Quality of Care of Mothers and Newborns: Avoiding Under-usage and Over-usage

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What do we hope to take away from today’s session?

- Define underuse, overuse and misuse
- Understand how drivers of underuse and overuse are similar in low/ high resource settings
- Use basic design principles of improvement for underuse and overuse in any setting
- Apply these basic design principles to your own improvement initiatives
Overuse, Underuse, Misuse

- Overuse - use of health care resources and procedures in the absence of evidence that the service could help

- Underuse – failure to give patients medically necessary care or to follow proven health care practices.

- Misuse - failure to execute clinical care plans and procedures properly.

- Overprescribing of antibiotics
- Overuse of surgical procedures (e.g. stents)
- Overuse of procedures (e.g. radiological)

- Screenings
- Immunizations
- Chronic disease management

- Medical errors.
Basic Approach to fixing Underuse and Overuse: Systems Thinking….

“Every system is perfectly designed to achieve the result it gets”
Paul Batalden
Basic Approach to fixing Underuse and Overuse: The Model For Improvement:

1. Set a Numeric and Time-bound Aim
2. Develop a Content Theory (clinical and health system)
3. Design and undertake an Implementation Strategy
4. Measure, Learn, Adjust
“4 million women, newborns and children in sub-Saharan Africa could be saved every year if well-established, currently available, affordable health care interventions could be implemented across the region”
Background and context: Underuse

Deaths in Children under 5:

- In sub-Saharan Africa, 1 out of 12 children dies before his or her fifth birthday.
- In South Asia, 1 out of 19 dies.
- In high-income countries, 1 out of 147 dies.
- Singapore: 1 out of 370 dies.

Regional Disparities
Background and context: Underuse

Neonates account for 45% of all under-5 mortality

“Prematurity” accounts for 36% of neonatal mortality
Why Focus on Care Around the Time of Birth? Maternal, Stillbirth, Newborn

Lives Saved

Preconception Nutrition
Pregnancy Care
Labour, delivery, early care
Care of small sick newborn

- Neonatal deaths
- Stillbirths
- Maternal Deaths
Evidence-Based Interventions to Prevent Death well known


<table>
<thead>
<tr>
<th>Amount of Evidence</th>
<th>Reduction (%) in all-cause neonatal mortality or morbidity/major risk factor if specified (effect range)</th>
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<tbody>
<tr>
<td><strong>Preconception</strong></td>
<td></td>
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<tr>
<td>Folic acid supplementation</td>
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<td><strong>Antenatal</strong></td>
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<tr>
<td>Tetanus toxoid immunisation</td>
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<td>Syphilis screening and treatment</td>
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<td>Pre-eclampsia and eclampsia: prevention (calcium supplementation)</td>
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<td>Intermittent presumptive treatment for malaria</td>
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<td>Detection and treatment of asymptomatic bacteriuria</td>
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<td><strong>Intrapartum</strong></td>
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<td>Antibiotics for preterm premature rupture of membranes</td>
<td>IV</td>
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<tr>
<td>Corticosteroids for preterm labour</td>
<td>IV</td>
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<tr>
<td>Detection and management of breech (caesarian section)</td>
<td>IV</td>
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<td>Labour surveillance (including partograph) for early diagnosis of complications</td>
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<td>Clean delivery practices</td>
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<td><strong>Postnatal</strong></td>
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<td>Resuscitation of newborn baby</td>
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<td>Breastfeeding</td>
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<td>Prevention and management of hypothermia</td>
<td>IV</td>
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<tr>
<td>Kangaroo mother care (low birthweight infants in health facilities)</td>
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<td>Community-based pneumonia case management</td>
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PNR=perinatal mortality rate. *See webtable 1.* **See panel 1 for definitions.**

Table 1: Evidence of efficacy for interventions at different time periods

Benefits of combining interventions into packages along the continuum of care, rather than providing single interventions (no “magic bullets”)
Where is the problem?

Basic science → Proof of concept → Large scale efficacy Study → Reliable “real-life” implementation (effectiveness) → Scale-up to populations
Case Example: Malawi

- Population 16 million
- GDP $226/capita
- Neonatal mortality of 31/1000 live births
- Highest rate of prematurity in world (18%)
- Mortality of small babies 1000-2000g (10-50%)
District Hospital in Malawi

- 35 deliveries per day
- One medical officer per shift
- Staffed by midwives and nurses
Health System Failure

- A baby is born at around 2000g with moderate asphyxia in the middle of the night.
- The baby is resuscitated successfully but requires O2 and is being managed in the nursery.
- Power outage in early evening lasts 10 hours.
- Heating and O2 concentrator fails because of power outage.
- Initial backup generator is activated, but after an hour, runs out of fuel.
- Staff member is dispatched to town to get more fuel.
- Baby becomes cold, develops respiratory distress and dies before the power came back on.
A System perfectly designed for newborn hypothermia

- After birth, the baby is put on the chest of mother while the midwife cuts umbilical cord and dry the baby (about 5 minutes).
- Midwife takes the baby to weigh, treat and wrap
- Midwife leaves the baby wrapped on the table by the entrance
- Mother has to vacate bed in less than 30 minutes after delivery to allow for next mother to deliver.
- Mother moves to the postnatal ward without baby, cleans herself.
- Once the mother is ready, she comes to the labor ward to pick her baby up - average time baby separated from mother >60 minutes.
Improvement: Bringing Together Two Types of Knowledge

- Protocols/Guidelines
- Clinical Training

Evidence-based Subject Matter Knowledge

- Protocols/Guidelines
- Clinical Training

Improvement

- Motivation/Leadership
- Efficient Systems
- Accurate Reflective Data
- Context-sensitive learning

Implementation Knowledge
Theory of Change: Aim

Aim: decrease mortality in low birth weight babies by 30% in 2 years through reliable application of evidence based facility interventions

- Admission: Assess fetal size, Screen and manage risk factors
- Intrapartum: Monitor with Partograph, Act if baby or mother at risk
- Early Postpartum: Clean birth, HBB, Skin to skin, Early breastfeeding
- Late Postpartum: KMC, Manage Infection
Theory of Change: Content Theory - 6 drivers of reduction in mortality

1. Activated leadership who can champion an improvement system for neonatal survival

2. Immediate access to essential commodities (drugs, equipment, blood etc) needed for neonatal survival

3. Data systems that can easily and accurately record and report key processes and outcomes in real time

4. Knowledgeable health workers who can expertly deliver newborn care

5. Functional frontline teams that can reliably apply key processes to every mother and newborn infant, and treat mothers with respect and dignity

6. Engaged, knowledgeable mothers and communities that can advocate for effective and respectful care.

30% reduction in deaths in babies <2000g through reliable application of evidence based facility interventions
Implementation Theory- Bring District Leadership and Facilities together in Learning network

- 13 District hospitals in Central Malawi
- 65,000 births/year
- 50% of all newborn deaths and 80% maternal deaths in hospitals
- IHI Breakthrough Series for 24 months
Implementation Theory - Bring District Leadership and Facilities together in Learning network

- Assessment and Design Period
  - Learning Session 1

- Evidence-based Subject Matter Knowledge

- Improvement
  - Implementation Knowledge

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Theory of Change: Measurement Strategy

Data Sources

- Registers (routine collect, collate, report)
- Patient files (periodic sampling)
- Partograph review (periodic sampling)
- Death audits (as needed)
- Pharmacy stock reports (routine)

Data Collection and reporting

- facility teams, supported by external agency
Outcomes: Facility based mortality babies >2500g (20/1000 to 11/1000)
Outcomes: Facility-based mortality babies <2000g
Kangaroo Mother Care

- Evidence-based alternative to incubator care
- Thermal protection (baby wrapped between mother’s breasts)
- Nutritional Support (cup and spoon feeding)
- Stimulation and bonding benefits
- Significant effect on mortality in LMIC settings (~30%)

Moving from Nursery care to KMC
Kangaroo Mother Care: resource constraints
Step 1: Get eligible babies (1000-2000g) into KMC
Outcomes: <2000g (in KMC vs not in KMC)

- Outside KMC before/after 215-426/1000
- Inside KMC before/after 79/62 per 1000
Outcomes: Birth weight <2000g in KMC

Outside KMC before-after 215-426/1000

Inside KMC before-after 79/62 per 1000
Worsening of mortality in small babies outside KMC: Possible explanations

- “enrichment” of small baby population
- Worsening mortality only in most vulnerable population (<200g babies outside KMC) due to events after September 2015
  - staff rotations
  - National financial crisis
  - Cancellation of locum policy: Staff Shortages
  - Erratic pay: low morale
  - Increase Power cuts – (heating, O2) – compounded by shortage of $$ for back-up fuel
Intervention: Adaptive design

- Major focus on “skin to skin”
- Redesign of action during power cuts
- Redesign of baby-mother unit
- KMC expansion/refurbishment
- Policy interventions (power cuts)

- Re-design, training
- Leadership, Resources
- Leadership, Policy
The Basic Steps of Improvement Design

1. Set a Numeric and Time-bound Aim
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Global Trends in Caesarian Section
Beyond 10-15%: No benefit to population for Maternal or Newborn Mortality/Morbidity
Myths and Facts

Why have global CS rates increased relentlessly over the past 30 years?
Understanding the Epidemic: 3 Myths that perpetuate high CS rates in USA

<table>
<thead>
<tr>
<th>Myths</th>
<th>Reality</th>
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<tr>
<td>more and more women are asking for cesarean sections that have no medical rationale, the number of women who genuinely need a cesarean is increasing liability pressure is driving rates up.</td>
<td>1% of women who had had primary CS had wanted CS in absence of medical indication CS rates have increased for all groups regardless of age, parity, health, race, etc Studies show a small fraction of actual decision making is driven by fear of litigation</td>
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US data: 6 reasons why rates are high

1. Lack of care models that support physiological birth
2. Care model/interventions that increase CS (early induction, continuous fetal monitoring, poor labour augmentation practices)
3. Failure to offer the informed choice of vaginal birth
4. Casual attitudes about surgery: limited awareness of harms that are more likely with cesarean section
5. Variation in professional practice style
6. Incentives that are more likely to produce CS

Segmenting the population: Robson classification for "low risk" vaginal birth

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<thead>
<tr>
<th></th>
<th>Description</th>
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<tr>
<td>1</td>
<td>Nulliparous with single cephalic pregnancy, ≥37 weeks gestation in spontaneous labour</td>
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<tr>
<td>2*</td>
<td>Nulliparous with single cephalic pregnancy, ≥37 weeks gestation who either had labour induced or were delivered by CS before labour</td>
</tr>
<tr>
<td>3</td>
<td>Multiparous without a previous uterine scar, with single cephalic pregnancy, ≥37 weeks gestation in spontaneous labour</td>
</tr>
<tr>
<td>4*</td>
<td>Multiparous without a previous uterine scar, with single cephalic pregnancy, ≥37 weeks gestation who either had labour induced or were delivered by CS before labour</td>
</tr>
<tr>
<td>5</td>
<td>All multiparous with at least one previous uterine scar, with single cephalic pregnancy, ≥37 weeks gestation</td>
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<tr>
<td>6</td>
<td>All nulliparous women with a single breech pregnancy</td>
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<tr>
<td>7</td>
<td>All multiparous women with a single breech pregnancy including women with previous uterine scars</td>
</tr>
<tr>
<td>8</td>
<td>All women with multiple pregnancies including women with previous uterine scars</td>
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<tr>
<td>9</td>
<td>All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars</td>
</tr>
<tr>
<td>10</td>
<td>All women with a single cephalic pregnancy &lt;37 weeks gestation, including women with previous scars</td>
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Trends in Brazil

Rapid Increase over past decade:
• CS rate in 2005 – 27% (WHO Global survey)
• CS rate in 2011 – 45% (WHO Multi-country survey)

Current estimated CS Rates:
• Private Sector – 85%
• Public Sector 50%
Case History

- First time mother visits her Obstetrician and is told she is 20 weeks pregnant
- Discusses delivery – has heard it’s “possible” to have baby naturally and asks OB if it can happen
- OB says “wait and see” but CS is very safe and has advantages for mother and infant
- Mother and baby are healthy late in pregnancy and date is set for induction at 38 weeks as OB will be out of town for next 2 weeks.
- Labour is never established and mother has CS later that day
- Baby is 2.4kg, 36 weeks gestation, spends 2 weeks in NICU for mild respiratory distress.
- Mother is treated for post-partum depression
Background: CS in Brazil

- Brazil – pop 200 million. $11,200 GDP/capita
- Numerous previous efforts (payment reform, standards) to try to drive down these rates.
- 2014 - Agência Nacional de Saúde Suplementar (ANS) – taken to court by the Public Prosecutor for high CS rates in the private sector.
- 2014 successful QI prototype in Jaboticabal hospital increased the percentage of vaginal birth from 0-3% to 40% in nine months.
Theory of Change: Aim

Double the Rate - from 20% to 40% - of Natural Child Birth in Low Risk Mothers, in 28 private and public hospitals, by September 2016
Theory of Change: Content Theory

- Coalition of stakeholders
- Empowerment of women & families
- New care model
- Learning System

Doubling the rate of Natural Child Birth (20% to 40%) within 24 months in low risk pregnancies

Ideas, plans, predictions, tests, measures
Execution Theory

- BTS Collaborative learning model with 28 Hospitals well distributed across country
- Entry criteria: Hospital CS rate > 75% (Avg 81%)
- 26 Pilot Hospitals (ex 42) active, “16 followers”, Public and Private
- CQI to develop, test content theory
Pilot population 27 hospitals: Natural birth rates

Laney P’ Chart of Vaginal Birth Intensive Group
Sigma Z = 0.618746, 1.18013, 0.799849, 1.14146

Tests performed with unequal sample sizes
“Follower” hospitals: Natural birth rates
Secondary Aim: Decrease unnecessary NICU admissions
Evolution of a Content Theory: Change Package – cutting down on

Doubling the rate of Natural Child Birth (20% to 40%) within 24 months in low risk pregnancies

Coalition of stakeholders
Empower women & families
New care model
Learning System
Implementation: National Scale-up design

- Prototype (3)
- Demonstration BTS (27)
- Test of Scale-up Multi-BTS (150)
- National Scale-up Campaign (~4500)
The Basic Steps of Improvement Design

1. Set a Numeric and Time-bound Aim
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Thank You!