need the procedure suffer because they cannot access that level of care, while many women who do not need it are subjected to it and exposed to potential harm because of induced demand and unscientific clinical decision making. This calls for urgent corrective action.

It is highly commendable, therefore, that UNICEF, the Government of Telangana and the Centre for Economic and Social Studies convened a National Consultation on "Rising Rates of Caesarean: A Cause for Concern" in April 2016. The proceedings and recommendations of that consultation, presented in this monograph, are of great value in advancing public discourse, policy review and health professional reorientation in an area of utmost importance in public health. By presenting trends across different Indian states, comparing with global practices and reaffirming international guidelines, this publication provides the pathway for restoring caesarean section to its rightful place in obstetric practice and can free it from the distortions created by deviant practice patterns. I hope this monograph will challenge the collective social conscience of all stakeholders and catalyze the cleansing of blemishes that obscure the true value of caesarean section.

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Message

The birth of the National Rural Health Mission and programs like Janani Shishu Suraksha Karyakram (JSSK) and Janani Suraksha Yojana (JSY) have ushered in an era of increasing access and availability to maternal and child health services in India. The 2015-16 National Family Health Survey, Round 4 (NFHS-4) for Telangana has shown that the state has made great strides in increasing access to maternal health services, with an institutional delivery rate of 91.5% -up substantially from 68.3% 10 years earlier. As the state continues its efforts to eliminate barriers to access, it is now expanding its vision on how to enhance the quality of services.

In its 2015 statement paper on caesareans, the WHO concluded that, "caesarean section rates higher than 10% are not associated with reductions in maternal and newborn mortality rates" and goes on to say that "caesarean section can cause significant and sometimes permanent complications, disability or death […] and should ideally only be undertaken when medically necessary." With a total caesarean section rate (CSR) of 58%, Telangana has among the highest CSRs in the country. In exploring this problem further, it was seen that little concrete evidence exists on how much different drivers contribute to the problem or how best to counteract this trend.

It was in this light that UNICEF, the Center for Economic and Social Sciences (CESS) and the Government of Telangana, with the support of the Maternal Health Division of the Ministry of Health, held the "National Consultation on Rising Rates of Cesarean Section: A Cause for Concern". The workshop served as the beginning of a national dialogue to explore, not only the rising rates of caesareans and it's possible causes and solutions, but also to commence the examination of broader health systems issues affecting quality of health services in the country, of which rising CSR is one symptom.

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Message

The 2016 Lancet Maternal Health Series describes how a growing number of low and middle income countries straddle the extremes of receiving "too little, too late" or "too much, too soon" by way of maternal care services, with the use of ***unnecessary*** caesarean sections being a prime example of the later.

C-section can be a life-saving procedure when medically indicated and is an important indicator of the ability to provide comprehensive emergency obstetric and neonatal care (CEmONC). While the primary purpose of monitoring caesarean section rates (CSRs) in the country has been to ensure access to CEmONC services, which are still not available to many vulnerable communities, in recent years, a new problem of over utilization of this procedure, without medical indication, is a growing concern.

Of the first 17 Indian states for which NFHS-4 fact sheets where released earlier this year, roughly 70% had CSRs of over 20%-well over the 10% level, after which the WHO states improvements in newborn and maternal mortality are not seen. As a major surgical procedure, unique in simultaneously impacting the lives of two physiologically high risk clients –a pregnant mother and her fetus- the benefits of a caesarean delivery should always be weighed against the added risks incurred due to the procedure. Without a clear medical indication for the procedure, the risks of a cesarean can far outweigh any presumed benefits.

In addition to the unnecessary risk to the health of the mother and fetus, the economic impact of an unwarranted, extremely high caesarean section rate on health care financing can be substantial. Irrespective of whether individual households or the public sector bears the additional health care cost, the total cost incurred in financing exorbitant rates of un-indicated caesarean sections in a nation with an estimated 30 million annual deliveries could be sizable. Limited household and public health funds, which could otherwise be used to finance essential health interventions, would be diverted to cover this added cost.

Hence, the country wide trend of ever increasing CSRs, that are several times higher than "optimal" levels, brings to focus the need to examine the many contrasting public and private health care issues that have led to this rise and ways to enhance the practice of evidence based, quality care.

It is our hope that the discussions sparked at this consultation extend even further to catalyze a larger, unified effort among the public and private health sectors, health professional associations and the public at large, aimed at improving the quality of medical care for every woman and every newborn in the country.

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Acknowledgement

We would like to thank Dr. Dinesh Baswal, Deputy Commissioner for Maternal Health at the Ministry of Health and Family Welfare, Government of India for supporting the National Consultation on "Rising Rates of Caesarean: A Cause for Concern" and assisting to bring national attention to this growing public health issue.

Thank you to the Government of Telangana, especially Mr. Rajesh Tiwari, IAS, Principal Secretary of Health-Telangana and Dr. Jyothi Buddha Prakash, IAS, Commissioner of Health and Family Welfare-Telangana for co-hosting the consultation with the Centre for Economic and Social Studies (CESS) and the UNICEF Hyderabad Field Office.

Additional thanks to all the eminent participants who attended the consultation and contributed to the thoughtful discussions that took place before, during and after the workshop; a full list of consultation participants is included in Annexure 6.

Special thanks goes to Dr. K. Srinath Reddy, President of the Public Health Foundation of India, for his support of the consultation and for writing the eloquent foreword to this report.

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Contents

Abbreviations

ACOG	American College of Obstetricians and Gynaecologists
AMTSL	Active Management of Third Stage of Labour
ANM	Auxiliary Nurse Midwife
AVD	Assisted Vaginal delivery
AYUSH	Ayurveda Yoga Unani Siddha Homeopathy
BCC	Behaviour Change Communication
BEmOC	Basic Emergency Obstetric Care
BMI	Body Mass Index
BPCR	Birth Preparedness and Complication Readiness
CDMR	Caesarean Delivery on Maternal Request
CEmOC	Comprehensive Emergency Obstetric Care
CEmONC	Comprehensive Emergency Obstetric and Neonatal Care
CESS	Centre for Economic and Social Studies
CHC	Community Health Centre
CME	Continued Medical Education
C-section	Caesarean Section
CSR	Caesarean section rates
CTG	Cardio-topography
CY	Chiranjeevi Yojana
DH	District Hospital
EAG	Empowered Action Group
EmOC	Emergency Obstetric Care
FIGO	International Federation of Gynaecology and Obstetrics
FOGSI	Federation of obstetrical and Gynaecological Societies of India
FRU	First Referral Unit
GNM	General Nurse Midwife
GoI	Government of India
HMIS	Health Management Information System
HR	Human Resource
HPD	High Priority District
ICM	International Confederation of Midwives
ICU	Intensive Care Unit
IHI	Institute for Health Care Improvement

JS	Janani Sahayogini
JSSK	Janani Shishu Suraksha Karyakram
JSY	Janani Suraksha Yojana
KPI	Key Performance Indicator
LDR	Labour, Delivery and Recovery
MBBS	Bachelor of Medicine and Bachelor of Surgery
MCI	Medical Council of India
MDG	Millennium Development Goal
MDR	Maternal Death Review
MMR	Maternal Mortality Ratio
MNH	Maternal and Newborn Health
MNM	Maternal Near Miss
MO	Medical Officer
NFHS	National Family Health Survey
NGO	Non-governmental Organisation
NHM	National Health Mission
NICE	National Institute for Health and Care Excellence
NNF	National Neonatology Forum
NPOL	Non Progress of Labour
NVD	Normal Vaginal Delivery
OPD	Out-patient Department
OSCE	Objective Structured Clinical Exams
OT	Operation Theatre
PDSA	Plan Do Study Act
PPROM	Preterm premature rupture of membranes
QA	Quality Assurance
QI	Quality Improvement
RCOG	Royal College of Obstetricians and Gynaecologists
SBA	Skilled Birth Attendant
SBI	Sitaram Bhartia Institute
SNCU	Special Newborn Care Unit
SOP	Standard Operating Procedure
TOLAC	Trial of Labour after Caesarean
UNICEF	United Nations Children's Fund
VBAC	Vaginal Birth after Caesarean
WHO	World Health Organisation

Preface

Over the past few years, the rates of Caesarean section (C-section), as a proportion of all deliveries, have been rising sharply both in India and across the globe. Such high rates, that are multiple times the 'optimal' level indicated by the World Health Organisation (WHO), are proving to be a cause of concern for policy makers, programmers, providers and the community at large. These concerns stem from the potential undesirable effects of 'unnecessary' C-sections on the health of the mother and child, as well as the questions escalating rates raise around quality of care and the practice of evidence based medicine.

In order to discuss this phenomenon as it is happening in India, UNICEF, in collaboration with the Government of Telangana and the Centre for Economic Studies (CESS), organised the first ever national consultation on the issue, calling Ob-Gyn, Paediatric, Public Health, Nursing, Social Science and Research experts from across the country to discuss and share their research, opinions and recommendations on this issue. Titled "Rising Rates of Caesarean Section: A Cause for Concern", the consultation was held in Hyderabad (Telangana, India) on April 12th and 13th at the Taj Deccan Hotel.

The consultation was held with the following broad aims:

1. To acknowledge and understand the magnitude of the problem of rising C-section rates (CSR)
2. To understand the causes – medical, health systems, social, economic etc. – for rising CSR
3. To understand the impact – medical, health systems, economic – of rising CSR
4. To list down the gaps in information (magnitude, causes, impact) with regards to rising CSR.
5. To identify potential solutions based on experiences from within India and across the globe

This report is an analytical assessment of the proceedings and discussions at the workshop. The list of participants can be found in ***Annex 5***.

How to read the document

As was hoped, the presentations and discussions before, at and after the consultation, not only led to a sharing of available information, but also exposed where some of the biggest gaps in information exist and where further inquiry may be required. Interestingly, informal discussions with the meeting participants and other practitioners in the field revealed that, while most people acknowledge the rise in CSR, the perceptions on the reasons for this rise are very varied. Many a time, these perceptions did not match the data and information that was shared at the consultation, however limited this data might have been.

Given this insight, the organising team felt that while a simple, session by session, almost verbatim, reporting might be a good means to 'record' the deliberations, it would perhaps not do justice to the richness of the discussions. The team also felt that this report should be prepared not just for the benefit of the participants, but also for a larger audience who have a stake in the discussions. Therefore, the format should be one that appeals to and addresses the thinking of this larger audience. Being the first consultation on this issue at the national level, the organising team also felt this documentation should aim, not just at informing and sharing as its main goal, but also at advocacy on this issue.

In light of this thinking, this document attempts to go beyond the presentation and discussions at the meeting. Taking up information from the consultation, as well as the studies, data and narratives shared before and after the meeting, this document presents these points in an analytical format, using the current 'lay-person' thinking on this issue as the basis for the discussions and views presented. The draft versions of the document were shared with all the stakeholders to give them a chance to comment on the analysis and viewpoints taken by the documentation team. In case of a difference in opinion, the same has been documented.

While the background that triggered this consultation is shared in the first section, the rest of the report is primarily divided into 3 additional sections – the determinants of rising CSR, the impact of rising CSR and the potential solutions to bring CSR to an 'optimal' range. As mentioned above, the triggers for the discussions detailed in the determinants and impact sections are some of the commonly held 'perceptions' on this issue. The attempt then is to use data and information shared before, during and after the consultation to better clarify the issues around that perception. In case of ambiguity, as there is a general absence of robust data of this topic, it too has been specified as such.

The last section gives hope. It shares information from not just some of the solutions already being tried in India and at the international level, but also the potential solutions offered by the participants of the consultation.

Executive Summary

Background

The availability of Caesarean section (C-section) services is one of the signal functions of Comprehensive Emergency Obstetric and Neonatal Care (CEmONC). The surgery is needed in many cases of obstetric and/or foetal complications in order to save the lives of the mother, child, or, at times, both members of the dyad.

The World Health Organisation (WHO), in its publication, "Monitoring Emergency Obstetric Care: A Handbook" (2009), recommends an optimum rate of C-section to be between 5-15% of all deliveries, re-iterating original conclusions made after an international WHO consultation on the topic in 1985. As per the handbook, C-section rates (CSRs) below 5% signify an unavailability of neccessary CEmOC and a need to increase access to care. A reassessment of evidence in 2014 prompted the WHO to state in it's 2015 Statement on Caesrean Section Rates that "at a population level, caesarean section rates higher than 10% are not associated with reductions in maternal and newborn mortality rates. […] Caesarean sections should ideally only be undertaken when medically necessary."

While the purpose of monitoring CSR has tranditionally focused on a need to increase access to CEmONC and, in turn, how to increase CSRs, especially in emerging and low and middle income economies that often see a deficiency in these services, a trend of high population CSRs is a growing concern. In many countries, population CSR far exceeds optimum levels. Among the countries for which data is available, Brazil is amoung the highest on this parameter with a CSR of 56%, as per data presented at the consultation. These escalating trends are being increasingly seen in some states of India as well. The latest NFHS-4 (2015-16) CSR data released for 17 states in early 2016, reveals that many states have rates several times higher than the population levels recommended by WHO. Out of the first 17 states, 11 have CSRs of over 20%, with Telangana having the highest total CSR, at 58%.

High CSR is not only concerning because of the additional load that it puts on an already burdened health system, but also because there is sufficient evidence to say that unnecessary/un-indicated C-sections may actually be harmful for the mother and child.

It was in the face of such concerns that UNICEF partnered with the Centre for Economic and Social Studies (CESS) and the Government of Telangana to host the first Indian national consultation on this issue, in April 2016 at the

Taj Deccan Hotel in Hyderabad, Telangana. The objective of the consultation was to understand the determinants and impact of the rising rates of C-section, as well as to discuss potential solutions to optimise rates. The consultation was attended by leading Ob-Gyn, Paediatric/Neonatology and Public Health Specialists, Researchers, Nursing and Midwifery experts and policy-makers from the Government of India and states throughout India.

This report is an analytical assessment of the various issues around this topic and synthesizes, not just the presentations and discussions from the workshop, but goes beyond to take into account the materials and discussions that were shared and discussed with various stakeholders, both before and after the consultation. The following is a condensed summary of the full document.

Determinants of Rising Rates of C-section

As mentioned above, C-section can be a life-saving procedure. Traditional obstetric literature, as well as guidelines from internationally recognised professional bodies such as ACOG and NICE, list down conditions when the procedure is indicated. While there are some "absolute" indications, there are also many "relative" indications, where the decision on whether or not to operate needs to be taken by the attending Obstetrician.

The data shared by several participants, but particularly seen in an analysis of data from select public sector facilities in the southern states of Andhra Pradesh, Karnataka and Telangana, revealed that the most common indication for C-section, was a previous C-section. The experts agreed that a previous C-section, in itself, was not an absolute indication for a repeat C-section in subsequent pregnancies. On closer inspection, the proportion of cases where an "absolute" indication was the trigger for the surgery were very few. As such, it would be important to both clearly define the "absolute" and "relative" indications, such as "prolonged labour," "foetal distress" etc., for the Indian context and educate on the indications in more systematic ways, so that unnecessary primary, as well as repeat, C-sections can avoided.

Additionally, there is a perception that life-style changes, as well as increased patient demand, may be leading to a rise in caesarens, although this was contradicted by the preliminary data presented. A small scale qualitative study discusseded at the consultation described the perception amoung a handful of doctors and community members that it is, perhaps, the changing epidemiology of obstetric conditions and the rise of non-communicable disease, like gestational diabetes and hypertensive disorders of pregnancy, that is leading to rising caesarean rates. There was also thought to be a possible link to the rising cases of caesarean delivery and increased maternal request for the procedure, due to the fear of labour pains (tocophobia). Data from the facilities, however, revealed a very low proportion of C-sections due

to indications connected to non-communicable disase or caesarean delivery on maternal request (CDMR). In fact, during some the in-depth interviews conducted with women in the community from the qualitative study, it was revealed that women seemed to prefer a vaginal delivery. A few women interviewed associated the ability to bear labour pains and delivery through the vaginal route as one of the symbols of womanhood and CDMR was not looked upon favorably. Exploring these and other perceptions mentioned at the consultion through more rigourous research is required to come out with a more consclusive understanding of drivers.

The consultation also attempted to break down the available data to describe the epidemiology of C-sections. Data from survey sources like NFHS-4 revealed that overall, the private sector conducted more C-sections as a proportion of total deliveries when compared to the public health sector, with private sector CSRs often being double or several times more the value of public sector CSRs. The states with the highest private sector CSRs among the first 17 NFHS-4 states were West Bengal and Telangna, which have private sector CSRs of 71% and 75%, respectively, compared to their public sector CSRs of 19% and 41%; total CSRs for these states are 24% and 58%, respectively. In Murshidabad district of West Bengal, the CSR in the private sector is estimated to be 97%.

While private sector facilities, in the first 17 states for which the NFHS 4 fact sheets were released, all showed CSRs of roughly double or more public sector values, the differences between public and private sector values were generally less pronounced in those states with higher total population CSR (i.e. CSR >32%). In these states, even the public sector facilities generally had C-section rates of 25% or more. Also, government facility data revealed that those facilities which could not provide round-the-clock services (such as Area Hospitals and some designated FRUs) had higher C-section rates than even some of the larger referral centres and medical colleges. In such facilities, the number of C-sections, even emergency sections, was greater during regular working hours on weekdays, compared to off-peak, late night hours and Sundays. Shortage of skilled human resource to provide delivery services, leading to use of C-section as a means to pace deliveries, according to the providers' convenience, was hypothesised as one of the main reasons for this scenario in public sector facilities. It should be noted that the government facility data presented was from a handful of hospitals; in order to have a more conclusive understanding, more empirical research, with proper sampling, is required.

While on one hand, the data and discussions pointed towards a low threshold among providers for diagnosing complications that are indications for C-section, other health system factors like the shortage of skilled human resource, late referrals (which often increase the severity of complication to require more than non-surgical management), the fear of litigation (leading to

doctors preferring to 'play it safe') and differential payments for C-sections vis-à-vis normal delivery, along with other health system issues, were also percieved to be contributing to this increase in rates.

Impact of Rising Rates of C-section

C-section is generally considered a safe surgery. When done for life-saving purposes, the benefits outweigh the risks. However, like any other major surgery, it carries risks and these need to be kept in mind before taking a decision, especially in cases where the indication is not an absolute one. As per the latest WHO statement and alluded to previously, "Caesarean sections can cause significant and sometimes permanent complications, disability or death, particularly in settings that lack the facilities and/or capacity to properly conduct safe surgery and treat surgical complications. Caesarean sections should ideally only be undertaken when medically necessary." Known complications of C-section, such as increased risk for uterine rupture, subsequent surgery including a hysterectomy, bood transfusion, bowel and bladder injury etc., especially when compared to a normal delivery, were discussed at the meeting. There is also an increased risk of complications, like placenta accreta, in subsequent deliveries, a complication which has the potential to mandate a repeat C-section.

The risks to the newborn are relatively less well defined. It was shared that normal delivery, ie. through the vaginal route, offers significant advantages to the mother and child, principally mediated through the release of natural oxytocin which, unlike synthetic oxytocin, can cross the blood barrier to enhance mother child bonding and improve breastfeeding. A C-section delivery denies the baby this benefit of natural oxytocin, as well as the advantage of exposure to the vaginal flora that has a protective impact on the baby's immune status.

The discussion of natural vs. synthetic oxytocin also illuminated some of the inherant risks associated with induction and augmentation of labour with synthetic oxytocin. The less pulsitile uterine contractions seen with synthetic oxytocin, leading to longer, more intense contractions, can cause an artifical block in oxygen supply to the fetus and lead to a greater chance of foetal distress and maternal fatigue. This, in turn, may trigger an 'iatrogenic' C-section. Over-medicalisation of obstetric care and the lack of qualified midwives in the health sector were also seen as potential causes for decreasing normal delivery cases and rising C-sections.

Other than the potential adverse impact of un-indicated C-sections on the health of the mother and child, the additional burden on an already stretched health system that is struggling to provide the required numbers of human resource, hospital beds and all other aspects of paitent care, was also significant. A preliminary economic analysis of additional C-sections (beyond the WHO recommended optimal rates) revealed that unneccesary C-sections

are a major potential drain on the exchequer. For example, with a CSR of 58%, the additional amount being spent by Telangana on unindicated C-sections is about 14% of the state's total health budget. Again, this was a preliminary budget analysis, the results of which need to be validated.

The Way Forward

The national consultation helped highlight that the rise in caesarean rates can not be attributed to a single cause, but is rather the confluence of several drivers, amoung many different stakeholders, that need to be better understood through research and analysis. One of the key take-aways of the consultation was the relative lack of data on the determinants and impact of C-section. Increased widescale research is required to understand the causes that are leading to this rise, both from the health systems and community perspective, and it's impact on the same, so that more conclusive assertions and subsequent interventions can be made.

In order to compare, monitor and analyse caesarean rates within and between facilities and/or regions, it is also important to classify cases based on obstetric risk. WHO, after reviewing many such classification systems, proposes that countries use the Robson's criteria to classify all delivery and C-section cases into 10 mutually exclusive categories that signify variable risk of complications that may necessitate a C-section. The group of experts recommend that all facilities providing C-section facilities should start using this classification as part of their case sheet records.

In order to have a standard for Obstetricans to follow, the group felt that developing guidelines for C-section is another need of the hour. While organisations like ACOG and NICE have developed such guidelines, it is necessary that the same be vetted and adapted to the Indian context by an expert group, formed especially for this purpose.

The final section of this report looks at the multitude of interventios mentioned at the consultation and has been categorized into 4 stakeholder groups, to whom the interventions most strongly apply - Health Providers, Facilities/Systems, Policy Makers/Government and Patients & Community. The interventions are numerous and encompass changes and enhancements in everything from standardizing guidelines and SOPs, trainings and medical education, licencing, awareness, human resources, payment structures, facility enviornments, montitoring and record keeping, counceling and distribution of services. All initiatives need to be studied in-depth, as well as applied in different settings, to validate their applicability and success in optimising C-section rates.

In addition to the need to ensure availability of infrastructure, equipment/ supplies and trained human resources who deliver compassionate care, two of the more overarching intervention concepts from the consultation were the

need to enhance the practice of evidence based medicine and research and the incorporation of more accountability and quality improvement measures into practice. Enhancing the quality of medical and paramedical education in the care of patients and ensuring the attainment of these skills through hands-on, 'simulated patient' exams throughout graduate training and licensure, were seen as an important way to enhance the practice of evidence based medicine. This should be supplementated via manditory continueing medical education (CME) credits for all health practioners and periodic exams for re-licensure every 8-10 years, to ensure practitioners are aware of what current medical evidence states. There is also a need to enhance the understanding of how to conduct research and encourage production of the same through instruction and more robust funding.

Suggested measures to enhance accountability and quality included expansion and enhanced enforcement of the Clinical Establishment Act and incorporating more monitoring and review under the umbrella of holistic quality improvement programs in hospitals. Institutions that presented at the consultation and have been able to show dramatic and sustained changes in CSR, like Sitaram Bhartia Institute –New Delhi, have done so through a multipronged approach that incorporated several different interventions across stakeholder groups, implemented within an iterative system that included constant monitoring and quality improvement techniques. The need to have intervention strategies be dynamic, and implemented with a philosophy of constant monitoring and improvement, seemed pivotal to achieving dramatic sustained optimization of CSR.

The introduction into the health system of a professional midwifery cadre, as recognised by the International Confederation of Midwives, was also seen as an important step towards reducing C-section rates, which could address both the perceived 'overmedicalization' of birth, as well as help address the shortage of specialists in many areas. The group chalked out various steps that need to be taken to make this a reality.

Ultimately, as recommended by WHO, the consultation participants felt that the health system should not aim at achieving a particular C-section rate, but rather ensure that C-section services are available to those women who need them and the need to come together as a health community to address the issue of escalating caesareans, but also the greater issue of overall quality in medicine. As the economy continues to grow, public health efforts will need to shift from an "availability and access" focus, to one that increasingly enhances accountability and quality. It is only through the joint efforts of all stakeholders –providers, patients, policy makers health systems and the community at large- that we will be able to create the systemic changes required for long lasting change.

Section 1

Background

C-section rate: What does it mean?

Provision of Emergency Obstetric Care (EmOC) to all women with complications during pregnancy, childbirth and the postpartum period is essential to reduce maternal and perinatal mortality and morbidity. Surgical interventions, including use of the abdominal route to deliver the baby – commonly known as "Caesarean section" or "C-section" – are important tools in the EmOC arsenal. C-section is also one of nine signal functions for assessing the availability of Comprehensive Emergency Obstetric care (CEmOC).[1]

In 1985, a panel of reproductive health experts gathered for a meeting organised by the World Health Organisation (WHO) in Brazil had stated that "[T]here is no justification for any region to have a rate [of C-section] higher than 10-15%".[2] Three decades later, in the face of rising rates of C-section and at the behest of the international community, including governments and clinicians, to re-visit these rates, the WHO came up with another statement in 2015 (***Annex 1***) which reiterated the 1985 statement by categorically stating that:

> **"At a population level, caesarean section rates higher than 10% are not associated with reductions in maternal and newborn mortality rates."**

As shared by Dr. Kansal, the Maternal and Reproductive Health Focal Point from WHO-India, the current statement on what has been termed as the "optimal level" of C-sections – i.e. the expected rate for medically indicated caesarean sections, while avoiding unnecessary operations – is based on a systematic review of the various ecological studies on the association between C-section rate (CSR) and maternal and newborn mortality rates. In addition, WHO also undertook a worldwide ecological study to understand this association.

While studying the rates through the systematic review, WHO found that increases in CSR up to 10-15% were associated with reductions in maternal, neonatal and infant mortality. However, further analysis revealed that, once socio-economic factors were controlled for, this association weakened or even disappeared in some cases. Adding a longitudinal worldwide ecological study

[1] Monitoring Emergency Obstetric Care: A handbook. WHO (with UNFPA, UNICEF and AMDD). 2009
[2] WHO Statement of Caesarean Section Rates. 2015

of their own to the systematic view, which took into account socio-economic profiles of countries across time, WHO found that "below a caesarean rate of 10%, maternal and neonatal mortality decreased when caesarean section rates increased. As caesarean section rates increased above 10% and up to 30% no effect on mortality rates was observed." The data did not enable the assessment of the impact of C-section rates above 30% on maternal and newborn mortality.

In another WHO document[1], produced about 6 years before the 2015 statement, meant for assessing access to and use of EmOC in different populations, the rate of "caesarean section as a proportion of all births" (referred to in this document as the "C-section rate" or "CSR") is listed as one of the critical indicators for monitoring EmOC service availability and use. In setting the 'standard' for this indicator, the document states that "the estimated proportion of births by caesarean section in the population is not less than 5% or more than 15%". On the face of it, such differing numbers (10% vis-à-vis 10-15%, and then this 5-15%) are bound to confuse the practising community, and this confusion was discussed at this workshop. The points to be kept in mind on the interpretation of these numbers, that matched the explanations in the various documents, were:

- CSR, as defined by WHO, is meant to be interpreted at a population level. This means, it needs to be calculated for an entire community or geographic area. A detailed description of how to determine a catchment area is included in the Monitoring EmOC Handbook[1]. The numerator is the number of caesarean sections performed in EmOC facilities, for any indication, during a specific period and the denominator is the expected number of live births (in the whole catchment area, not just in institutions) during the same period[1]. On the numerator front too, while the monitoring document initially talks about services in EmOC facilities, i.e. those that meet certain service delivery criteria, it then goes on to recommend that the data be captured from all maternity facilities, whether or not they meet the criteria.

- While one can calculate CSR at any level, including for individual facilities, it needs to be clarified that this range set by WHO is not applicable to individual facilities. This also makes practical sense, as referral facilities, which see a more complex obstetric case mix, are bound to have higher levels of C-sections compared to facilities offering only normal delivery or BEmOC services.

- The lower limit for this indicator has been set keeping in mind the rate of life-threatening obstetric complication occurrence, where a C-section may prove to be a life-saving intervention. Therefore a CSR less than 5% indicates lack of availability, access to and/or use of CeMOC services.

- The two documents also clarify that the upper limit of 15% is NOT a target to be achieved. Rather, it should be viewed more as a threshold that

must not be crossed. In practical terms, this means that CSRs higher than 15% need to be looked into, as it signifies a practice of undertaking this intervention when not medically warranted.

- Given the two points above, CSR of and around 10% of all births is 'reasonable' and balances the adequacy of EmOC services for those in need, while also ensuring that this intervention is not abused.

With this as the background, in its recent statement[2], WHO also warned of the potential risks of conducting this surgery when not required, saying "caesarean sections can cause significant and sometimes permanent complications, disability or death, particularly in settings that lack the facilities and/or capacity to properly conduct safe surgery and treat surgical complications". The statement's ultimate conclusion is that

> **"Every effort should be made to provide caesarean sections to woman in need, rather than striving to achieve a particular rate."**

The risks involved with 'unindicated' C-sections are discussed in details in **Section 3.**

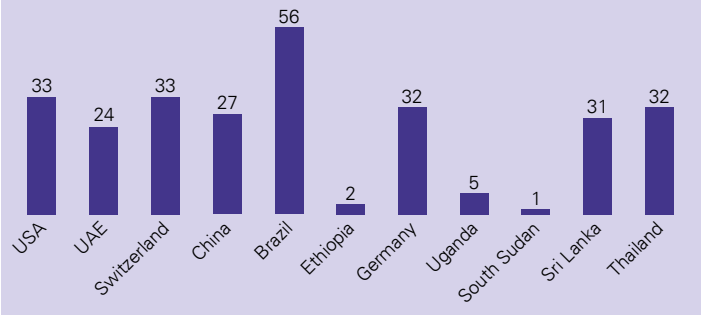
Until recently, the effort to reduce MMR and achieve MDG-5 by improving availability of EmOC has been the focus of programming in the development setting, hence the lower limit of 5% has been the point of reference. Now, as will be further elaborated below, the other side of the spectrum, i.e. exceptionally high CSR, is a growing concern.

C-section rates: Where does the world stand?

CSR is on the rise across the globe. According to the data shared at the workshop, (***Figure 1***), by Dr. Baswal, the Deputy Commissioner for Maternal Health, Ministry of Health, Government of India, the South American country of Brazil tops the charts on this dubious indicator with a CSR as high as 56% of all deliveries. Developed countries such as USA, Switzerland, Germany, and even some South Asian countries like Thailand and Sri Lanka, have about a third of their deliveries taking place through the caesarean route. As

Figure 1:
Caesarean Section Rates Across Countries

(Dr. Baswal's presentation)



Source :
World Health Statistics 2015

expected, CSR is low in Sub-Saharan African countries, as they are known to have poor EmOC services, which is a major reason for the high MMR in these countries.

Just as with other health indicators, there is a distinct difference seen in CSR between geographic regions as well. The Americas trend highest with an average CSR of 38%; the average CSR of South East Asian countries is 10%, while African countries tend to show the lowest rates, at an average CSR of 4%[3]. However, averages, by their very nature, mask gross differences, both between countries and within a country.

C-section rates: Where does India stand?

The lack of data on C-section was highlighted by many speakers, such as Dr. Baswal and Dr. Sanjeev Upadhyaya, Health Specialist, UNICEF-Hyderabad. The available data is primarily survey data, much of which is dated, or data from the government health management information system (HMIS). For obvious reasons, the latter source provides relatively robust data on the situation in public health facilities, but does not have as much complete data for the deliveries and C-sections being done at private sector facilities. Also, these data sources only provide very rudimentary data on C-section rates. Data on other key information areas, such as the determinants and medical indications of C-section, are not easily available through such sources.

One potential source are the case sheets of women who deliver. For the purpose of this workshop, UNICEF had done a quick analysis of data from the case sheets of C-section cases (for the month of February 2016) from a few select high case load public facilities in a handful of high priority districts (HPDs) of 3 states – Telangana, Andhra Pradesh and Karnataka. Over 1,800 C-section cases were analysed. While sharing the data from the UNICEF mini-assessment, Dr. Upadhyaya shared how poor record-keeping and lack of information in the case-sheets made the task very tough. Due to this reason, along with the fact that the data was not a representative sample, it was requested that the data from this analysis not be quoted, but be used to understand general 'trends' in C-section related service delivery.

According to the recently released fact sheets of the National Family Health Survey, Round 4 (NFHS-4) for 17 States and Union territories of India (***Figure 2***), CSR is significantly higher in the southern states compared to the northern ones. Within India, at 58% of all deliveries, the new state of Telangana has the dubious distinction of having the highest CSR among these 17 states, a rate that is higher than even the global leader in CSR, Brazil. This elevated rate was a major impetus for Telangana wanting to co-host the first national workshop on this issue.

[3] World Health Statistics 2015 *(Dr. Baswal's presentation)*

Figure 2:
Caesarean Section Rates Across States and UTs in India

(Dr.Baswal's presentation)

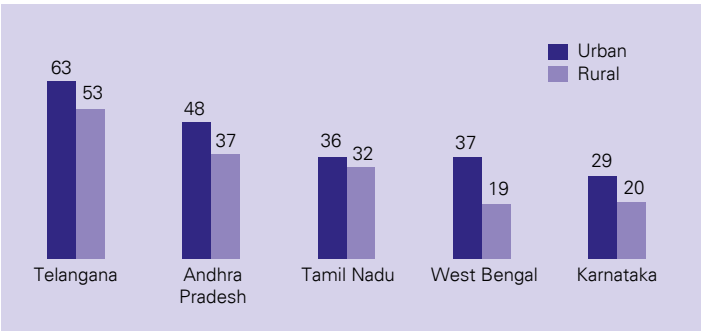
As NFHS-4 data had not been released for all states at the time of the consultation or by the time this report was written, it is difficult to determine what the national average for India is. However, HMIS[4] data does give an insight into the pan-India rates, at least with regard to public sector facilities. According to the pan-India data for FY 2015-16, of all the *reported* institutional deliveries (in both the public and private sector)[5], 16.7% were through C-section. However, as this is not a population based figure, and data from private facilities in HMIS is largely incomplete, it cannot be compared with the global standard of WHO.

As expected, NFHS-4 data also shows that the CSR is higher in urban areas than in the rural parts of India (***Figure 3***). However, the difference is not very stark, and in fact, in the states with high overall CSR, even the rates in the rural areas, far surpass the standards set by WHO.

Figure 3:
Caesarean Section Rates in Urban and Rural Residents in Select States in India

(Dr. Upadhyaya's presentation)

Source : NFHS 4



[4] https://nrhm-mis.nic.in/hmisreports/frmstandard_reports.aspx

[5] According to HMIS for FY 2015-16 of all the women who had registered for ANC, 64.3%, i.e. almost two-thirds, had delivered in a health facility based on the facility level reports from both the public and private sector. However, all the expected deliveries have not been reported in HMIS. This changes the 'institutional delivery rate' which is as high 88.5% of all the deliveries reported.

Section 2

Determinants of C-section – Deciphering Common Perceptions

Perception 1: C-sections are being conducted as a life-saving procedure for the mother and/or the baby

As mentioned before, C-section is a life-saving procedure and an integral component of EmOC. Dr. Reddy, Clinical Director of Obstetrics and Gynaecology, Rainbow Hospital Group, discussed the importance of surgery in general, and C-section in particular, in the health care system, and especially in obstetric care. She emphasised that while C-section has been listed as one of the "essential surgeries" by WHO that must be made available through the health systems, it is important to understand under which conditions it needs to be done and when it should be avoided. In this, she divided the indications under 3 heads (sourced from the National Institute for Health and Care Excellence (NICE) guidelines)[6]:

- Conditions which could lead to the death of the mother or the foetus (absolute indications): e.g. absolute disproportion, abnormal lie and presentation that makes vaginal delivery impossible, eclampsia, foetal asphyxia or foetal acidosis, etc.

- Conditions which could lead to sub-optimal outcome (relative indications): e.g. pathological cardiotocography indicating foetal hypoxia (Assisted Vaginal Delivery (AVD) may be an option to hasten birth in these cases), failure to progress in labour etc.

- Conditions in which the surgery is of doubtful benefit and should not be offered routinely (unindicated): e.g. twin pregnancies where the first twin has a cephalic presentation, small-for-gestational-age babies etc.

Dr. Mahapatra, a medical doctor, IAS officer and the current Dean of the Institute of Health Systems, talked about how studies have classified two "schools of obstetric practice" according to their preferred delivery modalities – one is the "strict medical indication and natural birth" school, while the other is the "liberal C-section operatives". "Overall," he said, "the threshold for caesarean decision making has been lowered."

[6] NICE guidelines for Caesarean Section https://www.nice.org.uk/guidance/cg132/chapter/1-Guidance

Data from various sources on the medical indications for C-sections shows that the proportion of cases where the surgery was performed for the above mentioned 'absolute' indications was relatively low. In fact, the 'indication' that was listed most frequently in the majority of the data presented was "previous C-section". Dr. Upadhyaya shared that this was listed as the sole indication in about 35% of Sick Newborn Care Unit (SNCU) admissions in Telangana and 41% in Andhra Pradesh (it should be noted that these percentages are out of all the SNCU newborn admissions delivered through C-section). Similarly, in the data analyses from the case sheets, "previous C-section" was listed as the primary indication in almost a third of all C-section cases. This data seems to suggest that C-section in the first delivery is, in itself, proving to be a trigger for subsequent sections, and that high rates of C-section in primigravidas lead to even higher rates in multigravidas. This was clear from the analysis of the case sheet data, where over two-thirds of the multi-gravidas who underwent C-section had "previous C-section" mentioned as an indicator in their case-sheets. The case-sheet analysis also showed that, of the 910 multigravidas who had undergone a C-section, 708 (78%) had undergone at least one section previously. Thus, this data shows that rationalising the C-section rates in primigravidas is extremely important to bring about a reduction in CSR.

According to SNCU data, "other causes" (beyond the listed indications in the automatic drop-down menus of the SNCU software) accounted for 35% and 20% of C-sections in Telangana and Andhra Pradesh, respectively. Based on the case-sheet analysis, "other causes" accounted for about 12% of the cases. It must be clarified here that while the SNCU data listed only common indications of C-section, the case sheet analysis tried to analyse the additional indications mentioned, such as cephalo-pelvic disproportion (CPD, or what was referred to in the case-sheets as "big baby"), HIV positive mother etc. Therefore, the case sheet data had fewer indications that were aggregated into the 'other causes' category. These 'other' causes commonly included oligohydramnios, premature rupture of membranes and even the term "precious baby," on occasion. In some case sheets, the indication, as recorded by the data collector, seemed to bear no connection to a valid medical indication. For example, "labour pains" or "primigravida" had been listed in some case sheets as indications. Even if this is an inadvertent error, it clearly shows the need to improve record keeping, without which it will be extremely difficult to analyse C-section related data.

There were discussions on how unnecessary induction and 'routine' augmentation of labour using syntocinon might be creating an artificial need for emergency C-sections, particularly due to foetal distress. These may also be changing clinicians' expectation of how long labour lasts, and therefore increasing the diagnosis of "prolonged labour" or "labour dystocia" (see **Perception 7** to understand the difference between natural and synthetic oxytocin). That these practices are rampant was brought out in Dr. Iyengar's

presentation. Dr. Iyengar is a medical doctor and Chief Executive of the non-governmental organization, ARTH, in Udaipur. He shared excerpts from Government of India's (GOI's) report on the assessment of a teaching hospital in Rajasthan where a large number of maternal deaths had taken place. The report said that after admission to the said hospital, "the doctor prescribes as standard Inj. syntocinon, buscopan, cerviprim and epidocin to all women…." The report also mentions how the doctors did not have knowledge of active management of third stage of labour (AMTSL), and that the decision to perform a C-section was taken very quickly.

Perception 2: Rising C-section rates are because of newer indications emerging

There appears to be a perception amongst both the providers and women that there is a change in the epidemiology of the health status of pregnant women, which is impacting C-section need and rates.

Ms. Chris Kurian, a public health scholar, shared the preliminary results of a qualitative study done with women and providers from Delhi and Kerala. By her own admission, the sample was small and purposive (7 women – 3 from Delhi and 4 from Kerala), and two service providers (a doctor and a nurse, both from Kerala). Therefore, the findings should be viewed as indicative of certain trends, rather than an absolute truth. According to her study, women thought it was a change in lifestyle, including reduced physical labour and exercise, along with prescribed rest during pregnancy and "good food" (referring to non-vegetarian, dishes high in fat, confectionary and other ready to eat food) that is adversely affecting the health of women and, in turn, impacting their strength to bear labour pains and ability to deliver normally. In their view there was an increase in the levels of "high BP" and "sugar" during pregnancy among their peer and acquaintances, which was also linked to this change in lifestyle. More such complications during pregnancy were seen as translating into an increased need for C-sections.

This same perception was also shared by a nurse who was one of the respondents in the study. In fact, this supposed inability of today's women to bear labour pains was construed as being a "non-cooperative patient" by the providers. According to the nurse, the perceived inability of the "non-cooperative patient" to push the baby may cause foetal distress and lead to a C-section.

The other changes in obstetric indications that have been mentioned are the rise in infertility cases and infertility treatment, resulting in more and more women who are carrying, what are often termed as "precious babies". Also, as women are now marrying relatively later and postponing childbirth, the number of 'elderly primigravidas' (i.e. those giving birth for the first time when 35 years of age or older) is also rising. These are generally viewed as 'high risk

for normal delivery' cases, and elective C-sections opted for. However data from the various presentations reflected a negligible number of C-sections that were performed due to either of these causes. Also, as mentioned by Dr. Bhatla, Professor of Obstetrics and Gynaecology, All India Institute of Medical Sciences (AIIMS), these conditions, by themselves, are not adequate indications for performing a C-section. As an example, she shared the case of her own student who had conceived in her late thirties, following infertility treatment. In the current obstetric environment, she would have been taken for an elective C-section. However, because the woman wished to go for a normal delivery, a trial of labour was given and she delivered a healthy baby normally.

Another such indication often mentioned is women with a history of multiple previous C-sections. The more the number of previous sections, the higher the likelihood of a subsequent C-section. While "previous C-section" was the most common indication for C-section in multi-gravidas, according to the information shared by different presenters, the number of previous sections among these multigravidas delivering by C-section almost never crossed one or two. The reason perhaps lies in the decreasing total fertility rate (TFR), which means that there are very few women with more than 3 children, and therefore the possibility of a woman having undergone more than 2 previous C-sections is negligible.

Perception 3: More and more women are preferring C-sections as the mode of delivery

Dr. Reddy shared that caesarean delivery on maternal request has now emerged as a much discussed 'indication' for C-section. "If it has developed an acronym – CDMR – the phenomenon is probably here to stay", she added.

According to the case-sheet data from select facilities of 3 states shared by Dr. Upadhyaya, less than 0.5% of the C-sections reviewed had listed maternal request as one of the indications for C-section. Similar findings came from the presentations made by Dr. Bhatla as well as Dr. Poonam Shivkumar, Professor and Head of the Department of Obstetrics and Gynaecology, Mahatma Gandhi Institute of Medical Sciences, Sevagram, where maternal request rates were listed as ranging from 0.3%-0.5%. The experts discussed that it is probable that the actual number of requests was higher. However, as it is still not recognised as a 'valid' indication, it may not have been mentioned on the case sheets. Dr. Mahapatra said that the exact incidence of CDMR was not known (perhaps due to a lack of a clear definition), but it is probably less than 5% of all deliveries. Thus, its contribution to rising CSR is debatable.

Dr. Reddy said that in her experience, "tocophobia" – fear of labour pains – is the most common reason for CDMR. Some women, either due to anxiety, depression and other stressful mental conditions may not feel confident handling labour pains. Some fear loss of control over self during normal

labour. In other cases, a previous traumatic delivery or perineal injury during normal delivery feeds into this fear the next time around.

In some cases, the request may emerge out of other worries and social compulsions. For example, Dr. Diwakar, Obstetrician and Gynaecologist, and former President of Federation of Obstetrical and Gynaecological Societies of India (FOGSI), talked of women opting for Caesarean so as to fit the delivery time into their busy schedules. In cases of conception following infertility, couples may opt to go for a C-section because of its perceived safety for the infant, compared to a vaginal delivery. There were also discussions on how celebrities opting for C-sections (as they are "too posh to push") may also be feeding into this desire for C-sections. Dr. Reddy mentioned the desire to preserve the perineum, as in the pre-delivery state, as one of the reasons for CDMR. There is a perception that due to the pressure on the perineum, there is an increased risk of urinary incontinence following a normal delivery. However, studies have shown no difference in incontinence rates between vaginal and caesarean deliveries.

Perhaps the most eye opening insight into this issue came from Ms. Kurian's presentation. Ms. Kurian shared that none of the women she talked to in her study viewed C-sections positively. All of them thought that delivery, being a natural process, should happen normally. It was interesting to note how all of them discussed how, ultimately, the decision for performing a caesarean was the physician's. Most women interviewed actually preferred a NVD, but circumstances arose that they were told necessitated the caesarean and thus, they deferred to what their physicians thought was best, trusting the later were making the best medical choice.

The dislike for C-section was also because they felt that C-section has undesirable effects (ranging from unpleasant to downright harmful) compared to a vaginal delivery (***Figure 4***). Some women also did not want to go for C-sections because they wanted a large family. Knowing that one C-section often leads to a repeat section in subsequent deliveries, and that multiple surgeries are risky and would impact their ability to have many children, it can be difficult to convince women who desire many children to have a C-section (as shared by a respondent doctor interviewed for the study).

It was interesting that despite these apprehensions, the women understood that C-sections do have a place in delivery care, and that there are situations, such as the baby passing stools while still in utero, or the baby's heart rate being too slow or fast (both indicating foetal distress) or cord around the neck, that may necessitate a C-section.

However, one of the women who had delivered through a C-section also felt that in her case, the section was performed due to the doctor's convenience (her doctor had to attend an international conference a week after she was operated upon, she said) rather than a medical need.

Figure 4:
Women's Perceptions of the Unpleasant Effects of a C-section

(Ms. Kurian's presentation)

(*please note, all names after quotes from the study are alias' and not the actual names of respondents)

Disadvantages associated with the C-Section

" In a normal delivery pain lasts till the labour, After that one is free but if you have a caesarean then you have to bear pain for much longer "

- Viji Valooran (36 years), Kottayam

- Longer healing period
- Necessity of depending on others during recovery
- Worry about availability of support and care
- A caesarean leads to subsequent caesareans
- Fears about the procedure : spinal injections, own safety
- Guilt and Inadequacy : 'What did I do wrong to not have a normal birth?'

Chris M Kurian
National Consultation on Rising Caesarean Rates : A Cause for Concern, 12th and 13 April 2016

Ms. Kurian shared that women often feel a loss of control or autonomy when a C-section is suggested. As most cases of C-sections are ostensibly based on medical indications (rather than on demand), the decision actually lay in the hands of the service provider, the women felt. As one woman said, "*If the doctor says that the baby's heart-rate is dropping, or the baby has passed stools, what can I say? I have no way of knowing or verifying that. I have to go along with what I am told.*" This information asymmetry between the health care provider and the woman was also highlighted by Dr. Mahapatra who shared that when there is a conflict between the doctor's and the woman's preference, in 75% of the cases, the matter was resolved in the doctor's favour.

As mentioned by Dr. Reddy, there is a dire need to mandate that detailed information about the procedure, including its purpose, indication, intended benefit, potential risks and alternatives in an informed consent form be explained to, and signed by, the woman who is delivering. More information on consent forms are available in **Section 4** of this report. In addition to this, Dr. Iyengar raised the issue of the need to devise a procedure to be followed for patient consent in case of an emergency procedure. There are no guidelines for the same.

Most women interviewed by Ms. Kurian had also heard of women demanding C-sections (reference to CDMR). Incidentally, none of them actually knew any one in their circles who had actually asked for a C-section. In fact most women carried a misogynistic view of women who demanded a C-section. They believed that it was the more educated, "modern", urban woman too weak to bear the rigour of labour pains who demanded a delivery through a C-section. The lay respondents in the study judged such a person (who opted for C-section without indications) as being "less of a woman". The idea that CDMR is a more recent phenomenon was alluded to by one of the respondents who had delivered two decades ago. She shared that she had had a difficult labour. When asked why she did not seek a C-section, she said, "*I didn't know I could ask.*"

Sharing her experience with delivery, one of the women explained how the lack of privacy in the labour room (presence of paramedical and nursing students), "nasty" remarks from the providers and not being offered food during the long labour, had led to an emotionally traumatic experience, because of which she feared going in for a normal delivery again. Other unpleasant experiences recounted included instances of frequent and painful vaginal examinations during labour and the discomfort caused by having to move from room to room in revealing hospital gowns.

In the face of such negative experiences of vaginal deliveries, whether faced by themselves or by their friends and relatives, women may actually show a preference for C-sections. Dr. Mahapatra quoted from a study in Brazil which found that obstetricians may paint a negative picture of the birthing process, such that women may feel relieved when a C-section is offered. The study also showed that in many cases "doctors frame their decisions as maternal demand" and this explained why even women who initially preferred a normal birth went home satisfied after a C-section -because it was made to appear as a response to their request.

The providers appear to be divided in their opinion on CDMR as a valid indication for C-section. While some talk of maternal choice and autonomy as a valid reason for C-section, the others do not think a maternal request can be considered a valid indication for caesarean, because of the higher risk associated with an "unindicated" C-section. Dr. Mahapatra shared how acceptance of CDMR varied between countries, with some countries like Spain having only 15% of the obstetricians accepting to conduct a hypothetical CDMR, while other countries like the US and Germany had over three-fourths of the doctors agreeing to this request. The guidelines from renowned provider bodies like the International Federation of Gynaecology and Obstetrics (FIGO) and NICE are also divided in their opinion on CDMR (***Figure 5***).

Figure 5:
Practice Guidelines on CDMR

(Dr. Mahapatra's presentation)

- Intl Fed of ObGs (FIGO, 2012) :
  - No hard evidence RR & Benefits of CDMR.
  - Normal del is safer in short & long run.
- US State-of-the Science Conf. (NIH, 2006) :
  - CDMR decision be carefully induvidualized & within ethics,
  - CDMR is not good for women desiring several children,
  - No CDMR before 39 weeks gestation, and
  - Effective pain management must be available.
- UK Natl Inst of Clinical Exlnce (NICE, 2011) :
  - Ascertain & record specific reason for maternal request.
  - Apprise the NIR woman of overall risks & benefits of CS.
  - Address her anxieties & offer perinatal mental health support
  - If vaginal del is still not acceptable, offer a planned CS.
  - If attending physician is unwilling, refer to one who is willing,

Perception 4: Rise in CSR is an issue primarily at the private sector facilities

Data from NFHS-4, and other surveys such as the Annual Health Survey (AHS) and NFHS-3, shows a significant difference in C-section rates between private and public sector facilities (as a proportion of all deliveries conducted in private and public sector facilities, respectively). In both the public and private sector, CSR tends to be lower in 'high focus states'[7] than in the other states. While the difference between the public and private sector is stark in most states, it is further magnified in the Eastern states of Assam and West Bengal (***Figure 6*** and ***Figure 7***). Also, Telangana, Tripura and West Bengal show extremely high CSR in the private sector, with almost 3 of every 4 births in private institutions being through the abdominal route. District-wise data was presented for a few states, like Telangana, Karnataka and Tamil Nadu and showed that despite variations in rates, the issue of high CSR in the private sector held constant across all districts. In fact, the private sector CSR in Murshidabad district of West Bengal is a whopping 97% (***Figure 8***), indicating that there are almost no normal deliveries taking place in the private sector there.

Dr. Mahapatra also talked about the systematic review that he had done on this issue. Globally, studies have shown higher CSR in private facilities, compared to public sector ones. Dr. Mahapatra discussed how the majority

Figure 6:
Comparison of C-section Rates in Public and Private Facilities in "High Focus States"

(Dr. Baswal's presentation)

Source : AHS 2012-13

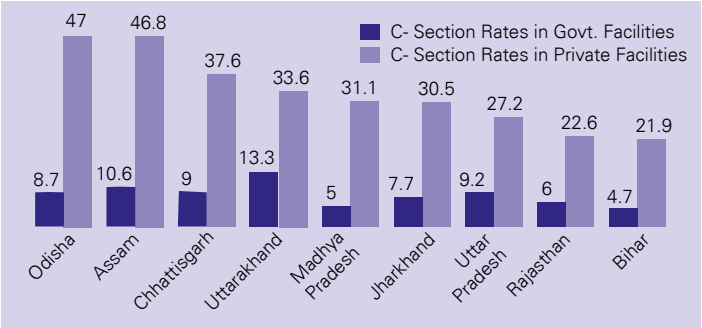
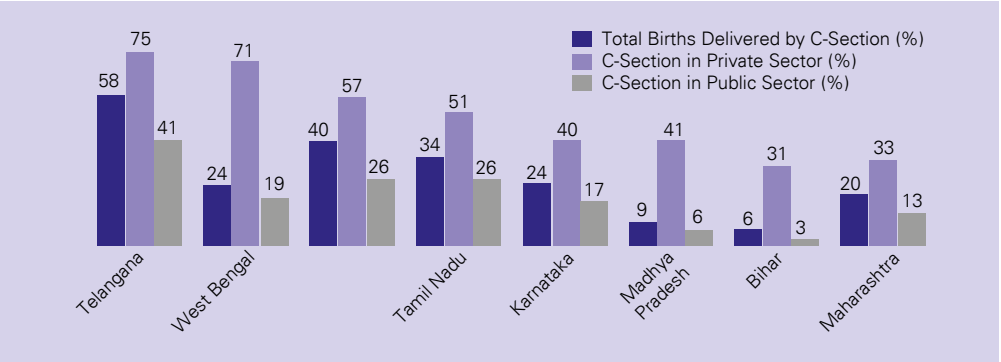


Figure 7:
Comparison of C-section Rates in Public and Private Facilities in Select States, Including "Non-High Focus States"

(Dr. Upadhyaya's presentation)

Source : NFHS 4



[7] These are the states with relatively high MMR and poor performance on other maternal health indicators too such as ANC coverage, institutional delivery rates etc. These include the EAG states plus Assam.

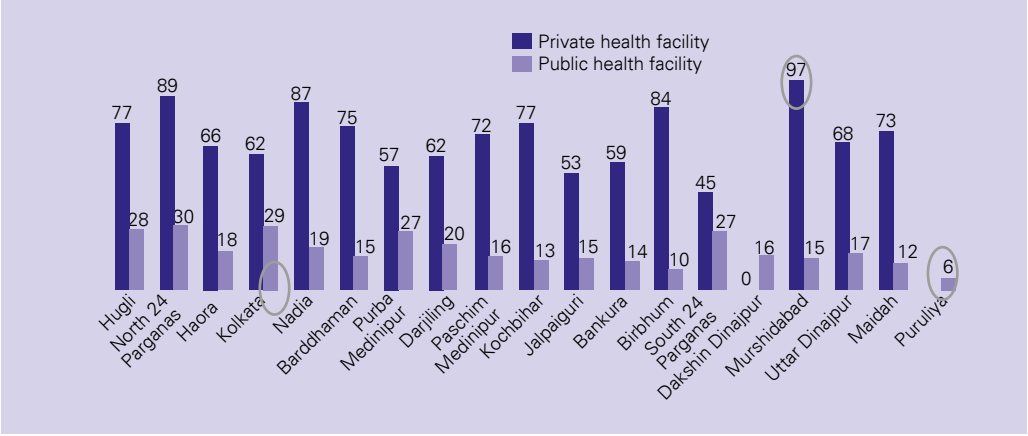
of the C-sections in private facilities (64%) were decided during the ANC period itself, compared to only 23% that were decided pre-admission in public health facilities. Also, comparing women with similar preferences for vaginal birth, the conversion to C-section as the preferred mode for delivery was double the rate in women visiting private facilities, when compared to those vising public sector facilities.

In the face of a weak public sector with poor EmOC facilities, as seen in the 'high focus' states, it has been argued that the high rates in the private sector are a reflection of the referral of complicated cases there, but this explanation does not hold true for the states like Tamil Nadu, Andhra Pradesh and Telangana which are known to have a relatively robust public health sector (***Figure 9***). Also, in the Murshidabad, West Bengal example, a CSR of 16% in the public sector facilities of that district indicates that lack of EmOC at the government health facilities is probably not the reason for a 97% CSR in private facilities, as public facilities seem to be conducting their share of C-sections, if one goes by the WHO statement. The reason for such high rates of caesarean in the private sector of these states needs further exploration.

Going back to the charts again to see how the public sector is performing on C-sections in more detail, one can see that as expected, the CSR in government facilities are as low as 4.7% in the 'high focus' states (***Figure 6***) indicating a relative lack of availability of EmOC services in the public sector. However, in the other states, CSRs are extremely high even in the public sector (***Figure 7***).

Figure 8:
Comparison of C-section Rates in Public and Private Facilities in the Districts of West Bengal

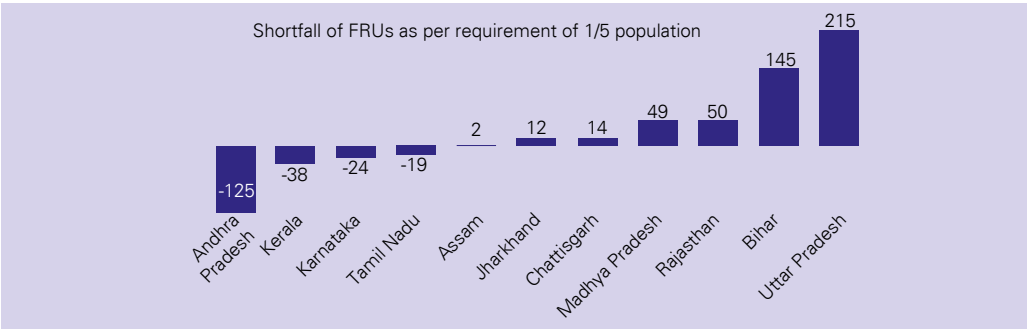
(Dr. Upadhyaya's presentation)



Source : NFHS 4

Figure 9:
Availability of EmOC Services in the Public Sector

(Dr. Baswal's presentation)



As shared by Dr. Upadhyaya, while sharing the results of the Dakshata Resource Needs Assessment from Telangana (200 facilities, 100 of which were the highest delivery load facilities spread evenly across 10 districts), contrary to expectations (based on the obstetric case mix in different level facilities), it was often the 'lower level' FRUs, such as Area Hospitals and CHCS, which had very high C-section rates, even to the tune of 85% of all deliveries in a particular facility. In contrast, the District Hospitals and Medical Colleges, despite being referral centres for the most complicated cases, and where, owing to the tertiary care facilities, one would expect the C-section and other surgical intervention rates to be higher, it was much lower. In fact, the three teaching institutes in Hyderabad had C-section rates ranging from 38-43%. (*See Dr. Upadhyaya's presentation in* ***Annex 4***). Dr. Iyengar, in his presentation too, discussed the C-section rates in a teaching hospital in Rajasthan, which was seeing a steady increase over the last few years.

Perception 5: The health care professionals are to be blamed for this rise in CSR

From the discussion above under ***Perception 1***, it does seem that over-medicalization of the delivery process, and the 'stretched' definitions of the indications for caesareans are causing the rise in C-sections. While, based on the discussions at the workshop, this may be true to a large extent, there are many other factors within and outside the health system, which go beyond the medical decision-making by health care professionals that seem to be contributing to this situation. These include:

- Lack of adequate skilled human resource to manage the increased case load of the normal birthing process.

- Based on informal conversations with public sector providers, as well as other data analysed from case sheets, this appears to be a possible reason for high rates of C-section existing in the public sector facilities of some states. Following the introduction of Janani Suraksha Yojana (JSY) and Janani Shishu Suraksha Karyakram (JSSK), the institutional delivery rate has increased substantially in all states. While the numbers of women visiting the private sector for delivery is almost the same, the case load at public health facilities has increased manifold in the last decade (as per a comparison of survey data from NFHS-3 and NFHS-4, for select states). However, there has not been any commensurate change in the physical infrastructure or the human resource capacity to absorb this increasing client load. Through informal discussions with doctors in public sector facilities, it was shared that the relative lack of SBAs (nurses and Auxiliary Nurse Midwives (ANMs)) in public facilities often does not allow them to provide normal delivery services round the clock. Therefore, they attempt to 'schedule' the deliveries in a 'manageable' manner. Perhaps the reason why this increase in CSR is not seen in the Empowered Action Group (EAG)

states (unlike the southern states) is that, in the former, even Ob-Gyns (who are skilled in conducting C-sections) are not available in sufficient numbers in public health facilities.

The data analysed by UNICEF from the C-section case sheets of 3 states showed a clear trend of increased number of cases during the weekdays, with a peaking on Mondays and Fridays, and a definite downward trend on Sundays. To understand whether the difference was because of a lack of elective C-section surgeries on Sundays, only the cases labelled as emergency C-sections were analysed. However, even when looking at just emergency C-sections, the trend still remained (***Figure 10***). The difference in numbers between the days of the week was even starker if the District Hospitals (DHs) and other large institutes, like RIMS, were removed from the analysis (on the assumption that these facilities are more likely to be 24x7).

A similar picture emerged when the data was analysed by the time of the surgery. It was seen that most C-sections were performed during 'regular office hours' i.e. 8 AM to 8 PM, and the difference stayed even when the cases were disaggregated by whether they were emergency or elective C-section (***Figure 11***). This data on the day and time of C-sections clearly points to the lack of truly 24x7 facilities in most Area Hospitals and CHCs, which could explain why doctors are resorting to C-sections to clear the delivery case-load. On the contrary, Dr. Poonam shared data from her medical college where most (>50%) of the C-sections took place at night, between 9 PM and midnight, showing that bigger facilities with adequate HR can offer 24x7 EmOC services.

Figure 10:
Distribution of C-sections According to the Day of the Week Performed: Case Sheet Data

(Dr. Upadhyaya's presentation)

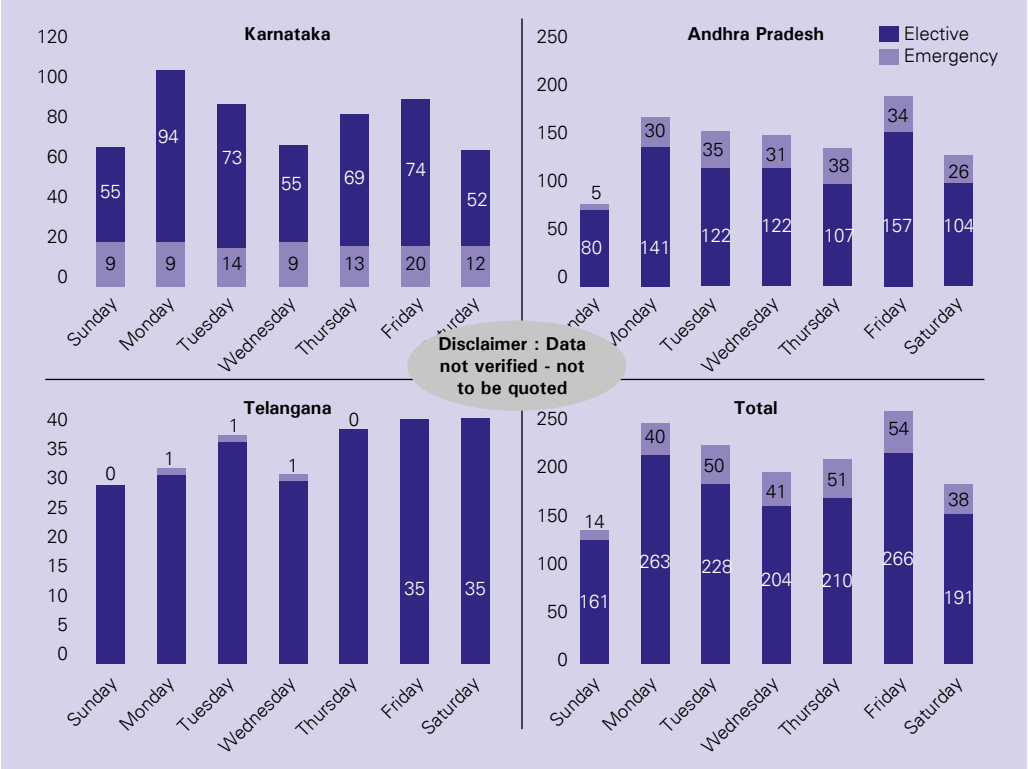
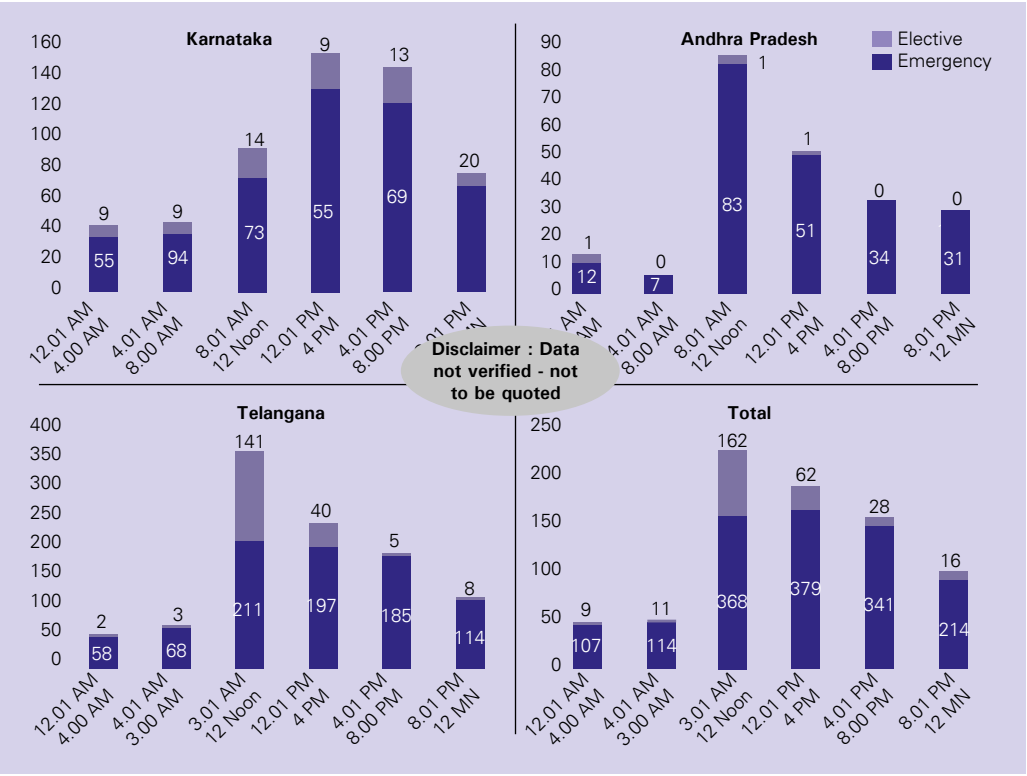


Figure 11:
Distribution of C-sections According to the Time of Day Performed: Case Sheet Data

(Dr. Upadhyaya's presentation)



While increasing case load is perceived to be a cause for the lack of quality of care, Dr. Mahapatra shared that his systematic analysis of different studies on the association between hospital patient volume and quality outcomes showed varying results. While many showed no association, one study showed a U-type relationship between the two variables, with mortality increasing with very low volumes (<100 births / year) and then coming down with intermediate volume, only to rise again when the client load crossed a threshold (>3000 births per year). This can perhaps be understood as the dichotomy between the need to have a minimal case load to maintain the skills of the providers, versus an unmanageably high case load when quality will suffer because of an inability to provide complete attention to the woman in labour.

Late Referrals

Many experts shared that often the referral facilities received the cases so late (such as women with severe pre-eclampsia or eclampsia), that they were left with no time for any optional interventions and had to conduct C-sections.

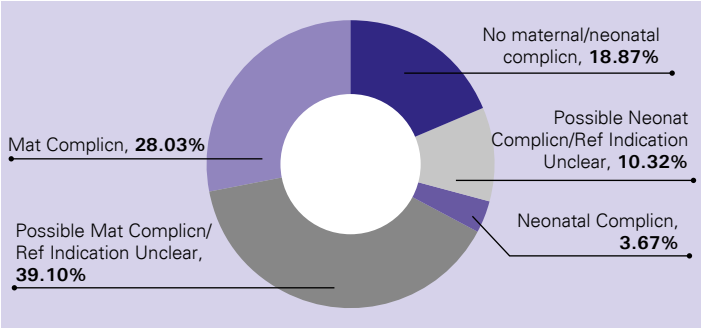
Dr. Iyengar gave significant insight into the referral system in the public health sector through the findings from a project called 'Sampark' in Rajasthan that his organisation was managing, the overall aim of which was to improve the referral and transportation systems to ensure women received EmOC in a timely manner. As part of this project, they assessed the referrals to the DH in three districts of Rajasthan, from July to December 2015. In total, there were 1763 referrals – 1440 (82%) for the women and 323 (18%) for the

newborns. Based on the referral notes/cards, less than a third of these cases were deemed to have a sound reason for referral to the DH (***Figure 12***). In the others, the reasons mentioned for referral were something that could possibly have been handled at a lower level facility (such anaemia, maternal fever, etc.). However, in about 1 in 5 cases, the indication for referral was delinked from any possible maternal/neonatal complication (e.g. labour pains – surprisingly as many as 248 cases were referred for this, abnormal vaginal discharge etc.). In some cases, "lack of staff" was mentioned as the reason for referral, lending additional credibility to the issue discussed above, regarding human resource shortages.

Figure 12:
Reasons for Referral to 3 District Hospitals in Rajasthan – July-Dec 2015

(Dr. Iyengar's presentation)

Source : NFHS 4



Of the women referred, most of them (>85%) had a normal delivery. Also, some women who were referred due to absolute indications for C-section, such as a transverse lie or obstructed labour, also had a normal delivery at the DH. This brings into question the correctness of the diagnosis and the necessity of referral, which was creating an unmanageable burden at referral facilities, like the DH. The experts hypothesized that due to the tracking of maternal and neonatal deaths by the government, and the possibility of penalisation by the authorities in case of mortality, the referrals have increased and health professionals are unwilling to handle even the minimally 'risky' cases. The fear of litigation (*see below*), as well as the fear of occasional physical violence by the relatives of the mother-child dyad for unfavourable outcomes, is another possible reason for additional referrals.

Fear of Litigation

Provision of health and medical services are covered under the Consumer Protection Act. As "consumers" of medical services, the patients and/or their relatives can, and indeed are, seeking the assistance of courts to attain redressal against the providers of care, in case of an adverse outcome. While the courts recognise both errors of omission as well as commission while delivering a verdict in such cases, the experts felt that the doctors are "playing it safe" with deliveries and using C-sections, even in cases where the risk through a normal delivery is minimal. For example, a borderline foetal heart rate can be managed in most cases without resorting to C-section; similarly a previous C-section can be given a trial of labour (TOLAC) without risk of scar dehiscence in most cases.

Lack of Counselling

Information about the mode of delivery and counselling women with tocophobia on ways to reduce or better tolerate labour pains is currently not part of most counselling modules, even in the government sector. Preparing women for labour has been shown to reduce the risk of C-section.

Tracking of CSR as an Indicator of EmOC

As mentioned in the first section, C-section is an important element of comprehensive EmoNC, and therefore CSR is an important monitoring indicator. Given the poor level of EmOC, especially in public sector facilities, the availability of C-sections for women in need (CSR) is tracked as a key indicator for EmOC. It has been traditionally viewed as a "positive" indicator with people and facilities (mostly public facilities) being reprimanded for not achieving certain rates, thus building the perception that the more C-sections, the better. Till now, the system has not set an upper limit for this indicator while monitoring it.

Other Health System Issues

Dr. Iyengar shared data from a regression analysis done by WHO on the determinants of C-section. It showed that increasing the number of hospitals and the number of hospital beds (which would, presumably, increase facility coverage of EmONC services) was associated with a rise in CSR in the 38 countries study. On the other hand, an increased share of government funding in the overall health expenditures brought down C-section rates. Also, with rising incomes, CSR rose in the short-term, but over a longer duration, improved economic status of the population brought down C-section rates.

Differential Payments for C-section

The most oft quoted reason for rising CSR is the additional income that hospitals and practitioners generate through C-section vis-à-vis a normal delivery. Given our present knowledge and available data, this appears to be somewhat true. The higher CSR in the private sector indirectly point towards this fact because the private sector charges for each delivery it performs, and more if it is a C-section. However, that is not the case with a practitioner in the public sector. Most practitioners in the public sector are salaried and, therefore, tend to be less inclined to perform C-sections due to lack of monetary gain. In fact, a study from the US quoted by Dr. Mahapatra showed that the differential payment for delivery modes caused the fee-for-service doctors to shift more patients into C-sections, while the CSR by salaried doctors remained unresponsive to this change.

Dr. Mahapatra also shared in his presentation that, globally, women who have health insurance are more likely to undergo a C-section, whether on the health provider's recommendation or by self-option. Also, the more generous the insurance package, the higher the CSR in that group.

Section 3

Impact of C-section – Deciphering Common Perceptions

As discussed above, while many women from the community might not see C-sections as a 'desirable' method of delivery, there is a thinking of 'better safe than sorry' among both providers and women alike. To put it simply, the overarching perception is that the procedure may be 'needless' in some cases, but is, by and large, 'harmless'.

As mentioned earlier, the recent WHO statement[2] is a breakthrough in this regard as it categorically states that:

> **"Caesarean sections can cause significant and sometimes permanent complications, disability or death, particularly in settings that lack the facilities and/or capacity to properly conduct safe surgery and treat surgical complications."**

Perception 6: C-section is, by and large, a safe surgery for the woman

Informal discussions with practitioners and the general community revealed that while most people acknowledge that, like any other surgery, C-section is an "inconvenient procedure", they do not know or acknowledge that there are serious short-term and long term risks and complications associated with the procedure.

Dr. Mahapatra, while discussing the two schools of obstetric practice shared that the "caesareanists" argue that there are much lower risks associated with the procedure in recent times, due to improvements in surgical technique, anaesthetic procedures, etc. The fact that elective C-sections are associated with lower complication rates compared to emergency ones is used as an argument for opting for the procedure, instead of 'risking' the occurrence of a complication that may necessitate an emergency C-section. Respect for maternal autonomy (on choice of delivery mode) was another reason for preferring C-sections. However, this argument is refuted by the opposing school of obstetricians who state that an un-indicated C-section in low-risk pregnant women carries a greater risk of subsequent complications, compared to vaginal deliveries in the same group of women.

Many speakers, including Dr. Baswal, Dr. Reddy and Dr. Dakar shared the risks associated with C-sections (especially in comparison with a normal vaginal delivery). At minimum, the procedure, being a surgery, carries with it all the risks associated with any major surgery, including morbidities from anaesthesia related drugs and procedures, surgical infections, adhesions etc.

The common (more frequent than 1 in 100 cases) risks include[8]:

- Persistent wound and abdominal discomfort in the few months following the surgery
- Chances of a repeat C-section in subsequent deliveries (about 25%)
- Excessive blood loss in the intra-operative period
- Infection

The relatively rare, but usually serious, maternal complications include:

- Need for additional surgeries, such as an emergency hysterectomy or other surgeries later
- Admission into the ICU
- Uterine rupture/scar dehiscence, placenta praevia, stillbirths in subsequent pregnancies
- Thrombosis, and even stroke
- Urinary tract and bowel injuries
- Severe and long-lasting pain
- Longer hospitalisation and re-hospitalisation
- Death of the woman (due to either the surgery or the anaesthesia)

Due to these serious complications, the woman may have to undergo additional procedures including:

- Hysterectomy
- Blood transfusion
- Repair of damage to bladder, bowel or blood vessels.

Dr. Iyengar shared case studies of two women who were part of a cluster of 16 maternal deaths that had taken place in a certain medical college in Rajasthan in 2015. Almost two-thirds of these women (10 of 16) had undergone a C-section. In the 2 cases shared, the C-section had to be followed up with a hysterectomy and multiple blood transfusions due to subsequent complications. In none of the cases was the indication for C-section very clear (though one had a twin pregnancy, the information related to presentation of the first twin was not mentioned in Dr. Iyengar's presentation). He also

[8] Royal College of Obstetricians and Gynaecologists. Consent Advice No. 7. October 2009. https://www.rcog.org.uk/globalassets/documents/guidelines/consent-advice/ca7-15072010.pdf

shared that of the 410 maternal deaths in Rajasthan in 2011-12, 7% were said to be due to post-caesarean section complications. This figure increased to 10% if one counted only the deaths that took place in the postpartum period following an institutional delivery.

Emergency/crash (ultra- emergent) C-sections have been shown to have a higher complication rate than elective C-section rates (11.1-25% vs. 7.1%).[9] The risks of complications like haemorrhage, or the presence of placental defects like placenta accrete, also increases with the number of previous C-sections that the woman has had.

ACOG, in its guidance titled *Safe Prevention of the Primary Caesarean Delivery*[10], compares the rates of adverse maternal and neonatal outcomes by mode of delivery. The table is reproduced below (***Figure 13***).

In this table, most of the complications occur more frequently following C-sections compared to a normal delivery, except for shoulder dystocia (for obvious reasons). It is also interesting to note that there is no difference in the rate of urinary incontinence when compared between the two modes of delivery, indicating that women opting for C-section to preserve the perineal floor are making a choice based on a seemingly non-existent benefit.

Figure 13:
Adverse Maternal and Neonatal Outcomes by Delivery Mode

Outcome	Risk	
Maternal	*Vaginal Delivery*	*Caesarean Delivery*
Overall severe morbidity and mortality	8.6%*	9.2%*
	0.9%#	2.7%#
Maternal mortality	3.6:100,000	13.3:100,000
Amniotic Fluid embolism	3.3-7.7:100,000	15.8:100,000
Third Degree or Fourth degree perineal laceration	1.0-3.0%	NA (scheduled delivery)
Placental abnormalities	Increased with prior caesarean delivery vs. vaginal delivery, and risk continues to increase with each subsequent caesarean delivery.	
Urinary incontinence	No difference between caesarean delivery and vaginal delivery at 2 years.	
Postpartum depression	No difference between caesarean delivery and vaginal delivery.	
Neonatal	Vaginal Delivery	Caesarean Delivery
Laceration	NA	1.0-2.0%
Respiratory morbidity	<1.0%	1.0-4.0% (without labour)
Shoulder dystocia	1.0-2.0%	0%

* Overall severe morbidity and mortality defined as one or more of the following: death, postpartum bleeding, genital tract injury, wound disruption, wound infection, or both; systemic infection.
# Overall severe morbidity and mortality defined as one of the following: death; haemorrhage requiring hysterectomy or transfusion; uterine rupture; anaesthetic complications; shock; cardiac arrest; acute renal failure, assisted ventilation venous thromboembolic event; major infection; in-hospital wound disruption, wound haematoma, or both.

[9] Pallasmaa et al. Caesarean delivery in Finland: Maternal complications and obstetric risk factors. Acta Obstetricia et Gynecologica 2010.
[10] Safe Prevention of the Primary Caesarean Delivery. Obstetric Care Consensus. ACOG. March 2014. http://www.acog.org/Resources-And-Publications/Obstetric-Care-Consensus-Series/Safe-Prevention-of-the-Primary-Cesarean-Delivery

It should be noted that some of the increased risks displayed in the table above have to do with the inherent risks associated with caesareans, while others are due to the more high-risk situations in which emergency caesareans are used.

Dr. Diwakar also talked about the psychosocial harms to a mother who undergoes a C-section, compared to a normal vaginal delivery. The following items were said to be seen more frequently and with greater severity in women who undergo an emergency / unplanned C-section:

- Reduced early contact with the baby and unfavourable early reaction to the baby
- Psychological trauma (especially in an unplanned C-section) and even depression; poor overall self-esteem and mental health, leading to poor functioning
- An overall, poor birth experience.

Such issues were also shared by the women who Ms. Kurian interviewed for the qualitative study. The fact that social norms and thinking, including those of the women themselves, link the ability to bear labour pains and the ability to deliver 'normally' as a sign of healthy womanhood is a potential driving factor behind this impact on mental health and psychological well-being of mothers. As mentioned by the WHO, these effects need to be studied further.

Perception 7: C-section, as a mode of delivery, is safe for the baby

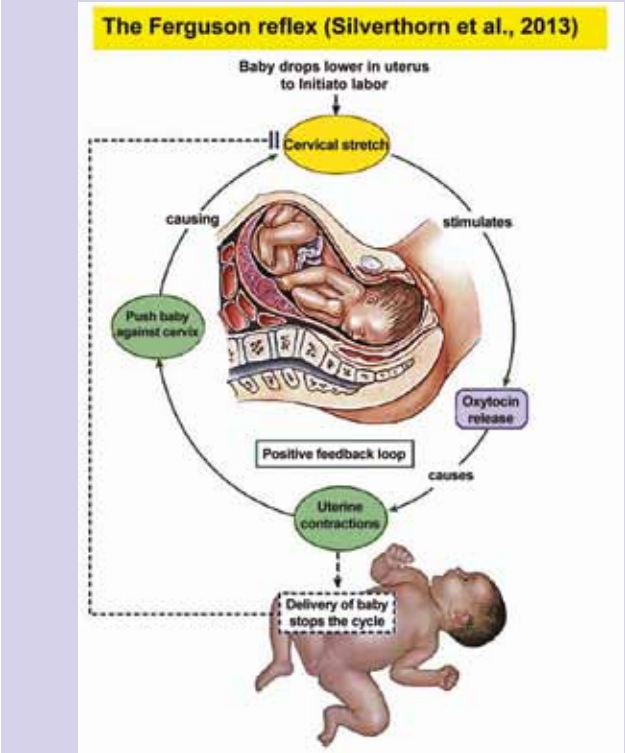
C-section is a surgery performed on the woman, and therefore the surgical risks and potential complications to the woman due to a C-section are more easily perceived and understood; however, as many indications for C-section are actually to save the life of the baby, the potential dangers to the newborn are less perceived and discussed.

According to the SNCU online data shared by Dr. Upadhyaya, 50% of the SNCU admissions in Telangana, and about a third in Andhra Pradesh, are babies who were born through the C-section route. However, given the high CSR in the state, this data is not sufficient to state whether or not C-section, in itself, poses an additional threat to the baby. It could very well be a reflection of the poor condition of the foetus which necessitated, not only the C-section, but also the subsequent SNCU admission. However, a look at the C-section indications for the SNCU admissions showed that foetal distress (which can translate into birth asphyxia and related complications necessitating SNCU admission) was the stated trigger for conducting a C-section in only 2.7% of these cases.

The process and advantages of normal delivery for the baby were explained by Dr. Arun Singh. He took the audience through the endocrine responses

Figure 14:
Role of Oxytocin Release in Delivery of the Baby

(Dr. Singh's presentation)



of the body during delivery and how the pushing of the baby into the cervix causes cervical stretching, which is a trigger for oxytocin release, which then leads to uterine contractions. (***Figure 14***)

Additionally, the hormone oxytocin is important for the milk let-down process that is so important for breastfeeding, along with developing the loving bond between the mother and child. Therefore, normal delivery aides mothers to initiate breastfeeding in a timely manner. Breastfeeding and mother child bonding are known to have a huge impact on both the physical and mental health of the baby, both in the short term as well as the long-term. Breastfeeding has also been shown to offer cognitive benefits in terms of an increase of about 10 IQ points, on average, compared to non-breastfed babies.

Dr. Singh also talked about the differences between synthetic oxytocin (commonly known as Syntocinon or Pitocin) and natural oxytocin. One difference is that synthetic oxytocin may not result in 'pulsatile' uterine contractions (i.e. a contraction followed by relaxation), and even if it does, the contractions are known to be longer and more intense. This can cause an artificial block in oxygen supply to the foetus. Therefore, with syntocinon use, there are greater chances of foetal distress and maternal fatigue, both of which may, in themselves, prove to be triggers for a C-section. Thus, irrational use of oxytocin for either induction or augmentation may be an 'iatrogenic' cause for excessive C-sections. Dr. Upadhyaya had also shared during his presentation that UNICEF had attempted to check the association between

use of syntocinon and foetal distress. However, due to the incomplete nature of the case sheets, the history of treatment provided was unclear in many cases, and no inference could be drawn.

Beyond C-sections, syntocinon use has the potential of causing tetanic contractions which can lead to premature separation of placenta, uterine rupture, cervical tearing and excessive bleeding postpartum.

The other key difference discussed was the inability of the synthetic syntocinon to cross the blood brain barrier. This means that the drug is unable to offer the complete benefits provided by the natural version of the hormone for breastfeeding and mother-child bonding.

Keeping these features in mind, the experts were of the opinion that, as far as possible, C-section should be performed only after the initiation of spontaneous labour, as this signifies the readiness of both the maternal and foetal bodies for the delivery process. This, they felt, should be made applicable even in elective cases of C-section, instead of deciding on a particular convenient date for the surgery.

Dr. Singh also shared how the pituitary reflexes triggered the release of oxytocin, and that any stress can actually create a negative feedback loop, reducing oxytocin flow. Crowded hospitals (as many of our public sector hospitals are) and unsympathetic providers may, therefore, impede the flow of the natural hormones and delay the process of labour. Often, this delay results in prolonged labour leading to a C-section being done due to "labour dystocia / failure to progress".

This scientific information was corroborated by Ms. Kurian, who shared some perspectives from women on what causes a woman in labour to be an "uncooperative patient" (***Figure 15***). The women interviewed talked about stress inducing issues, such as the lack of privacy in the health facility, repeated vaginal examinations, the presence of additional staff and being

Figure 15:
A Woman's Perspective of "Non-cooperation" During Labour*

(Ms. Kurian's presentation)

How non co-operation may come about: a patient's viewpoint

" Surrounding me were two doctors, six-eight paramedics and nurses to who the doctors were simultaneously demonstrating how to attend to a delivery. To add to my distress the last meal I had was the previous night's dinner: The pain was induced at 8.30 am and an enema had been administered. I had been giving nothing to eat barring a glass of black tea. I finally delivered at 5.00 PM but on an empty stomach, with all those people surrounding me, dealing with nasty remarks, my moral was broken."

- Viji Valooran, 36 years

Chris M Kurian
National Consulting on Rising Caesarean Rates : A Cause for Concern, 12th and 13 April 2016

(*All names in the presentation have been changed to ensure confidentiality of the respondents.)

used as cases for teaching students, all of which generated a strong sense of discomfort in them during delivery, which may have had an impact on their ability to bear labour pains and push the baby when the need arose.

Dr. Singh shared that the other advantage of the baby born normally was the exposure to the maternal natural flora as it passed through the vaginal route. This conferred additional immunity to the baby making it less disease prone.

Perception 8: C-sections are an efficient way to take care of the burden on health care staff due to childbirth

As C-sections can be planned according to the provider's convenience and take much less time than a normal delivery, many providers view it as an "efficient" use of their time, which is seen as a big benefit in a world where skilled manpower is limited.

However, being a surgical intervention, C-section is an expensive procedure compared to a normal delivery, not just in terms of price paid by the woman/client, but also in terms of the cost to the provider and the health system overall. Dr. Iyengar shared in his presentation that in today's world, unnecessary C-sections co-exist with needed, but un-provided, C-sections. According to 2010 data from WHO, about 4 million unnecessary C-section globally are siphoning off about US$2 billion annually, while we still need about US$432 million to provide the 1 million needed C-sections. In fact, these unnecessary C-sections use resources that can be used for normal vaginal institutional deliveries too. Dr. Iyengar also added that rising CSR is changing people's mind-sets about the level of care they perceive to be necessary. They are now crowding the higher level facilities that offer CEmOC, so that they can avail definitive care, i.e. C-sections and other complication management, should the need arise. This is leading to a disproportionately higher hospital attendance and bed occupancy rate at the CEmOC facilities compared to other facilities that are offering only normal delivery services. Overcrowding at any health care facility beyond its capacity to deliver (based on bed strength and human resource availability) is known to have a negative impact on the quality of services delivered, which in turn may result in greater risk of morbidity and mortality.

As C-sections are becoming more and more common, health insurance companies are increasing premiums to meet the demand, which in turn is putting extra burden on people's pockets.

One of the most insightful discussions into the economic impact of rising C-sections was brought out by Dr. Devadasan, a medical doctor and PhD in community health financing, who is also the current Director of the Institute for Public Health. Dr. Devadasan calculated, in monetary terms, the economic impact of the rising CSR. He shared that, as a general principle, the economic

impact of any health or disease phenomenon goes beyond the narrow domain of health, as it impacts the production and consumption of goods and services, which should be included in any economic study or assessment. However, given the relatively sparse data available on the cost of C-sections, normal vaginal delivery and the cost of their related health impacts (morbidity and mortality, loss of productivity etc.), as well as the short time frame in which to conduct this analysis for the workshop, Dr. Devadasan focussed only on the health related impacts of mortality and morbidity, and their associated costs.

In order to assess the economic impact of these "additional" C-sections, Dr. Devadasan took the Asian average CSR of 25% for the calculation. Taking the higher end of the WHO recommended rate, he started with the presumption that of this 25%, 15% were required, and therefore the remaining 10% were "not indicated". There were additional assumptions too (necessary for any economic analysis) that are detailed in his presentation (see Dr. Devadasan's presentation in ***Annex 4***).

The biggest take home message was that if one does not include the cost of mortality[11] into the calculations, the cost of 100,000 deliveries shot up from 187 crores if CSR was at an optimal 15%, to 250 crores when it rose to 35%, and to 367 crores if the rate was at 55% (***Figure 16***), a rate which is a reality in some districts and states in India. Extrapolating this to the state of Telangana alone, it means that given the current CSR of about 55%, the state is spending about 642 crore rupees extra compared to what it would have spent if the CSR was at its optimal level of 15%. This additional amount being spent on C-sections alone is about 14% of Telangana's health budget. However, given the different sources of information and the presumptions, assumptions and estimates used for this calculation, these figures need more careful analysis and interpretation, Dr. Devadasan said.

Figure 16:
Economic Analysis: Cost to the Country at Different Rates of C-section

(Dr. Devadasan's presentation)

Cost without mortality caculations

Cost in Crores	15% CSR	25% CSR	35% CSR	45% CSR	55% CSR
Cost of procedure	44	48	52	57	61
Loss of Productivity	82	103	105	146	168
Cost of extra admissions	1	14	27	40	53
OOP expenses	50	58	66	74	82
TOTAL	187	223	250	317	364
% increase	0	19%	34%	70%	95%

[11] The mortality rates seemed to decrease with increasing C-sections, perhaps because the first 15% were for definite indications, which means that given the complications, the woman was already at higher risk for death. This was not the case in unindicated C-sections, because the woman and the baby were both healthy in that case.

Due to lack of readily available population level data on stillbirth rates and morbidity outcomes, the WHO could not study the association between CSR and these indicators. There is a lot that still needs to be researched. Again, as given in the 2015 statement:

"The effects of caesarean section rates on other outcomes, such as maternal and perinatal morbidity, paediatric outcomes, and psychological and social well-being are still unclear. More research is needed to understand the health effects of caesarean section on immediate and future outcomes."

Section 4

What are the Possible Solutions?

This section on possible solutions is divided into two parts. The first looks at "Evidence and Research" and is further subdivided into sub-areas looking at how this topic is the need of the hour, ways to standardize C-section classification, the creation of evidence based guidelines, as well as some thoughts for devising a research agenda; it closes with a call for financial support. The second part of the section looks at "Possible Interventions" that were discussed at the consultation and is broken down by 4 stakeholder categories - Health Providers, Facilities/Systems, Policy Makers/Government and Patients & Community.

PART 1: Evidence and Research

The Need of the Hour

The 2015 WHO statement recommends that caesareans be conducted only when medically necessary and as per the recommendations of evidence-based medicine. The cornerstone of 'evidence-based medicine' is 'evidence' and the main way to attain evidence that can guide medical practice is through new research and inquiry, along with systematic analysis of existing research and data.

The need for more validated evidence and research was a major theme that arose from the conference and was seen as the necessary first step to create targeted interventions, as well as to determine which interventions work best and could be brought to scale. This need for more evidence and research was a driving idea behind Dr. Kranti Vora's session at the consultation. Dr. Vora is an Obstetrician-Gynaecologist, with a PhD in Maternal and Child Health. She is currently an Associate Professor at the Indian Institute of Public Health (IIPH), Ahmedabad. During her session on potential interventions to optimize caesarean rates, she explained that one of the most important learnings to gather from other countries, and their successful intervention efforts towards optimization of CSR, was the process used to develop, implement and monitor interventions. One of Dr. Vora's main take home messages was that the need of the hour is standardized research and enhancing the evidence based practice of medicine.

Dr. Vora started her lecture by saying how groups like ACOG (United States) and NICE (United Kingdom), who have released guidelines on indications for caesarean sections, had first studied the causes for rising caesarean rates in great detail, to understand the drivers of the phenomenon in their countries,

before changing their guidelines. Most of the changes made to the guidelines in these countries are also part of re-certification exams that are required to be taken by all specialist physicians (every 5-7 years), to ensure practioners are aware of what the latest evidence based guidelines recommend, which further ensures the incorporation of standard of care guidelines into practice. Currently, there is no official re-certification exam for specialist doctors in India, nor any guidelines on indications for caesareans. The development of guidelines has been recommended as an intervention towards ensuring quality of obstetric care.

In addition to incorporating a process for understanding drivers and devising guidelines, Dr. Vora stressed the need to have systems in place for continuous monitoring and analysis of any implemented interventions, and noted that solutions are not as simple as releasing protocols or coming up with an intervention. There needs to be greater understanding of what, exactly, is the extent of influence of different drivers on CSR and whether the interventions chosen are effective in curbing unnecessary use of caesarean, as well as the larger outcomes of improved morbidity and mortality.

Standardizing Measurement: Adoption of Robson's Classification

One of the limitations raised during the consultation was the relative lack of comparable data available on caesareans, both internationally as well as within the country. Even in the two Cochrane Reviews that looked at ways to reduce unnecessary caesareans, from 2007 and 2011, Dr. Vora shared that the results were mostly inconclusive or not indicative of major impact. This was largely due to a lack of robust randomized control research (given the inherent ethical issues tied to randomizing patients to a 'planned caesarean' arm without any medical indication), as well as the heterogeneity in results that made it difficult to execute meta-analysis with studies that have been conducted.

As such, one of the main recommendations of the WHO 2015 Statement, in addition to the need to perform caesareans only when medically necessary, is the request for all facilities to adopt a universal classification called 'Robson's classification system' (***Annex 1***), so that data can be more easily compared, monitored and analysed across facilities.

> **"WHO proposes the Robson classification system as a global standard for assessing, monitoring and comparing caesarean section rates within healthcare facilities over time and between facilities."**

Robson's classification helps categorize women who come in for delivery into one of 10 mutually exclusive categories, which, as a set, are also totally comprehensive. The categories are based on different parameters including parity, onset of labour, gestational age, foetal presentation and number of foetuses. This classification system helps in comparing C-section rates across different categories, but also across facilities, whose rates are otherwise not

comparable due to variable obstetric case mix. The WHO is presently in the process of developing guidelines on the use, implementation and interpretation of the Robson's classification system, but in the meantime, it recommends that all health care facilities that provide delivery care, use this classification system for every woman admitted to give birth. Facilities may add more parameters for comparison purposes, such as morbidity and mortality outcomes or caesarean indications, if they wish. The WHO also urges that facilities make this data publicly available, presumably for further analysis.

During the consultation, Dr. Nuzhat Aziz, who leads the Obstetrics and Gynaecology Department at Fernandez Hospital in Hyderabad, discussed how their hospital monitors obstetric outcomes. Amongst other metrics, Fernandez Hospital categorizes all of their deliveries into Robson's categories and monitors trends for how their rates of caesareans and indications vary between different Robson's groups, to determine which groups seem to be going higher than desired and if steps need to be taken to address any worrying trends. In addition to their standing hospital dashboard, Fernandez Hospital has developed an easy to use tool that facilities can use to automatically categorize deliveries into Robson's groups and track trends over time. There is more information on Fernandez's monitoring dashboard, discussed in Dr. Aziz's lecture, in the "Facility" level intervention section below. Details of their Robson's Classification trends are included in the Fernandez Hospital presentation in ***Annex 4***.

An Expert Group for Evidence-based Guideline Development

Setting standards and definitions for caesarean indications, based on in-country evidence or the best available evidence, was brought up as one of the first tasks that needs to be accomplished. It was suggested that a group, comprised primarily of Ob-Gyns, along with other experts and researchers, should be set up to review existing international guidelines, as well as reputable research and data available from Indian and South Asian literature, to devise a preliminary set of caesarean indication guidelines for India. In addition to the preliminary guidelines, a list of additional research questions that need to be answered in order to better customize practice guidelines to the Indian context, should also be devised.

Topics related to clinical care and indications, along with their accompanying discussion points from the consultation, are described below. If a guideline is to be devised, the section below highlights some of the items that may be considered as topics for inclusion, after thorough literature review, analysis and final consensus.

Clinical Care Issues for Further Investigation/Research and Guideline Development

Re-visiting Indications for Caesareans: ACOG and NICE have, in their recent guidelines on indications for C-section, shared detailed descriptions and definitions on common indications. This guidance was developed after

working groups in both professional organizations conducted reviews of literature, as well as their own research, to better understand rising caesarean rates. Many of these changes mark a shift from earlier teaching, due to re-calibrated definitions on the triggers for surgery. Some of the changes and corresponding discussions during the consultations included the following:

a) **Labour dystocia/Non (slow) progress of labour:** Recent data shows that contemporary labour progresses at a rate substantially slower than what was historically taught. A prolonged latent phase of labour is not an indication for C-section. It has been suggested that a 4-hour partogram be used to track the progress of labour.

b) **Admitting only in active labour:** The ACOG guidelines propose that active labour be defined at 6 cm cervical dilatation, instead of 4 cms, as it is defined now. This is because the slope of labour progress becomes steeper only after 6 cms. ACOG's decision came from women's experiences of labour, which revealed admission closer to labour had a positive impact on their morale due to shorter stay. However, experts at the consultation felt that the definition should be contextualized to the Indian setting, given the longer distance and relative lack of geographic accessibility to a health facility. As such, some participants felt earlier admission, as per the previous 4 cm cut-off, might make more sense, so as to ensure that the delivery does not happen en-route to the facility.

c) **Foetal distress:** Foetal distress, as indicated by interpretations of foetal heart rate, was discussed. Dr. Vora mentioned in her lecture that evidence showed foetal heart monitoring with intermittent auscultation is found to be associated with decreased C-section rates. A Cochrane review on continuous fetal heart monitoring with CTG showed that it leads to less neonatal seizures, but increased caesareans. Private facilitates that used CTG reported having undergone a training for this and both Dr. Aziz and Dr. Anita Sabherwal (an Obstetrician and Gynaecologist from Sitaram Bhartia Institute (SBI)) discussed how there are periodic audits and reviews of tracings against decisions taken, to see if any re-calibrations of the diagnostic criteria are necessary.

   It is proposed that in cases of suspected foetal acidosis, foetal blood sampling should be offered, if available. In many cases of foetal hypoxia, use of AVD is a rational and effective option to hasten delivery without resorting to C-section.

d) **Need for labour induction:** NICE proposes waiting until completion of 41 weeks before initiating the process of induction of labour. This will not only reduce the likelihood of C-section, but also perinatal mortality.

   However, there were some Ob-Gyn experts at the workshop who shared, based on their personal experiences, that women in India seem to have

placental maturation earlier than 41 weeks. There was mention of a European journal article that discussed how placentas of South Asian women seem to "age" faster than women from other races. This contrasted against other Obstetricians in the audience, who felt otherwise. One of them mentioned that their hospital waits until the recommended 41 weeks, as dictated by general international evidence. They said that if they did pre-pone to 40 weeks, their CS rates would likely raise even higher. Review of what existing literature states, along with research that is specific to the Indian context, is required to understand these differences between populations and make definitive conclusions.

There was also discussion around the need to reduce unnecessary induction, given its potentially harmful effects when not indicated (as seen in the description of Dr. Singh's presentation on the role of Oxytocin in maternal and perinatal health).

e) **Breech presentation:** Participants discussed how external cephalic version should be attempted for breech presentation. They also discussed that this was a 'dying art' and attempts should be made to impart this skill to Ob-Gyn students.

f) **Twins:** Participants discussed how a trial of labour should be given if the first twin is in cephalic presentation.

Additional Obstetric Practice Related Topics Discussed:

g) **Emergency vs. Elective C-sections:** Dr. Bhatla brought up that there are no official, clear cut definitions for emergency vs. elective caesareans that are being used in the country. The general opinion is that if a delivery is planned ahead of time to be a caesarean and it does not have a valid medical reason for being planned as such, it is elective. These definitions can be clarified in any potential guideline, so that documentation requirements can be made clearer.

h) **Infertility:** Pregnancies following long periods of infertility and treatments for the same, are on the rise. In India, generally, babies born after fertility treatment (sometimes referred to as "precious babies") are delivered through C-section. Dr. Bhatla mentioned a case of an acquaintance who delivered abroad. This person was 42 years old at the time of delivery and had had an almost fatal anaphylactic reaction during the pregnancy. Despite this, the Obstetrician on the case waited until the patient went into spontaneous labour at 41 weeks to deliver her through the vaginal route. It was discussed how practices like this may be reconsidered for use in India.

i) **TOLAC/VBAC:** Dr. Bhatla talked about how Obstetricians at AIIMS conduct a trial of vaginal birth after caesarean. Patients and their families are counselled on TOLAC (trial of labour after caesarean) and VBAC (vaginal birth after caesarean) during antenatal visits and delivery planning is done

around the same. However, being an apex referral institute, they have the needed back-up to take care of any emergency, including the need for C-section, should it arise in the process. Determining the infrastructure, equipment and training needed for other facilities to perform more TOLAC/ VBAC procedures should be a part of new technical guidelines.

j) **Partograph/e-Partograph:** One of the working groups at the consultation requested that instructions for the use of partograph be part of any guidelines that are released. During Dr. Poonam Shivkumar's lecture, use of an e-partograph was mentioned as a useful tool that can make keeping a partograph easier, because the health care provider needs to only enter information on cervical dilatation and the digital application tool draws the graph automatically, in addition to warning the provider if the alert line/action line is crossed. E-partographs also help ensure real-time data capture.

Devising a Research Agenda

While there are countless research questions that can be addressed in trying to devise a research agenda, this section summarizes some of the items brought-up over the course of discussions at the consultation. Ideally, quantitative data should be attained through randomized control trials (RCTs) when possible, as this is the best way to attain the most unbiased data. However, it was recognised that RCTs may not always be feasible, as randomizing to a "planned, non-indicated C-section" trial arm would not be ethically sound. In these cases, using other research methodologies should be explored. The ultimate goal is to increase the scientific exploration and examination of practice, in order to better determine what standards of care should be.

Existing Data

One way to start examining trends is to look at data that already exists. The group looking at evidence and research discussed the need to study the scope of using existing data after assessing the completeness and validity of what is available.

Drivers and Gap Analysis

There are many potential drivers in the rising caesarean section rate. Drivers can be specific circumstances of the system, provider knowledge or attitudes, type of facility, changing epidemiology, community perspectives or anything beyond or in-between. Below are just a few of the potential drivers that were mentioned for further exploration to determine how much each influences rates in public and private facilities.

Possible drivers for the unusually high rising caesarean rate in India include the following (many of these have been discussed in detail in the **'Possible Interventions'** section of this document):

- **Health Facility/System**
  - Insufficient HR: Does the lack of staff in some areas, especially in peripheral public facilities, make practioners feel that it is better to schedule an elective C-section than to have a normal vaginal delivery (NVD) that is not attended by a trained health professional? Does scheduling a C-section for patients attending facilities with insufficient staff lead to better morbidity and mortality outcomes?
  - Equipment and infrastructure deficiencies: When basic items for medical management are not available at the facility, are referrals increased to higher levels? Are these referral based delays adding to higher levels of caesarean?
  - Lack of access to CEmONC on an "as-needed" basis: Is the lack of enough and evenly distributed CEmONC facilities contributing to an increased caesarean rate?
  - Financial benefits: Are health facilities receiving increased profits by conducting more caesareans?
  - Does scheduling a C-section for patients attending facilities with insufficient staff lead to better morbidity and mortality outcomes?

- **Provider Side**
  - Fear: Is fear of legal or patient/family repercussions, if something goes wrong during a normal delivery, contributing to increased rates?
  - Low awareness: Is low awareness among providers on the adverse impact of unnecessary C-sections contributing to increasing rates?
  - Convenience: Does scheduling convenience contribute to increasing CSR?
  - Patient demand/pressure: Are patient requests for caesarean contributing to the CSR?
  - Contributing medical interventions (example: unindicated induction of labour leading to foetal distress): Are certain (incorrect) practices contributing to increasing caesareans rates?
  - Financial benefits and medical education debt: Are personal/professional financial constraints (high debts from capitation fees and loans incurred), or general financial benefits, contributing to increasing rates?

- **Patient Side**
  - Cultural expectations including caesarean delivery on maternal request (CDMR): Are patients requesting caesareans at higher rates than before? If so, what are the reasons or triggers? For example, are patients requesting caesareans to correspond with auspicious dates? How do current social norms impact choice of delivery mode? What are the links between delivery mode and the concepts of womanhood and motherhood?
  - Fear of pain and discomfort: Are patients requesting CS to avoid pain/discomfort?
  - Perception of safety/benefit: Are patients requesting C-section because they think that it is safer? What are the perceived pros and cons of a normal delivery versus a C-section? Are there any identifiable factors that can facilitate a preference for normal delivery versus C-section?

Qualitative Research

More qualitative research on patient and provider experiences, decision-making factors, as well as client-provider relationships and interactions, can help unwrap additional dimensions of these issues. Although it had a small, purposive sample and was not conducted to saturation, Ms. Kurian's qualitative data on individual patient experiences helped expose a very different perspective than what is generally held by many practitioners. Dimensions of provider and patient feelings and thinking around caesareans should be explored further by utilizing qualitative and mixed-methods research.

As a special subset of community-opinions on C-sections, there is a need to define and analyse CDMR. From the discussions at the workshop, various factors appeared to be at play if and when a woman decides to ask for a C-section. One needs to define CDMR – for example, do we only count those requests that come in the ante-natal period (before onset of labour) and in the absence of any medical indications, or do we also count those that arise when the woman is in labour, but is perhaps unable to bear the pain? As mentioned in **Section 2**, the qualitative factors linked to CDMR need more in-depth research. How is counselling about the birthing process linked to CDMR? Is the provider's choice being translated as maternal request? Is the lack of support during labour contributing to increasing requests, etc.?

Changing Epidemiology of Pregnancy Related Conditions

Given the perception that "newer" indications for C-sections are now emerging (as can be seen by looking at some of the issues presented in Perception 2), there is also a need to study the changing epidemiology of pregnancy related conditions. This could include the following questions:

- What is the prevalence of conditions like gestational diabetes and hypertension during pregnancy?
- Are these conditions impacting the ability of women to deliver normally?
- What proportion of C-sections are, directly or indirectly, because of these conditions?
- What is the rate of C-section in women conceiving after infertility treatment?
- What is the complication rate for such cases (conception after infertility) if they undergo a vaginal delivery versus if they undergo a C-section?

Clinical Outcomes/Morbidity Mortality

More research on mortality and morbidity, especially the latter as it relates to caesareans, is needed. For groups that do start using Robson's classification and tracking outcomes, looking at how both mother and newborn fare immediately after birth, as well as in the weeks, months and years after the procedure, is important. The analysis could be disaggregated by indications

for the caesarean, and also by whether the procedure was elective or emergency. Emergency caesareans for medically indicated reasons are often associated with high-risk mothers (i.e. the patient has high risk health issues that require special attention and management, for example women with preeclampsia that are at higher risk for an eclamptic seizure during delivery) and are thus, more prone to morbidity and mortality issues than would be present from just the caesarean alone. As such, being able to tease out the effects of the indication for caesarean, from the effects of the caesarean itself, would be needed.

As mentioned in the WHO statement, there were also discussions at the consultation on the need to measure C-section outcomes beyond mortality including:

- maternal physical morbidity
- infant morbidity
- psychosocial and mental health of the mothers
- impact on mother-child bonding
- impact on breastfeeding rates

Economic Impact of Rising CSR

While Dr. Devadasan had shared the preliminary results of a basic analysis on the possible economic impact of rising C-sections, he admitted that there were gaps in the information available and the analysis procedure. Thus, a more in-depth analysis, that also takes into account outcomes beyond the health arena, such as loss of productivity and/or consumption capacity due to death or illness, needs to be done. This could serve as a very powerful advocacy tool to policy makers by demonstrating the financial ramifications of unnecessary C-sections.

Intervention Research

The working group also discussed how the interventions that are implemented need to be done with an evaluation framework in mind to better determine, not only the efficacy of the interventions in terms of optimizing C-sections, but also their potential scalability. Whether the intervention is about developing and testing behaviour change communication (BCC) or quality improvement, the need to document outcomes and conduct research was stressed.

A Final Call: More Robust Funding of Research

The working group looking at "Evidence and Research" also requested more robust funding mechanisms to fund large scale research. While small sums can be requested through the state program implementation plans (PIPs), large scale funding that tends to nurture long term, wide scale research, is needed.

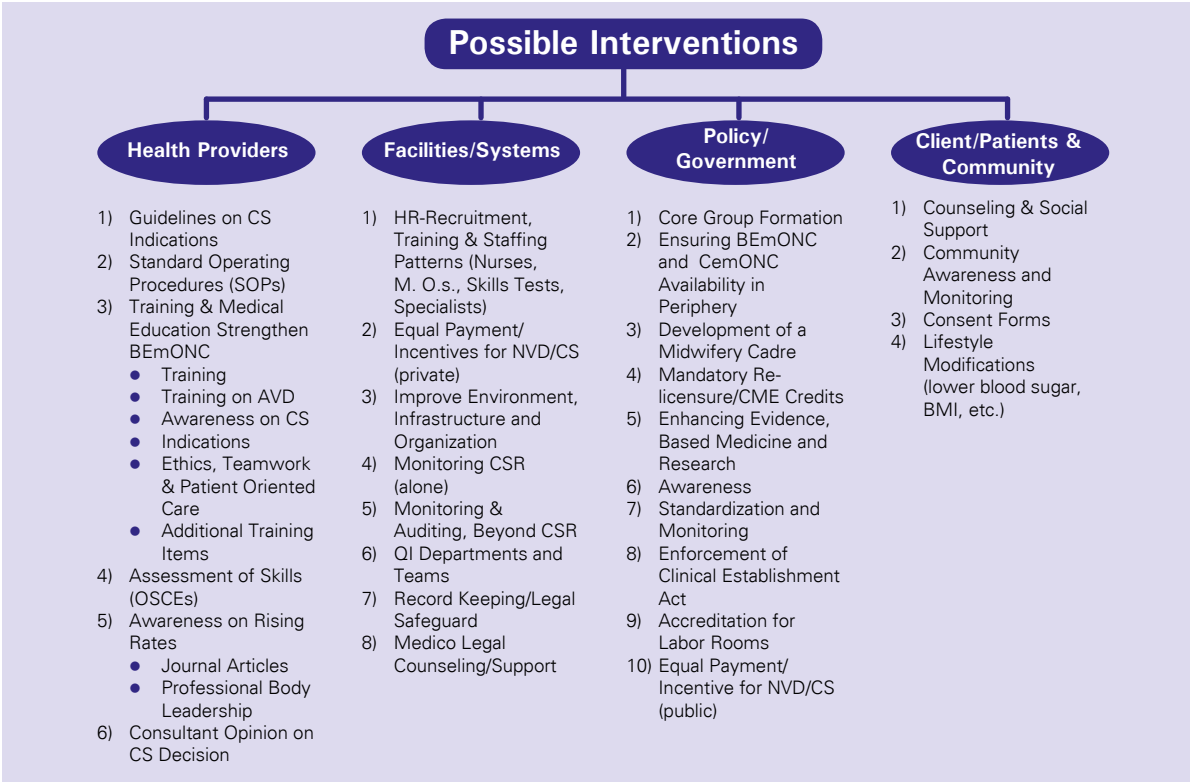
PART 2: Possible Interventions

Dr. Vora explained how the Cochrane reviews[12,13] that looked at how to reduce unnecessary caesareans were, by and large, inconclusive, primarily because of high variability in interventions being implemented, outcomes being measured and data collection methodologies. Nonetheless, there are some individual interventions that have been tried and show promise. The section below is a compilation of the interventions that were discussed during and after the consultation.

Intervention Summary

Figure 17 breaks down the major interventions discussed and is organized by the major stakeholder group (Health Providers, Facility/Systems, Policy Makers/Government and Client/Patients & Community) that the intervention would either most strongly apply to or that would need to take the lead in implementation. Ultimately, to see change happen, all stakeholder groups will need to work together across several of these interventions.

Figure 17:
Summary of Interventions Discussed at Caesarean Consultation



Below is a more detailed description of the options included in the figure above.

[12] Khunpradit S, Tavender E, Lumbiganon P, Laopaiboon M, Wasiak J, Gruen RL. Non-clinical interventions for reducing unnecessary caesarean section. Cochrane Database of Systematic Reviews 2011, Issue 6. Art. No.: CD005528.
[13] Brown HC et al. Package of care for active management in labour for reducing caesarean section rates in low-risk women. Cochrane Reviews 2008, Issue 4. Article No. CD004907.

A. **Health Providers**

1. Guidelines on CS Indications:

As discussed in detail above, it was suggested that an expert group of Ob-Gyns, along with public health professionals and researchers, should be convened to help establish guidelines for indications on Caesarean. The experts of this group can come from both public and private institutions, but should be composed of people who are experts in Obstetric practice and can help evaluate existing literature and develop and implement new research to determine how best to move forward.

2. Standard Operating Procedures (SOPs) for the Labour Room:

Appropriate labour room protocols that conform to evidence based norms and reduce unneeded medical interventions are a starting point to reduce the need for C-sections.

The Ministry of Health, Government of India, has released draft Guidelines for the Standardization of Labour Rooms, as well as Guidelines for Obstetric HDUs and ICUs directly to state Maternal Health Departments. The National Health Systems Resource Centre, an apex technical group set up under the National Rural Health Mission, also has a draft set of Hospital Management SOPs that includes clinical care activities of the labour room; states are free to adapt the same to their situation.

While neither of the aforementioned guidelines are focused on the issue of rising C-sections and are generally more administrative in nature, they provide a starting point for discussions and can be adapted further. Dr. Bhatia and Dr. Aziz also mentioned the availability of labour room protocols with their home institutions (AIIMS and Fernandez Hospital, respectively). Dr. Aziz described how the protocols developed by Fernandez Hospital covers both administrative and clinical items, with the major focus on steps for clinical care. This includes sections on management of normal labour, induction of labour, management of complications like PPROM, caesarean section, VBAC, etc. to help guide processes and decision making; the same is also incorporated into hospital record keeping. The Fernandez guidelines also include preformas of all case and register sheets, as well as condensed flow-charts depicting the management of common obstetric complications.

As for the effectiveness of SOPs, Dr. Vora mentioned how implementing standardized protocols had shown moderate impact in CSR reduction in Pakistan; evidence for stronger impact from SOPs existed in developed countries. This difference in effect could be due to differences in country contexts, study designs and/or the ways guidelines are incorporated into on-going practice and licensing structures in different countries. Regardless, once guidelines are developed, ways to ensure uptake and incorporation in medical teaching and existing practice, as well as devising mechanism to monitor impact, will be required.

3. Training & Medical Education:

***Strengthen BEmONC Training*:** The need to strengthen BEmONC training, especially among practitioners in peripheral public health facilities, was discussed. It is estimated that 80% of deliveries can be conducted through normal vaginal delivery and do not require higher level referral. It was mentioned that better quality trainers, who thoroughly understand the material and can demonstrate techniques and convey technical content in compelling ways, are required. It was also discussed how the training itself could be more focused on competency development, as a great deal of information is packed into the 10 day BEmONC training and opportunities to practice skill and ensure understanding are not always present. Hands-on practice for ensuring skills transfer was emphasised. It was also mentioned that some skills like AVD require extreme skill and cannot be effectively covered as a small part of the 10 day BEmONC training.

Training on Assisted Vaginal Deliveries (AVD): Discussions during the workshop revealed that most Ob-Gyn specialists felt AVD is a dying art. This was corroborated through data shared by Dr. Sanjeev Upadhyaya from the Resource Needs Assessment of Telangana state, which showed zero to negligibly low rates of AVDs (0.05%-0.06%) in FRUs, such as CHCs and Area Hospitals, and which also coincided with high rates of C-sections. As a corollary, in tertiary care facilities, such as medical colleges, AVD rates were comparatively much higher (2.13%-4.84%). For reference, the use of AVD, as reported by the Royal College of Obstetricians ranges from 10-13% in the U.K.[14]

Due to its relatively low use, even in teaching hospitals, most PG trainees do not get the opportunity to see forceps or vacuum procedures in action, let alone conduct them during their training course. This means they do not have the needed skills or competence to perform these procedures, should the need arise during the course of their practice. Dr. Sabherwal, who trained at a premier public institution in Delhi, said that it was only after being trained through a program at SBI, implemented as one of many initiatives to help reduce caesarean rates at their facility, that she was shown how to conduct and teach AVDs.

Given this scenario, it would be important for Ob-Gyns at teaching hospitals to think about their own practice and improve the AVD rates in their institutes to help impart these skills to students. If the patient load and the actual numbers of such procedures is too low to ensure hands-on training, additional strategies for passing along these skills to students can be developed, such as teaching-learning through videos, practicing on mannequins etc.

Awareness on Indications for C-section: As correctly pointed out by Dr. Reddy, it needs to be re-emphasized to Obstetricians that most births will proceed uneventfully without any major medical interventions being

[14] Royal College of Obstetricians and Gynaecologists. Greentop Guidelines No. 26 –Operative Vaginal Delivery. January 2011. https://www.rcog.org.uk/globalassets/documents/guidelines/gtg26.pdf

required. Therefore, interference should be kept to a minimum. Also, many adverse outcomes can neither be anticipated nor prevented by resorting to a C-section. The indications for C-section and their definitions need to be taught and understood in detail so that the decision-making on when to resort to C-section is in line with evidence based practice.

Ethics, Teamwork and Patient Oriented Care: There were discussions throughout the two days on the need to have a cultural shift in the way medicine tends to be practiced in many facilitates. During her lecture on interventions, Dr. Vora discussed how there needs to be a cultural shift from the hierarchical structures and dynamics that tend to be pervasive in many health facilities. She discussed how heartening it was to visit Fernandez Hospital and experience the collaborative environment across cadres of health professionals (physicians, nurses, midwives, etc.) and the subsequent confidence, initiative and leadership seen with the Fernandez midwives; she called it a nice example of "enlightened leadership". Dr. Vora went on to discuss how medical units can take cues from the way airline crew members are trained for emergencies. In this model, every unit should function as a team; no matter what someone's 'role' or 'position' on the team is, they should feel comfortable sharing and providing feedback if they feel another team member could improve on what they are doing, even if this feedback is regarding the actions of the highest 'ranking' member of that team. Medical teams should be a place where a nurse can provide feedback to an Obstetrician if s/he feels something could be done better, and where that feedback is accepted, because it comes from a fellow team-member. These skills could be taught as part of a specially designed training curriculum on soft skills, teamwork and ethical care practices for health providers and hospital administrators. This training could then be included in graduate, post-graduate and in-service training, and these concepts could even be considered for incorporation into hospital accreditation procedures.

Additional Training Items: It was also discussed that training on external cephalic version (in an effort to prevent certain malpresentations from becoming 'default' caesarean deliveries), delivering twins vaginally when the first twin is a cephalic presentation, and additional guidance on management of high risk cases, be added to the list of skills that require strengthening to reduce caesarean rates.

4. Assessment of Skills:

OSCEs (Objective Structured Clinical Exams): OSCEs are used to test the clinical competency of practitioners by having the examinee perform a 'hands-on' demonstration of skills, which is assessed against a checklist. OSCE exams are traditionally comprised of different skill stations, each of which contain a simulated patient scenario. The person being assessed is evaluated based on his/her performance of key steps in the simulated management of that patient, against a pre-determined checklist. OSCEs are used in many different health professional training institutions, licensing exams and health systems, worldwide.

5. Awareness on Rising Rates of Caesarean:

Journal Articles/Opinion Pieces: More awareness needs to be created among practitioners, policy makers and the community at large around this issue. One way to do this is by practitioners and subject specialists writing opinion-editorial pieces or letters to the editors of major journals and newspapers.

Professional Body Leadership: In many of the countries that have addressed this issue of rising CSR, leadership in conducting rigorous research, evaluating results and setting policy, has come from national professional physician bodies. If one visits the ACOG or RCOG websites, one can find research, consensus statements, and guidelines on indications for caesareans, created by each of these groups. It also helps the public know that providing the best clinical care is always the specialty group's top priority.

6. Consultant Opinion on CS Decision:

Involving another consultant (i.e. a senior Obstetrician) in the decision-making for whether or not to conduct a C-section has been shown to reduce C-section rates. In addition to having some evidence in literature, this practice was also a lesson learnt in some of the teaching hospitals represented at the consultation. Dr. Shivkumar discussed how their teaching hospital necessitated that a consultant Ob-Gyn sign off on case-sheets before a caesarean was performed by a resident, as internal audit had revealed that almost half the decisions for C-section were made by PG students, who often cover emergency night duty cases on their own. This practice resulted in a significant decline in C-section rates, especially at night and during other emergency hours. Having second opinions, even for fully certified Obstetricians, has also been shown to potentially reduce caesarean rates.

It was suggested that, in Teaching Hospitals, the Assistant Professor on the floor and, in Non-Teaching Hospitals, the Specialist/Senior Consultant on the floor could potentially provide this second opinion, if this idea is to be tested for efficacy. The development of a helpline or mobile app, with an expert group of consultants or retired teachers to give second opinions on the need to conduct a caesarean section, was also discussed as an option to explore further.

B. Facility/System Interventions

1. Human Resources -Recruitment, Training and Staffing Patterns:

Nurses: Recruitment, Training and Non-Rotation: Given the shortage of doctors and Ob-Gyn specialists, especially in peripheral areas and public facilities, the need to have a greater focus on the recruitment and training of nurses was discussed. In addition to strengthening the training of nurses who are recruited in the public system and ensuring the transfer of clinical skills through OSCEs, the need to ensure nursing staff of the labour room, remain in the labour room and are not rotated to other departments (in accordance

with the policy specified in the Maternal and Newborn Health (MNH) Toolkit[15]) was discussed. More items on nursing and the development of a Midwifery cadre is included in the "Policy" level interventions section.

Medical Officers (MBBS and AYUSH): Given the shortage of Ob-Gyn specialists, and the strain on those specialists that come into the government health system, it was suggested that Ob-Gyn doctors be supported through the recruitment of either MBBS doctors (after training in BEmONC) who have a desire to do a post-graduation in Obstetrics and Gynaecology, or AYUSH doctors (after training in the Skilled Birth Attendant course) who have a strong interest in the topic.

***Skills Tests for Recruitment*:** One suggestion raised to ensure a baseline level of competency for all new health practitioner staff, was having a skills test before recruitment. This could be a written test, practical test or combination of both, that would test basic ability to manage clinical situations and complications.

***Specialists*:** The request for more specialist recruitment in high need areas was raised. The government officials present at the consultation shared that this continues to be a challenge, despite increased incentives to help attract this cadre of staff. Still, attempts to see what the bottlenecks are – such as lack of housing, meagre salary, poor schooling facilities for children, etc. – could be evaluated more thoroughly to address these, or any other potentially surmountable, barriers.

2. Equal Payment/Incentives for NVD/CS (Private Facilities):

While this is also discussed in the "Policy" section, it is mentioned here for consideration by private facilities to reimburse staff the same amount for conducting normal deliveries and caesarean sections, so that potential monetary drivers of increased rates can be minimized.

3. Improve Environment, Infrastructure and Organization of Facilities:

Dr. Arun Singh's lecture discussed the positive effects of natural oxytocin released from the mother's body during labour and delivery and how everything, from the arrangement and atmosphere of delivery rooms, to the sounds and smells experienced by a delivering woman, can influence hormone release. Measures can be taken to ensure a woman is able to deliver in a calm and peaceful environment, which aids in the reduction of stress-induced cortisol levels and increases natural oxytocin levels in her body. In addition to having a beneficial effect on maternal physiology, a pleasant environment, with all the equipment and infrastructure necessary for delivery, also ensures health providers have the tools they need to deliver quality patient care. The following items were discussed as interventions to promote improvement of environment:

[15] Maternal Health Division, Ministry of Health and Family Welfare, Government of India. Maternal and Newborn Health Toolkit. November 2013. http://nrhm.gov.in/images/pdf/programmes/maternal-health/guidelines/MNH_Toolkit_23_11_2013.pdf

***a) Privacy, both Visual and Auditory*:** Maintaining patient privacy is a requirement for all labour rooms. In the case of existing spaces, use of curtains between labour tables and restricting entry into the labour room is helpful. In newer facilities, the designs mentioned in the new 'Guidelines for Standardization of Labour Rooms at Delivery Points' from the Ministry of Health for Labour, Delivery and Recovery (LDR) Rooms may be used, which offer greater privacy. The presence of multiple providers (doctors, nurses, paramedics, students) should be avoided around the woman in labour, but there should be enough care to have constant and close monitoring of progress.

***b) Avoiding Moving Stages of Labour*:** The age-old practice of having multiple rooms in a facility for the different stages of labour is being challenged by recent evidence. The shifting adds to the pain and stress that the mother is undergoing. Thus, as mentioned above, the concept of LDR Rooms has now emerged and is already being practiced in some private facilities and is also recommended by the Ministry of Health. New facilities and those undergoing renovation should think about how this concept can be incorporated into upcoming and existing spaces.

***c) Equipment/Infrastructure*:** Ensuring availability of all essential equipment needed to handle obstetric complications is important. The equipment list that is part of the "Dakshata" resource needs assessment, available on the NHM website, is a helpful guide in this regard.[16] This list goes over the most essential equipment to handle the most common obstetric complications that affect the mother and the foetus/newborn, and also addresses some basic infrastructure issues, like privacy and patient flow. It's important that the equipment and design of the labour room is per specification in the new Guidelines for Standardization of Labour Rooms from the Ministry.

***d) Birth Companion*:** Discussed in more detail in the "Patient/Community" interventions section, a birth companion helps provide both emotional and physical support throughout the process of labour.

***d) Service Provider Attitude*:** A supportive, pleasant and encouraging attitude from service providers can go a long way in reassuring the woman and keeping her in a healthy and less stressed frame of mind, both before and during the delivery. This is in line with the point on patient-centred care training in the "Health Provider" section. Making supportive behaviour towards patients an integral part of hospital policy also helps reinforce these ideas at the systemic level.

f) Clean and Pleasant Surroundings: Cheery and clean labour rooms, with pleasant sounds and smells, help maintain a calming atmosphere, which helps in the flow of oxytocin and aides in the delivery process. Research has even

[16] Maternal Health Division, Ministry of Health and Family Welfare, GoI. Dakshata Empowering Providers for Improved MNH Care During Institutional Deliveries –Operational Guidelines. April 2015. http://nrhm.gov.in/images/pdf/programmes/maternal-health/guidelines/Dakshata-Operational_Guidelines.pdf

found positive impact from relaxing music or the sounds of natural elements, like water. While public sector facilities may not have the financial resources to make these changes, the private sector could consider testing these types of initiatives for CSR optimization and enhancing patient well-being.

g) *Nutrition and Hydration*: Ensuring that the woman is well-fed and given enough fluids to maintain her hydration levels during labour, not only ensures that she maintains her strength to go through the painful labour process, but also reduces the risk of imbalances like ketosis from the lack of food and water.

4. *Monitoring Caesarean Rates:*

This intervention would include reviews of existing data and collecting new data for future audits, analysis and peer review. Dr. Shivkumar and members of the audience also brought up the prospect of having a caesarean registry to track rates of C-section.

Dr. Vora discussed how limited impact was seen in Pakistan with monitoring CSR alone, in a setting where CSR was already high, however, this was from one short-term observational study that was *not* part of a larger Quality Improvement (QI) initiative. Making individual practitioners' CS rates publicly available also showed limited impact. Further investigation of these interventions in the Indian setting would be needed.

The process followed with CSR monitoring interventions can have a large impact on the type of outcomes seen. The validity of the data collected, the analysis conducted, feedback given to the providers and corrective actions implemented would impact the efficacy of an intervention like this. As such, it may be useful to have monitoring and auditing activities conducted in the context of a QI program that looks at quality of care holistically, and not just CSR alone, including incorporation of PDSA cycles to achieve desired changes. An example of this type of system was presented at the consultation by SBI. The same is described under the "Quality Improvement Department and Teams" head below.

5. *Monitoring and Auditing, Beyond CSR:*

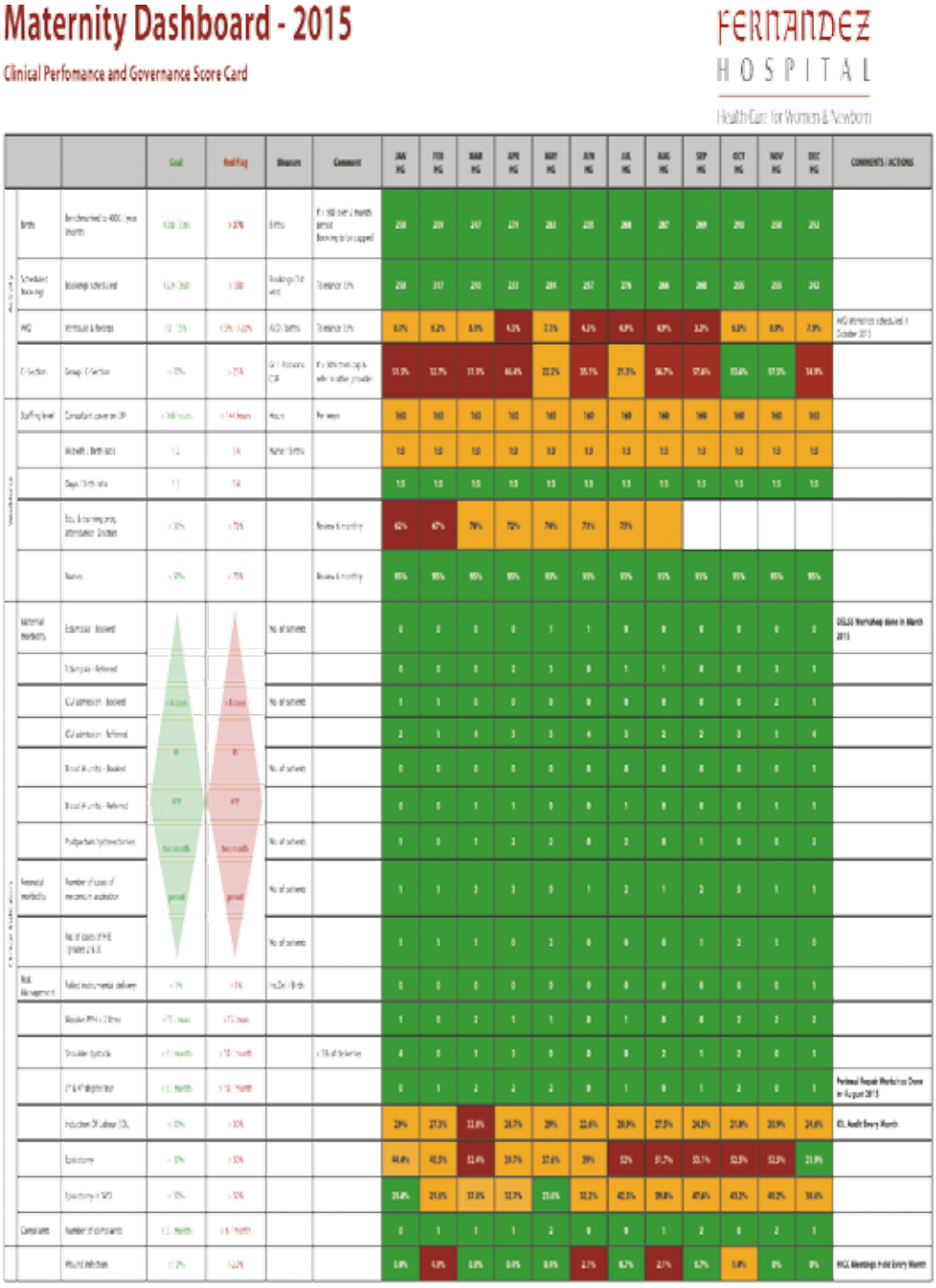
This issue was discussed early-on in the workshop by Dr. Reddy and in more depth by Dr. Aziz and Dr. Sabherwal. Given the high MMR in the country, the focus till now has been on ensuring the provision of EmONC services, including C-sections. Until recently, a rise in CSR was seen as a desirable trend, as the country had been working to ensure the provision of EmONC services and getting above the 5% CSR mark. However, in the face of exponentially rising rates of caesareans in some areas of the country, the time has come to bring focus to quality of care, adherence to recommended clinical practices and monitoring of the same.

During the consultation, SBI and Fernandez Hospital both discussed how they maintain dashboards on quality indicators for their labour rooms. These

dashboards track multiple indicators and are reviewed by clinical staff on a monthly basis. During these reviews, action plans for how best to address any indicators outside of a 'desired range' are discussed, along with the need for further investigation, if required. A portion of one of the dashboards from Fernandez Hospital that Dr. Aziz presented is shared below in ***Figure 18***.

Figure 18:
Portion of Indicator Dashboard from Fernandez Hospital

(Dr. Nuzhat's presentation)



To the right of the indicators, there is a colour coded metric to say if performance is within range or a cause for concern that needs further action.

Measuring outcomes of C-sections, in terms of complications and morbidities is an important element of monitoring quality of obstetric services. Dr. Reddy shared a hypothetical example (***Figure 19*** below) of a facility with 1000 deliveries that resulted in 93 adverse events (death or morbidity). Depending on the severity of the event, a 'weight' was assigned to it, and an aggregate value of all the 'weights' was used to assess the quality of obstetric services for that facility. The development of such indices to measure quality could be helpful to assess facilities, either through external reviews or as a self-monitoring tool.

Figure 19:
Hypothetical calculation of quality of obstetric care in a hospital with 1000 deliveries and 93 adverse events

(Dr. Reddy's presentation)

Outcome	Number	Points/ Event	Total Points for Event
Maternal death	0	750	0
Intrapartum or neonatal death>2,500g	1	400	400
Uterine rupture	2	100	200
Maternal admission to ICU	3	65	195
Birth trauma	5	60	300
Return to OR/ labor and delivery	5	40	200
Admission to NICU > 2,500g and for > 24 hours	8	35	280
APGAR < 7 at 5 minutes	12	25	300
Blood transfusion	15	20	300
30-or 40-perineal tear	70	5	350
Total deliveries with event	93		
Points			2,525
WAOS (Total points/all deliveries)			2.525/1,000 = 2.53
SI (Total points/deliveries with event)			2,525/93 = 27.15

The need to strengthen existing quality improvement mechanisms, like maternal death reviews (MDR) and maternal near miss (MNM) reviews, was mentioned during the group work as another way to monitor and evaluate gaps in care that may affects CSR. Looking at the delays in seeking care and ensuring appropriate referral as part of MDR and MNM can help elucidate where improvements can be made to ensure access.

6. Quality Improvement Departments and Teams:

In Dr. Sabherwal's presentation on the SBI experience in CSR reduction, several initiatives to reduce rates through the creation of a quality improvement (QI) program and a facility based Quality Assurance Team, were described. Through the quality improvement initiatives put in place at their facility, SBI was able to cut their CSR by nearly one half, from values of a high of 79% in 2001, down to a 20-28% range in 2015.

As shared by Dr. Sabherwal, SBI has been through two phases of activities to reduce C-section rates. The first phase was from 2002 to 2011, where the primary change was a shift from a "paid per case" consultant practice to a salaried consultant practice. During this time, there were no standardised clinical protocols, audits or patient counselling systems in place. While the hiring of full-time consultants helped to decrease CSR for a short time, the rates went back up soon after this initial dip.

In 2011-12, the initiative changed gears. New clinical leadership was brought on board and, with close collaboration and support from the Institute for Healthcare Improvement (IHI), a set of systemic and holistic interventions were undertaken. With the help of IHI, their facility created a Quality Assurance (QA) Department and hired a Quality Assurance lead to analyse data. These analyses were reviewed at weekly/monthly staff meetings. These meetings gave doctors and nurses feedback on how they were performing, to help improve both clinical and non-clinical processes. The commitment and engagement of the institutional leadership and clinician teams were crucial to initiate the most rigorous changes.

The systemic interventions they implemented included:

Administrative

- Hiring full time salaried consultant specialists
- Creating 'Labour Room Protocols' (similar to the protocols created by Fernandez and described more under the "Provider" section) to help standardize clinical practice
- Nursing roster change to ensure continuous labour support; they hand-picked those nurses who were passionate about delivery care and seemed truly interested to stay in the labour room to support mothers.

Monitoring

- Defining and measuring Key Performance Indicators (KPIs) for the labour room
- Documentation and Data surveillance –They created a dashboard of 25 additional indicators to monitor over time. While most data were entered by data entry operators, indicators that were more clinical in nature and potentially difficult to understand by a non-clinical person (like indications for C-section, induction info, etc.), the clinicians enter the data themselves.
- The QA department regularly compile and analyse the data for the facility as a whole and also disaggregate data by individual doctors and nurses.
- Weekly team meetings, monthly audits, with regular feedback to facility staff on all data analysed.

Trainings

- CTG – The department holds multidisciplinary CTG trainings and regular reviews of CTG tracings from women who had a caesarean for an abnormal CTG or foetal distress, to assess if interpretation was done correctly.
- Labour Room Nurses – SBI created case sheets to record each stage of labour and then trained nursing staff on use of the same. Nurses receive monthly trainings on various topics, and are retrained if any gaps arise. Additional training was given to nurses, along with other clinical staff, on communication skills.
- Birth Readiness Classes for Parents – These classes explain the benefits of normal delivery in uncomplicated cases and natural pain reduction techniques, along with routine counselling on topics like eating a balanced diet and maintaining a healthy lifestyle during pregnancy etc. Expectant mothers are encouraged to bring their partners or a companion to the classes, who are also taught everything the pregnant woman is taught.
- IHI Training – Doctors and staff who wanted to take the IHI course on quality improvement are encouraged to do so. All expenses for this training are paid for by SBI.

Clinical

- Eliminated elective deliveries, including inductions and elective C-sections before 39 completed weeks of gestation
- Admit women only in active labour
- Ensure 1:1 skilled labour support
- Standardized CTG interpretation
- Standardized definition of non-progress of labour (NPOL); use low dose oxytocin protocol, if augmentation is indicated.
- Intervene with primi-gravidas only when 2nd stage lasts for more than 3 hours

It was only after implementing the above changes along with the PDSA approach to see what worked and taking corrective actions for things that were off-course, that long term change was possible. The need for following the PDSA cycle was stressed. The list of interventions above are the most recent set of interventions tried by SBI. The facility described having implemented several interventions that were either variations of the above, or completely different, before observing that the items above are what worked for their facility. The list of interventions can vary, depending on the circumstance of individual facilities, thus interventions should be executed with the PDSA framework in mind, with staff members ready to adjust interventions, if a change in course is required.

In the end, it was through the melding of administrative and clinical interventions, combined with renewed leadership on improving quality of care, that sustained reductions in CSR were possible at SBI. Constant efforts must be involved to ensure quality is maintained over time.

The public health system now has a National Quality Assurance Program that could serve as an excellent spring board from which to incorporate concepts of process improvement and PDSA cycles into public health systems and clinical care.

Dr. Sabherwal also shared a write-up of this experience that is included in ***Annex 2***. More information on the Institute for Healthcare Improvement and its quality initiatives can be found on their website at the following address: http://www.ihi.org/Pages/default.aspx

7. Record Keeping/Legal Safeguards:

As the fear of litigation (for both performance and omission of a procedure) is an important factor that seems to be driving clinical decision-making in recent times, proper record-keeping is essential. This includes the record of consent (or refusal, as the case may be) given by the patient, as well as all the information that was shared with the woman about the procedure. The patient chart should also document the health status of the woman as well as the actions taken by the provider in detail.

In addition, ensuring standardized operation theatre (OT) records, that include the indication for any C-section performed, along with Robson's criteria and other monitoring indicators, is important. Pre-printed caesarean consent forms that includes the risks involved in C-section, with a copy that can be given to the patient, may be included in the case sheets of women especially those going for an elective/planned C-section. The group also discussed the possibility of developing a digital version of these medical records that could include alerts for missing information and other aspects, like an e-partograph.

8. Medico-legal Counselling Support:

As mentioned, one potential reason for increasing rates of caesareans is the fear some physicians have of unforeseen complications during the natural birth process that may result in legal repercussions as well difficulties in managing distraught family members. The idea for medico-legal counselling support for care providers, was mentioned as a possible service that facilities could provide to help practitioners understand the legal aspects of these situations and how to safeguard themselves from the same.

C. Policy/Government

1. Core Group Formation:

In the section titled "The Need for More Research," the suggestion for the formation of an Expert or Core Group was introduced. This group would be made primarily of Obstetricians from the public and private sector, along with researchers and public health experts. Their main purpose would be to help develop technical guidelines around indications for caesareans, as well as possible areas for research.

2. *Ensuring BEmONC and CEmONC Availability in Periphery*

Several times during the consultation discussions, the need to strengthen BEmONC related training, skills and availability of services across all designated facilities, with special focus on those in peripheral and tribal areas, was discussed. Given that roughly 80% of deliveries will have no complications, it should be ensured that existing MOs and nurses in all facilities have the necessary skills to handle normal deliveries and recognise complications early to ensure timely referral to facilities with CEmOC services, if required. This can help ensure cases are dealt with at the first point of contact to the maximum extent possible, thereby, preventing unnecessary referrals. Ensuring availability of BEmONC and CEmONC services as per guidelines in the MNH toolkit (at least 2 CEmONC centres and 18 BEmONC centres per 10,00,000 population) is important. This can help prevent delays in reaching the required level of care and reduce the potential need for performing a caesarean.

Making sure that (normal) delivery and BEmONC facilities understand indications for referral is important. Dr. Sanjiv Kumar, Executive Director, NHSRC, discussed how in Bangladesh, referrals are not done for 'caesareans', but for complications. The health system there has developed pictorial representations of common obstetric complications, along with a phone number to call should any of these complications arise. The number connects them with local drivers who are available to take the pregnant women to the nearest health facility for further management. These pictorial cards are shared with the woman and her family and are also an integral part of the training of service providers. All drivers inform the facility they are arriving ahead of time, to alert the hospital of the incoming case and ensure provider staff is on site and ready.

3. Development of a Midwifery Cadre:

Throughout the two days of consultation, there was a great deal of discussion on midwifery, given the greater optimization of CSR and reduction in maternal and perinatal mortality rates in countries that have built this cadre of staff over time. Dr. Mahapatra shared evidence showing that facilities that follow a midwife-led or a combined midwife–doctor model for delivery have higher rates of vaginal delivery and less medical interventions during labour, when compared to obstetrician led delivery care. There was no difference in maternal and perinatal outcomes between both the care models.

Dr. Iyengar, in his presentation, talked about the importance of midwifery as a way to help improve obstetric care and optimize caesarean-section rates. He added that the absence of a professional midwifery cadre in India, along with the over-dependence on doctors, may have resulted in over-medicalization of a physiological process. He also shared the results of a regression data analysis done by WHO in 2010, wherein the determinants of C-section rates were studied in 38 countries from 1980-2004. The findings suggested that, while the introduction of professional midwifery leads to

a minimal increase in CSR in the short-term, the long term impact of this intervention is positive, i.e. it leads to a reduction in CSR.

Many participants had the opportunity to visit Fernandez Hospital in Hyderabad after the first day of the consultation, to see how their midwifery program functioned. Fernandez Hospital enlisted the help of the Royal College of Midwives (UK) and a group of seasoned midwives from other countries to help develop a "bridge" curriculum, which is offered to any of their existing BSc nurses who have an interest in midwifery and are committed to completing the course. The course runs over two years and is done in conjunction with their on-going duties in the labour room. The midwives who helped develop the curriculum also come to conduct classes for the course and help format and conduct the periodic hands-on, OSCE skills evaluations. The working group discussed how a similar "bridge" training initiative for GNMs or BSc nurses could potentially be funded by NHM initially, with states taking over at a later date.

One of the working groups at the consultation looked solely at this issue of midwifery and how to create a midwifery cadre in India. The results of their detailed work is included below.

Definition of Midwifery: There is currently a great deal of confusion as to what exactly a midwife is, as there are so many cadres of staff in the country that seem to perform some of the functions of midwives or have the word 'midwife' in their name, but do not, in fact, have the appropriate level of training or official certification, as per globally accepted norms.

At the consultation, the working group that looked at midwifery adopted the internationally recognised definition of a midwife as "a person who has successfully completed a midwifery education program that is recognised in the country where it is located and is based on the International Confederation of Midwives (ICM) essential competencies for basic midwifery practice, as per the framework delineated in the ICM global standards for midwifery education."

In most countries that have midwifery, it is usually a completely separate cadre of staff that receives a different training from other nurses. A nursing degree is not a pre-requisite to become a midwife – i.e. a person can go directly into graduate training for a degree in midwifery. If one is already a nurse, a condensed bridge course can be taken to become a certified midwife as well.

Demonstration of Skills: The group said that the midwife has to demonstrate that s/he has "acquired the requisite qualifications to be legally licensed to practice midwifery and can use the title 'midwife', after demonstrating competency in practice." This demonstration of hands-on skills, along with a strong emphasis on a patient-centred approach, is a key part of midwifery training and certification. Experience from other countries has shown that the type and length of training received by midwives has an impact on maternal and perinatal morbidity and mortality. Therefore, ensuring good quality training, with hands on teaching and demonstration of skills, for the

necessary amount of time before certification, is a must, if the country plans to go ahead with developing this cadre.

Competencies: There should be a defined curriculum and set of competencies, for whatever course is being devised. The working group participants described midwifery competencies to include the requisite knowledge and skills related to obstetrics, neonatology, social sciences, public health and ethics that form the basis of high quality, culturally relevant, appropriate care for women, newborns, and childbearing families. There was also discussion on how two cadres of midwives could potentially be created –'community midwives' and 'facility midwives'- so that there is a continuum of care. Both midwife groups should have the same core competencies.

Transitional Midwifery Cadre through Bridge Course in Government System: The working group discussed how existing nurses in the system could potentially acquire midwifery skills through a bridge course. GNMs could be eligible to go through a specific course to upgrade or acquire skills in these competencies. At a later date, a decision may be taken to include bridge courses for ANMs, but the duration of the course would have to be longer, if training is opened up to this group of staff.

If the decision to create a midwifery cadre is taken, it would be important to compare the ICM framework and competencies against GNM/B.Sc. nursing curriculum to see how best to structure bridge courses for existing staff, as well has how to create a new curriculum all together, if a totally separate group is envisioned in the future.

The working group had the following suggestions for the bridge course:

- *Length:* The bridge course could potentially be for a period of one and half years, or more, depending on previous level of training.
- *Quality:* Training quality should be well maintained. For example, a cascade model of training - which is usually adopted for in-service trainings - is known to be associated with a reduction is quality along the chain. Picking strong trainers and continuing to enhance their skills is important.
- *Hands-on:* The training must include patient contact as well as hands-on skills training.
- *Training Venue:* Selected district hospitals/medical colleges could potentially serve as training sites.
- *Student-Teacher Ratio:* There should be an aim to maintain a trainee : trainer ratio of 10:1 to ensure adequate attention to each trainee.
- *Certification:* Certification of the course could be given by NHM and/or the Indian Nursing Council.

***Trainers*:** It will be of utmost importance that qualified and competent trainers are enlisted from specialized institutions for training midwives. Given there is presently no midwifery cadre in the country, enlisting the help of the ICM and seasoned midwives from other countries could be considered to help build a national group of trainers, as well as a curriculum framework.

Midwifery Core Group: If there is desire to create a midwifery cadre, a national level core group on midwifery should be constituted by the Ministry of Health, GoI, to help further clarify requirements. This group can consist of experts in the field of midwifery, nurses, NGOs and development groups, as well potential remote membership of certified midwives from abroad. This group could then resolve and finalize items that have been discussed already, as well as some of the following topics:

Pre-planning

- Assessment of the past and on-going initiatives on midwifery in different countries, states and by various organizations/hospital groups.

Training

- Selection of candidates for training.
- How to format the training schedule and methodology, so that the trainees will not have to be away from their current locations and families for long stretches of time; assess possibility of having virtual training incorporated.

Health System

- Incorporating this new cadre into the existing health system.
- Creating a promising career path, with additional professional advancement options and financial or other incentives, for this new cadre of staff.
- Incorporating continuous learning and mentorship into practice.
- Creating acceptance of midwives within the health system, especially by other 'more established' cadres.

Long-term plan

- Consider a 3-year, direct-entry course for professional midwifery
- Enhancing the functionality of the Nursing Directorate and incorporating this as a possible career progression pathway for the new midwifery cadre. Currently, existing nursing cadres do not have a fully functional Directorate nor many career progression options. A Planning Commission group had looked into some of these issues as part of a review of nursing and midwifery in the country and had recommendations that may be a starting point to structure increased career options and ways to strengthen the Nursing Directorate. A presentation of this review can be found at the link: http://planningcommission.nic.in/data/ngo/csw/csw_nurse.pdf
- Certification mechanism needs to be decided upon by involving the Indian Nursing Council.

Challenges

- Full incorporation of a completely new cadre of staff into the health system will be a major challenge and potentially resource intensive. Determining how best to phase the introduction of this cadre into the existing labour room staffing structure and the health system at large will be important.

- Acceptance in the health system and by members of the patient community may be a challenge. There is a need to start sensitizing doctors and patients on the concept of midwifery care.
    - Dr. Fernandez gave a short introduction to the midwifery program in their hospital and shared that women who deliver with the midwives at their hospital gave an over 90% approval rating of the services and providers. Thus, the challenge of acceptance by the community may not be an insurmountable one.
- Buy-in by states- States will need to accept the initiative, including an incentive package that may be required to encourage existing nurses to go through this additional training.
- Proper selection of candidates who are willing - If willing candidates are not available, then this initiative will not be successful. There is a need to think about how to make this 1.5 years of training manageable, not just for the trainee, but also for the facilities the nurses come from. No facility should depute so much staff for this training that they can no longer offer basic services.
- Getting qualified trainers and an appropriate training venue.
- Implementing the training with high quality - While it is possible to get trainers from abroad initially, the country will need a plan for mentorship to create a cadre of in-country trainers and resource persons.
- Appropriate placement of the trained midwives.
- Plan for post-training mentoring of the midwives once they begin practice.

4. *Mandatory Re-licensure/CME Credits*

Advances in science and medicine and generation of new evidence are continuous and necessitates a constant and regular change in guidelines. One of the ways revised guidelines are incorporated into clinical practice, in many other countries is by making them a part of, not only pre-service education, but also national medical licensing exams that are given in medical school, all the way through board certified licensure and beyond, with periodic (every 5 to 7 years) re-licensure for all medical specialties. However, this is not followed in India presently. Before implementing a system like this, the process for developing evidence-based guidelines and incorporating them into pre-service educational curriculum and practice would need to be fully functional. In the meantime, having compulsory CMEs/post tests on certain topics, or a certain number of CME 'credits' that need to be attained each year, may be a way to start the process of making life-long skill building a part of medical practice.

5. Enhancing Evidence Based Medicine and Research in Medical Education

With the recent evaluation and potential reconfiguration of the Medical Council of India (MCI), the country has an opportunity to look deeper into how it incorporates evidence-based medicine into teaching and licensure, as well as how it wants to encourage a culture of research and monitoring into clinical

practice. As per the 2015 draft Indian National Health Policy, "currently, 90% of the research publications from medical colleges come from just 9 medical colleges."[17] Creating more rigorous research capacity amongst medical practitioners in training, and, in turn, more research, analysis and evidence production for the public at large, would be a first step in determining how best to address the unique needs of the country's patient population. This then needs to be followed up by ensuring that this evidence-based knowledge is incorporated into pre-service curriculum, licensing programs and on-going knowledge updation of practitioners.

6. Awareness

The need to increase awareness about rising rates of C-section and create urgency among all stakeholders –including practitioners, patients, governments, private and public health facilities - was discussed. For the public health system, actions such as sending notices to health facilities with extremely high CSRs to explain the current situation could be a first step towards sensitising the system. Additional steps could include having an in-service sensitization training for all government medical doctors working in delivery care, especially providers of C-sections, on indications, and the risks and benefits of a caesarean-section. Doctors, nurses, researchers and community activists can help in spreading the word on, not only this issue, but also use rising CSR as a spring board from which to address the larger issue of quality in healthcare.

Also, given private sector CSRs are roughly double or more of public caesarean rates, highlighting the positive efforts of private facilities who have been able to reduce their CSRs and engaging these facilities in improving public facilities, would help in bringing recognition to champions in the private sector whose example can be followed and also allow for cross learning.

7. Standardization and Monitoring

Actions like adopting Robson's Criteria and standardizing case sheets, as discussed in the "Research" and "Facility" level interventions sections, respectively, are policy decisions that can be taken up at the state and/or individual facility level. Monitoring of this data by state level program officers and flagging sites with 'worrying' indicators, such as high CSR would be a first step. It would be important to then speak with the district, facility, and/or departmental health heads to understand if there are logistical or technical reasons for high rates. This can be the first step to help investigate further and create changes at the required level. For government health facilities, further quality improvement efforts could be done in conjunction with the district's quality assurance team, but the lead to make these changes sustainable would need to be taken by hospital leadership and the clinical staff.

[17] Ministry of Health and Family Welfare, Government of India. "2015 Draft National Health Policy." 2015. http://www.mohfw.nic.in/showfile.php?lid=3014

8. Enforcement of the Clinical Establishment Act

Because of relatively higher rates of CSR in private facilities compared to public facilities, the participants suggested to find ways to better enforce the clinical establishment act and incorporate ethical and quality of care parameters into the metrics that private hospitals would have to report on under this Act. The suggested list of indicators that could be requested from the private sector to better monitor C-section related trends included – the number of deliveries, disaggregated by the type of delivery (NVDs, caesareans, AVDs), birth outcomes (live birth, still birth and abortion), Robson's Criteria, indications for caesareans sections, date and timing of delivery etc.

9. Accreditation of Obstetric Units

The need to have hospitals abide by both administrative and clinical standards was discussed as another strategy to help increase quality of care. One challenge was that many of the existing accreditation standards for hospitals are largely administrative and infrastructure related. While these aspects are important, there is a need to have additional focus on ensuring adherence to evidence-based clinical protocols for patient care as part of the accreditation process.

During the consultation, there was mention of a joint FOGSI and NNF accreditation for labour rooms that is currently being developed and which looks at more clinical aspects of care.

Once a group of model hospitals are established under an effective accreditation system, other private and public hospital staff can be taken there for exposure visits to see how they can improve care practices.

10. Equal Payment/Incentive for NVD/CS

One of the potential drivers of high caesarean rates could be higher reimbursements for C-sections, when compared to payments for normal deliveries. As such, one idea was to pilot the feasibility and efficacy of changing reimbursement structures, such that staff are given a fixed amount for a delivery, irrespective of whether it was a NVD or a C-section.

During the consultation, Dr. Vora shared the results of a study she had worked on that looked at two Indian programs to increase institutional delivery rates– the Janani Sahyogini (JS) scheme in Madhya Pradesh and the Chiranjeevi Yojana(CY) scheme in Gujarat - and the differences in outcomes based on the contrasting incentive structures these two schemes utilized. The study explored whether supplier-induced demand can shape caesarean rates and the potential power of dis-incentivizing caesareans. Under the JS scheme, variable payments were given for NVDs and C-sections, with C-sections being reimbursed at a higher rate. Four years after the launch of this scheme, C-section rates among these beneficiaries went from 26% to 41%. In contrast, Gujarat's CY scheme ran on a public-private partnership (PPP) model where private providers

were paid a fixed amount for a package of 100 deliveries, irrespective of the number of C-sections performed out of these 100. This was to discourage the performance of unnecessary C-sections. Unlike the JS scheme, the CY scheme resulted in negligible changes in CSR before and after the program, although some evidence showed that among the poorest patients, CSR increased to 9% under CY.

Dr. Vora mentioned that one of the criticisms of the CY program was that the providers under the scheme were sometimes accused of not providing C-section services, potentially due to the higher cost of conducting the procedure compared to the reimbursement, and would refer complicated cases back into the public system. Dr. Vora said this was a lesson for policy makers to look at both supply and demand side aspects of the market, in order to make sure interventions are acceptable to all stakeholders.

D. Client / Patient and Community

1. Counselling & Social Support

It is important to counsel women and families during pregnancy about what to expect and how best to care for themselves throughout the course of the pregnancy and delivery. Among other things, this counselling should include information on the benefits of vaginal delivery, the need for C-section as a life-saving intervention in some complicated cases and the risks associated with C-sections, especially when they are un-indicated.

As tocophobia (fear of labour pains) was seen as a key driver for CDMR, the group said that women should be informed about non-pharmacological ways of reducing labour pains, including breathing exercises and the option to have a birth-companion of her choice in the labour room. Options for painless labour (epidural analgesia), if available, should be offered to women with strong fears.

Dr. Shivkumar discussed how her teaching hospital has a trained counsellor on staff to discuss birth preparedness and complication readiness (BPCR) with pregnant women and their relatives. These sessions include counselling to help ease fears of child birth, and Dr. Shivkumar noted that this has been helpful for their facility.

It was mentioned that although patient targeted interventions generally show little impact in the literature, perhaps because decision-making ultimately lies with the provider, moderate improvements were seen when antenatal patient counselling was combined with constant support during labour. A birth companion of the woman's choice goes a long way in providing both emotional and physical support through the birthing process. The companion can help the woman with non-pharmacological ways of pain reduction such as breathing exercises, back massages and reassurance. The companion can also ensure that the woman is kept well-fed and hydrated during labour, so

that she has the strength to push when required. Tamil Nadu is implementing a birth companion program, but its impact on C-section has not been documented. GOI has also sent out a note to all states, encouraging the presence of birth companions in labour rooms.

2. Community Awareness and Monitoring

The group also discussed the need to have more community-level awareness activities to promote NVD, as well as community-based monitoring and research. Community-based NGOs and other opinion leaders can be strong resources to help educate patients on their rights and expose problems through monitoring of services. They can also bring to focus many of the community-based issues related to quality of care, as was discussed by Dr. Iyengar's talk on C-section and its effect on health systems and the community. Dr. Sharad showed how his organization in Rajasthan has been an active partner in trying to strengthen health services and what is best for patients and communities and how these activities have helped improve awareness and services in the communities they partner with.

3. Consent Forms

Consent forms can be an effective tool in educating patients on caesareans. Dr. Reddy talked about the importance of seeking an informed consent, whenever a woman, or any person, is being operated upon. She shared the definition of "consent" for surgical procedures, as given by RCOG. A truly informed consent involves sharing all the vital information related to the procedure with the woman, including:

a. Proposed procedure
b. Indication
c. Intended benefit
d. Risks
e. Any extra procedures which may become likely
f. Alternatives, including no treatment
g. Statement of patient
h. Pre-op information
i. Anaesthesia

In case of an elective C-section, the procedure can be explained in the OPD itself. A copy of the consent papers should be handed over to the woman and the hospital copy should be signed by the time of admission, thus giving her ample time to read the document and make an informed decision.

As explained by Dr. Reddy, consent is 'voluntary'. An informed and competent woman has the right to refuse any procedure, including a caesarean section, even if it is detrimental to her own health and/or that of her foetus.

While this process can be adopted for elective C-sections, the process for taking consent, including who should be giving the consent, needs to be thought through in case of an emergency C-section, when timely surgery can, quite literally, be a matter of life and death for the woman and/or her baby, and there may be very limited time to provide detailed information.

4. Lifestyle Modifications (lower blood sugar, BMI, etc.)

Dr. Vora shared that studies from developed countries have shown moderate impact on C-section rates following lifestyle modification measures. Medically indicated C-sections are often seen in older primigravidas with other complicating factors like gestational diabetes or pre-eclampsia. The interventions studied focused on counselling patients about diet, exercise and other lifestyle changes, along with ensuring health facilities diagnose such conditions early (for example, using oral glucose challenge tests to diagnose gestational diabetes) so that management of the same can be initiated in a timely manner and the development of severe complications, that may become C-section indications, can be avoided.

Conclusion

The past two to three decades of economic growth in India has brought about tremendous shifts in many aspects of the country's health needs. The advent of the National Rural Health Mission, and the increased health investments through the early years of its implementation, led to a rapid increase in the availability of many crucial maternal and child health services. While increasing access to caesareans and CEmONC services was once a primary concern in maternal and child health, and the main reason for monitoring CSR, we now see the evolution of a new trend of seeming excess in the face of enduring pockets of need. While we still have areas of the country that require access to caesarean and CEmONC services, we are now also confronted with the contrasting burden of extremely high rates of population CSR.

The national consultation helped highlight that the rise in caesarean rates can not be attributed to a single cause, but is rather the confluence of several drivers, amoung many different stakeholders, that need to be better understood through research and analysis. The first step in targeting interventions is to conduct more research and analysis to better understand the extent to which different drivers are affecting these rates. These findings can then be used to focus interventions towards the core drivers and their root causes. Adoption of Robson's Criteria to help create a standardized system for assessing, monitoring and comparing CSRs, constituting an expert group for the development of evidence based guidelines and devising a research agenda, along with more robust research funding, were additional recommendations that arose from the consultation.

Several possible interventions, across stakeholder groups, were discussed and spanned a gamut of possibilities. Amoung the suggestions were calls for guideline and SOP development, training and skill enhancement of

health staff, awareness building, improved provision of human resources and infrastructure, better monitoring and record keeping, re-structuring of payment models, quality improvement, midwifery, mandatory relicensure/ CMEs, enforcement and bolstering of existing government policies like the Clinical Establishment Act, hospital accreditation, patient counselling and standardized consent form procedures. Institutions that presented at the consultation and have been able to show dramatic and sustained changes in CSR, like Sitaram Bhartia Institute, have done so through a multipronged approach that incorporated several different interventions across stakeholder groups, implemented within an iterative system that included constant monitoring and quality improvement techniques. The need to have intervention strategies be dynamic and implemented with a philosophy of constant monitoring and improvement seemed pivotal to achieving dramatic sustained optimization of CSR.

Above all, the consultation helped highlight the need to come together as a health community to address the issue of escalating caesarean, but also the greater issue of quality in medicine. As India's economy continues to grow, public health efforts will need to shift from a pure "availability and access" focus, to one that also enhances accountability and quality. It is only through the joint efforts of all stakeholders –providers, patients, policy makers health systems and the community at large- that we will be able to create the systemic changes required for long lasting change.

Annexure 1

WHO Statement on C-section Rates

"WHO proposes the Robson classification system as a global standard for assessing, monitoring and comparing caesarean section rates within healthcare facilities over time and between facilities."

Executive Summary

Since 1985, the international healthcare community has considered the ideal rate for caesarean sections to be between 10% and 15%. Since then, caesarean sections have become increasingly common in both developed and developing countries. When medically justified, a caesarean section can effectively prevent maternal and perinatal mortality and morbidity. However, there is no evidence showing the benefits of caesarean delivery for women or infants who do not require the procedure. As with any surgery, caesarean sections are associated with short and long term risk which can extend many years beyond the current delivery and affect the health of the woman, her child, and future pregnancies. These risks are higher in women with limited access to comprehensive obstetric care. In recent years, governments and clinicians have expressed concern about the rise in the numbers of caesarean section births and the potential negative consequences for maternal and infant health. In addition, the international community has increasingly referenced the need to revisit the 1985 recommended rate.

Caesarean section rates at the population level

WHO conducted two studies: a systematic review of available studies that had sought to find the ideal caesarean rate within a given country or population, and a worldwide country-level analysis using the latest available data. Based on this available data, and using internationally accepted methods to assess the evidence with the most appropriate analytical techniques, WHO concludes:

1. Caesarean sections are effective in saving maternal and infant lives, but only when they are required for medically indicated reasons.
2. At population level, caesarean section rates higher than 10% are not associated with reductions in maternal and newborn mortality rates.
3. Caesarean sections can cause significant and sometimes permanent complications, disability or death particularly in settings that lack the facilities and/or capacity to properly conduct safe surgery and treat surgical complications. Caesarean sections should ideally only be undertaken when medically necessary.

4. Every effort should be made to provide caesarean sections to women in need, rather than striving to achieve a specific rate.
5. The effects of caesarean section rates on other outcomes, such as maternal and perinatal morbidity, paediatric outcomes, and psychological or social well-being are still unclear. More research is needed to understand the health effects of caesarean section on immediate and future outcomes.

Caesarean section rates at the hospital level and the need for a universal classification system

There is currently no internationally accepted classification system for caesarean section that would allow meaningful and relevant comparisons of CS rates across different facilities, cities or regions. Among the existing systems used to classify caesarean sections, the 10-group classification (also known as the 'Robson classification') has in recent years become widely used in many countries. In 2014, WHO conducted a systematic review of the experience of users with the Robson classification to assess the pros and cons of its adoption, implementation and interpretation, and to identify barriers, facilitators and potential adaptations or modifications.

WHO proposes the Robson classification system as a global standard for assessing, monitoring and comparing caesarean section rates within healthcare facilities over time, and between facilities. In order to assist healthcare facilities in adopting the Robson classification, WHO will develop guidelines for its use, implementation and interpretation, including standardization of terms and definitions.

Introduction

For nearly 30 years, the international healthcare community has considered the ideal rate for caesarean sections to be between 10% and 15%. This was based on the following statement by a panel of reproductive health experts at a meeting organized by the World Health Organization (WHO) in 1985 in Fortaleza, Brazil: "[T]here is no justification for any region to have a rate higher than 10-15%"(1). The panel's conclusion was drawn from a review of the limited data available at the time, mainly from northern European countries that demonstrated good maternal and perinatal outcomes with that rate of caesarean sections.

Since then caesarean sections have become increasingly common in both developed and developing countries for a variety of reasons (2, 3). When medically justified, caesarean section can effectively prevent maternal and perinatal mortality and morbidity (4). However, there is no evidence showing the benefits of caesarean delivery for women or infants who do not require the procedure. As with any surgery, caesarean sections are associated with short and long term risk which can extend many years beyond the current delivery and affect the health of the woman, her child, and future pregnancies. These risks are higher in women with limited access to comprehensive obstetric care (5, 6, 7).

The proportion of caesarean sections at the population level is a measure of the level of access to and use of this intervention. It can serve as a guideline for policy-makers and governments in assessing progress in maternal and infant health and in monitoring emergency obstetric care and resource use (8). Over the last few years, governments and clinicians have expressed concern about the rise in the numbers of caesarean section births and the potential negative consequences for maternal and infant health (9, 10, 11, 12). Cost is also a major factor in improving equitable access to maternal and newborn care, as caesarean sections represent a significant expense for overloaded – and often weakened – health systems (12, 13, 14).

Over the past three decades, as more evidence on the benefits and risks of caesarean section has accumulated, along with significant improvements in clinical obstetric care and in the methodologies to assess evidence and issue recommendations, health care professionals, scientists, epidemiologists and policy-makers have increasingly expressed the need to revisit the 1985 recommended rate (9, 15). However, determining the adequate caesarean section rate at the population level – i.e. the minimum rate for medically indicated caesarean section, while avoiding medically unnecessary operations – is a challenging task. To answer this question, WHO conducted two studies: a systematic review of available country-level studies that had sought to find this rate, and a worldwide countrylevel analysis using the latest available data. The process and the results are described in the first part of this Statement.

At the heart of the challenge in defining the optimal caesarean section rate at any level is the lack of a reliable and internationally accepted classification system to produce standardized data, enabling comparisons across populations and providing a tool to investigate drivers of the upward trend in caesarean section.

Among the existing systems used to classify caesarean sections, the 10-group classification (also known as the 'Robson classification') has become widely used in many countries in recent years (16, 17). Proposed by Dr Michael Robson in 2001 (18), the system stratifies women according to their obstetric characteristics, thereby allowing a comparison of caesarean section rates with fewer confounding factors. WHO conducted two systematic reviews to assess the value, benefits and potential drawbacks of using this classification to better understand caesarean section rates and trends worldwide. The research process and conclusions are described in detail in the second part of this Statement.

1. Caesarean section rates at the population level

Ecologic studies involve comparisons and analysis of entire populations, rather than individuals. Populations are often defined within geopolitical boundaries, and it is therefore important to differentiate population-based studies from studies of patients in specific health care facilities ('hospitalbased studies').

Healthcare facility rates of caesarean births vary widely depending on differences in the case mix of the obstetric populations they serve, in their capacity and provisions, and in clinical management protocols. Therefore, a population-based recommended caesarean section rate cannot be applied as the ideal rate at the hospital level because of these very differences.

In 2014, WHO conducted a systematic review of the ecologic studies available in the scientific literature, with the objective of identifying, critically appraising, and synthesizing the findings of these studies, which analyse the association between caesarean section rates and maternal, perinatal and infant outcomes (19). At the same time, WHO undertook a worldwide ecologic study to assess the association between caesarean section and maternal and neonatal mortality, using the most recent data available (20). These results were discussed by a panel of international experts at a consultation convened byWHO in Geneva, Switzerland, on 8–9 October 2014. The panel made the following observations:

1. Based on the WHO systematic review, increases in caesarean section rates up to 10-15% at the population level are associated with decreases in maternal, neonatal and infant mortality (19). Above this level, increasing the rate of caesarean section is no longer associated with reduced mortality. However, the association between higher rates of caesarean section and lower mortality weakened or even disappeared in studies that controlled for socioeconomic factors (3, 21). Since it is likely that socioeconomic factors can explain most of the association between increased caesarean section rates and lower mortality in this review, WHO conducted another study to further analyse this aspect.

2. The WHO worldwide ecologic study found that a substantial part of the crude association between caesarean section rate and mortality appears to be explained by socioeconomic factors (20). However, below a caesarean section rate of 10%, maternal and neonatal mortality decreased when caesarean section rates increased. As caesarean section rates increased above 10% and up to 30% no effect on mortality rates was observed. The analysis took a longitudinal approach, using country-level data and adjusting for socioeconomic development. This approach may overcome some of the limitations of the cross-sectional studies found in the systematic review but it should be emphasized that ecologic associations do not imply causality.

3. Current data does not enable us to assess the link between maternal and newborn mortality and rates of caesarean section above 30%.

4. Quality of care, particularly in terms of safety, is an important consideration in the analysis of caesarean section rates and mortality. The risk of infection and complications from surgery are potentially dangerous, particularly in settings that lack the facilities and/or capacity to properly conduct safe surgery.

5. The association between stillbirth or morbidity outcomes and caesarean section rates could not be determined due to the lack of data at the population level. The available ecologic studies analysed mortality indicators only, probably because these are more readily available than maternal and newborn morbidity indicators at the population level. Likewise, psychological and social aspects related to mode of delivery were not considered in the research. Since mortality is a rare outcome, especially in developed countries, future studies must assess the association of caesarean section rates with shortand long-term maternal and perinatal morbidity outcomes (e.g. obstetric fistula, birth asphyxia). These include psychosocial implications regarding the maternal–infant relationship, women's psychological health, women's ability to successfully initiate breastfeeding and paediatric outcomes.

Conclusions

Based on the available data, and using internationally accepted methods to assess the evidence with the most appropriate analytical techniques, WHO concludes:

1. Caesarean sections are effective in saving maternal and infant lives, but only when they are required for medically indicated reasons.

2. At population level, caesarean section rates higher than 10% are not associated with reductions in maternal and newborn mortality rates.

3. Caesarean sections can cause significant and sometimes permanent complications, disability or death particularly in settings that lack the facilities and/or capacity to properly conduct safe surgery and treat surgical complications. Caesarean sections should ideally only be undertaken when medically necessary.

4. Every effort should be made to provide caesarean sections to women in need, rather than striving to achieve a specific rate.

5. The effects of caesarean section rates on other outcomes, such as maternal and perinatal morbidity, paediatric outcomes, and psychological or social well being are still unclear. More research is needed to understand the health effects of caesarean section on immediate and future outcomes.

2. Caesarean section rates at the hospital level and the need for a universal classification system

At the facilities, it is essential to monitor the rates of caesarean sections taking into account the specific characteristics of the populations that they serve (obstetrical case mix). Currently, there is no standard classification system for caesarean section that would allow the comparison of caesarean section rates across different facilities, cities, countries or regions in a useful and action-oriented manner. As such, it is not yet possible to exchange information in a meaningful, targeted, and transparent manner to efficiently monitor maternal and perinatal outcomes (22).

In 2011, WHO conducted a systematic review of systems used to classify caesarean section, and concluded that the Robson classification is the most appropriate system to fulfil current international and local needs. WHO recommended building upon this to develop an internationally applicable caesarean section classification system (16). The system classifies all women into one of 10 categories that are mutually exclusive and, as a set, totally comprehensive (see Box 1). The categories are based on five basic obstetric characteristics that are routinely collected in all maternities:

- parity (nulliparous, multiparous with and without previous caesarean section);
- onset of labour (spontaneous, induced or pre-labour caesarean section);
- gestational age (preterm or term);
- foetal presentation (cephalic, breech or transverse); and number of foetuses (single or multiple).

The classification is simple, robust, reproducible, clinically relevant, and prospective – which means that every woman admitted for delivery can be immediately classified into one of the 10 groups based on these few basic characteristics. This allows a comparison and analysis of caesarean section rates within and across these groups.

In 2014, WHO conducted a second systematic review of the experience of users with the Robson classification, to assess the pros and cons of its adoption, implementation and interpretation, and to identify barriers, facilitators and potential adaptations (17). WHO convened a panel of experts in Geneva on 8–9 October 2014 to review the evidence. In order to establish a common starting point for comparing maternal and perinatal data within facilities over time and between facilities, the panel made several recommendations:

1. Regardless of their level of complexity, health care facilities should use the Robson classification system for women admitted to give birth.
2. Users of the classification system, while maintaining the original structure necessary for standardized comparisons, may wish to further subdivide the 10 groups and analyse other desirable variables (e.g. epidemiological data, cost, outcomes or indications) within each of the groups, according to their local needs and interests.

3. Reports on the results of the classification should be made publicly available, where possible.

WHO expects that this classification will help health care facilities to:

- optimize the use of caesarean section by identifying, analysing and focusing interventions on specific groups of particular relevance for each health care facility
- assess the effectiveness of strategies or interventions targeted at optimizing the use of caesarean section
- assess the quality of care, clinical management practices and outcomes by group assess the quality of the data collected, while raising staff awareness about the importance of the data and its use.

Robson classification

Conclusion

WHO proposes the Robson classification system as a global standard for assessing, monitoring and comparing caesarean section rates within healthcare facilities over time, and between facilities. In order to assist healthcare facilities in adopting the Robson classification, WHO will develop guidelines for its use, implementation and interpretation, including standardization of terms and definitions.

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Further information on WHO's work can be found at: www.who.int/reproductive health/

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WHO/RHR/15.02

Annexure 2

Narratives from invitees and experts

Narrative Piece from the Sitaram Bhartia Institute of Science and Research

Caesarean section has revolutionized maternity care and saved the lives of a number of women and babies. It is important that a caesarean section be performed only when medically indicated and it not be used as a surgery of convenience for the doctor or for the patient. WHO states that any increase in caesarean section rates above 10% to 15% does not improve maternal or neonatal outcomes.

We at Sitaram Bhartia Institute of Science and Research have been making relentless efforts to promote normal delivery and control our caesarean section rates to a reasonable number that ensures safe and quality care. We are committed to deliver care as per internationally accepted, evidence-based guidelines, to promote a structured approach in which teams of health care professionals work together to comprehensively address the needs of patients and their families and to continuously monitor and improve the quality of our care.

Our journey at Sitaram Bhartia Institute of Science and Research towards the goal of reducing cesarean sections in the institute has been a rollercoaster ride with ups and downs, failures and successes. It has been a great learning and we are constantly pushing boundaries to learn and evolve even further.

In the year 2001, the overall caesarean rate in our hospital was 79%. The hospital had a competent team of doctors and provided comprehensive health care facilities, making such a high rate extremely puzzling. The management felt the need to understand the reasons behind these numbers. On analyses of the situation, it became clear that the practice of maternity care and delivery was consultant centred. Each doctor worked as a single unit and, at one time, any doctor could have OPD, a patient in labour, patients booked for OT, etc. Many a time, she or he was multitasking and pressed for time. Nobody was interested in caesarean rates and believed that they were providing the best care, to the best of their abilities, and according to the doctors "the patients were not complaining".

The Director of the hospital, Mr Abhishek Bhartia had a steadfast belief that it was possible to make a difference and reduce the "ridiculously" high caesarean rates. He looked into what evidence based practices were

and tried to understand the economics and management issues related to maternity care services. As a consequence, the hospital created a staff unit and hired two consultants on a full time, 'fixed salary' basis. The objective was to remove competition amongst the consultants and erase incentive based care.

The unit doctors were encouraged to work on building standard protocols of care and also focus on professional development, outside patient care. Antenatal workshops on labour and delivery for expecting mothers were started. Perinatal meetings, with informal data discussions, were started on a regular basis. By the year 2006, the caesarean section rates were 40% and this model of care seemed to be working. However, in the subsequent years the rates started to steadily increase again, before hovering around the 50-54 % range from 2007 to 2011. What failed?

The management sat down with the doctors and took stock of the situation. It was very clear that they had to work harder and improve upon whatever was not functioning. Thus, in 2011 began the second round of the project of reducing caesareans at the institute. It was during this second round that a series of important changes occurred that shifted course towards more positive results. A Quality Assurance Department was introduced, with defined responsibilities of documentation and data surveillance, conducting regular audits and providing feedback to consultants and management. The institute joined the Perinatal Improvement Committee of IHI (The Institute of Health Care Improvement). It not only sensitised doctors to the concept of quality improvement and patient safety, but also provided a definitive framework to assess care. The third most important development was the emergence of a dedicated team of consultants who shared the core philosophy of the institute to reduce caesarean section. A series of interventions in the form of defining labour ward practices, training of nurses and doctors on standardised care and involvement of patient and family in care, were introduced.

Improved labour ward practices included identifying and training a group of sisters to form a dedicated group of labour ward staff and introducing the concept of one-to-one labour support, with the help of nursing staff. Labour protocols were also strengthened. For example, protocols to define admission in active labour, non-progress of labour and duration of second stage were set, standardization of interpretation of CTG (cardiotocography) was developed. Robson classification was adopted as a measure to assess and monitor caesarean rates.

Training of all involved in maternity care was regularised. Doctors were encouraged to enrol in online courses, especially on CTG training. Regular meetings and classes to discuss cases and monthly data meets were organized to promote reflective practice. Training of nurses in all aspects of labour care services, including CTG, were carried out and followed by assessments, retraining and reinforcement on a regular basis.

A model for the education of patients and families was developed. Education began from the early antenatal period, education material in the form of handouts were given, benefits of healthy eating habits and exercise were explained in the OPD and in workshops, preparation for normal labour and normal delivery was explained in the OPD and in workshops. Families, especially husbands, were encouraged to participate in care and in promoting the concept of normal delivery. The concept of group practice and team based clinical care was promoted for a more stress free work environment.

The effects of these interventions have been gradual, but sustained and over a period of 4 years, there has been a steady decline in the caesarean section rates (CSR) at our institute. In the year 2015 our CSR was 28%. At this point in time, we have realized that the most effective method to reduce caesarean section rates (CSR) in the future would likely be to prevent the primary caesarean sections in low risk mothers. Our CSR in low risk, primigravidas is below 20% at present.

Our journey of reducing caesareans through interventions in maternity care is a complex and ongoing challenge. The culture change in the department, with an emphasis on the physiological basis of pregnancy and childbirth, are the guiding principles on our journey towards continued success in providing safe, quality patient care.

Dr. Anita Sabherwal
Obstetrician-Gynecologist
Sitaram Bhartia Institute of Science and Research

Annexure 3

List of participants

Cesarean Section Conference, Hyderabad (March - April 2015)		
S. No.	**Name of Guests**	**Organisation/City**
Government of India/MOHFW		
1	Dr. Dinesh Baswal	Deputy Commissioner, Maternal Health, GoI
2	Dr. Arun Singh (TBD)	Advisor, GoI, RBSK
3	Dr. Nomita Chandiok	ICMR, New Delhi
4	Dr. Sanjeev Kumar	NHSRC, Executive Director
5	Dr. Himanshu Bhushan	Advisor PHP, NHSRC, New Delhi
Government of Telangana and Andhra Pradesh		
6	Dr. Somaraju	Commissioner, APVVP
7	Dr. Buddha Prakash M Jyothi, IAS	Commissioner H&FW, Govt. of Telangana
8	Dr. G. Srinivas Rao	Chief Programme Officer, NHM, Govt. of Telangana
9	Dr. Jaya Kumar	Joint Director, MHW, Govt of Telangana
10	Dr. Neelima Singh	Consultant, IIHFW Hyderabad
11	Dr. Sailaja Bitragunta	Consultant with Planning Department, Govt of A.P.
Other Institutions		
12	Dr. Anita Sabherwal	Consultant, Sitaram Bhartiya Institute
13	Dr. Hema Diwakar	Pvt. Practitioner, Ex-President FOGSI
14	Dr. Poonam Shivkumar Verma	Professor & Head, OBG, MGIMS Sevagram
15	Dr. Anchita Patil	Independent Consultant
16	Dr. N Devadasan	IPH, Bangalore
17	Dr. Sharad Iyengar	ARTH, Udaipur
18	Dr. Narender	PRAYAS, Chittor
19	Dr. Samiksha Singh	PHFI, Hyderabad
20	Dr. Vara Prasad	Jhpiego, Hyderabad
21	Dr. S Shantha Kumar	FOGSI Secretary-Hyderabad
22	Dr. Evita Fernandez	Fernandez Hospital
23	Dr. Nuzhat Aziz	Fernandez Hospital
24	Dr Pranathi Reddy	Director, Maternal and Fetal Medicine, Rainbow Hospital
25	Dr. Neerja Bhatla	Professor of OBG, AIIMS, New Delhi
26	Dr Kranti Vora	OBG and Assoc Professor, IIPH-Ahmedabad
27	Dr. Ajay Gambhir	IAAP President
28	Dr. Prasanta Mahapatra	Dean, I.H.S., Hyderabad
29	Dr. Amrita Kansala	WHO India
30	Ms. Chris Mary Kurian	JNU
31	Dr. Kolanda Swamy	Director, Public Health, Govt. of Tamil Nadu
32	Dr. Vikrant Prabhakar	Sr Advisor, Access Health International

Cesarean Section Conference, Hyderabad (March - April 2015)		
S. No.	**Name of Guests**	**Organisation/City**
33	Dr. Santhosh	Access Health International
34	Dr. Keshavraj	RCHO, Tumkur District, Karnataka, SIHFW, Karnataka
35	Dr. Madhavrao	Deputy Director, SIHFW, Karnataka
36	Dr. Sridhar R.P	RCH Consultant, UNICEF Karnataka
37	Dr. Vineeta Das	HoD, Obstetrics and Gynecology, KGMU, Lucknow
38	Dr. Manju Chhugani	Principal, Nursing School, Jamia Delhi
39	Dr. Brajesh Raj	State Child Health Consultant, UNICEF Karnataka
40	Dr. Somajita Chakraborty	Associate Professor, Dept of O&G, Medical College
41	Dr. B Tirumala Devi	Access health International
42	Mr. Anvinash Kastura	Media Consultant, UNICEF
43	Dr. G Mahalakshmi	Asso. Prof, Gandhi Medical College, Hyderabad
44	Dr. Urvashi Kaushik	Knowledge Management, Hon'ble C.M.'s Mission on Social Empowerment
45	Dr. Prashant Kumar	Jhpiego, Hyderabad
46	Dr. Kaninika Mitra	Health Specialist, UNICEF Kolkata
47	Dr. Jagadeesan Murugesan	Health Specialist, UNICEF Chennai
48	Dr. Srikrishna	UNICEF Consultant
49	Dr. Sanjeev Upadhyaya	Health Specialist, UNICEF
50	Dr. Meena Som	Health Specialist, UNICEF
51	Dr. Anita Thurakal	UNICEF Consultant
52	Prof. S. Galab	Director, CESS
53	Dr. S. Vijay Kumar	CESS
54	Ms. Jagjyot Kaur	CESS

Annexure 4

Presentations from Day 1, Day 2 and Group Work Sessions of the Workshop (enclosed in attached pendrive)