Redesigning health systems to promote maternal and newborn survival

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90% facility delivery ≠ maternal survival

Maternal mortality rate per 100,000 births

SDG target

Maternal mortality
or newborn survival

Neonatal mortality rate per 1,000 births

SDG target

Newborn mortality
Poor quality is major factor in deaths amenable to health care

103,908 amenable maternal deaths

1,080,817 amenable newborn deaths

Two regions contribute majority of global newborn deaths

- Sub-Saharan Africa: 40%
- South Asia: 40%
- East Asia & Pacific: 9%
- Latin America & Caribbean: 4%
- Middle East & North Africa: 4%
- Europe, Central Asia & North America: 3%
- Middle East & North Africa: 4%

But not because of shortage of clinics: Kenya built 1800 facilities in 5 years

Extensive facility networks in even the poorest countries
1 in 3 babies born in primary care clinics in highest mortality regions

**Sub-Saharan Africa**
- 2003: 25% Home delivery, 20% Clinic delivery, 55% Hospital delivery
- 2008: 24% Home delivery, 24% Clinic delivery, 51% Hospital delivery
- 2014: 32% Home delivery, 30% Clinic delivery, 38% Hospital delivery

**India**
- 2006: 37% Home delivery, 5% Clinic delivery, 58% Hospital delivery
- 2016: 53% Home delivery, 29% Clinic delivery, 19% Hospital delivery

**United States**
- 2017: 98% Home delivery
On aggregate, facility delivery in India associated with lower newborn mortality.
But system models matters

2015-2016 India NFHS data for 640 districts
Irrespective of volume, hospitals have much better basic maternal care quality

Kenya, Rwanda, Uganda, Namibia, Tanzania

What do we mean by quality?

- Accurate diagnosis
- Correct management

**Provider competence**

- Timely detection and action
- Safety
- Continuity
- Integration

**System competence**

- Respect: dignity, privacy, voice
- Customer service: ease of use, wait time

**User experience**
Solutions

Poor quality delivery care in primary care facilities

- Improve delivery quality in all primary care facilities
- Strengthen prenatal risk assessment and stratification
- Transfer women during emergencies
- Redesign health systems
Solutions

Poor quality delivery care in primary care facilities

1. Improve delivery quality in all primary care facilities
2. Strengthen prenatal risk assessment and stratification
3. Transfer women during emergencies
4. Redesign health systems
Better Birth Study in India tried improving care in primary care clinics but found no difference in survival.

“There was no significant difference in the composite primary outcome or in secondary maternal or perinatal adverse outcomes”

Solutions

Poor quality delivery care in primary care facilities

- Improve delivery quality in all primary care facilities
- Strengthen prenatal risk assessment and stratification
- Transfer women during emergencies
- Redesign health systems
In US, 38% of women are judged to be low risk; of these 29% developed unexpected complications

Solutions

- Improve delivery quality in all primary care facilities
- Strengthen prenatal risk assessment and stratification
- Transfer women during emergencies
- Redesign health systems

Poor quality delivery care in primary care facilities
Referral is neither feasible nor clinically recommended

Across 5,627 primary care facilities providing deliveries in 10 LMICs...

14% have a functional ambulance with fuel

48% have a facility phone or short-wave radio available at all times

SPA data from Bangladesh, DRC, Haiti, Malawi, Nambia, Nepal, Rwanda, Senegal, Tanzania, Uganda
Solutions

Poor quality delivery care in primary care facilities

- Improve delivery quality in all primary care facilities
- Strengthen prenatal risk assessment and stratification
- Transfer women during emergencies
- Redesign health systems
Redesign health systems to maximize survival

- Conditions that demand advanced clinical expertise
  - Tertiary
  - Secondary
  - Primary

- Low-acuity conditions requiring coordinated, continuous care
System redesign is needed because

1. Complications arise unexpectedly
2. Referral is slow and dangerous
3. Need rapid response, advanced skills
4. And/or surgical or intensive care
Essential to connect services and tackle quality along continuum of care

Antenatal care -> Delivery care -> Postnatal care of women and newborn -> Well-child care

Health centers and clinics -> Hospitals or surgical facilities -> Health centers and health clinics
Is system redesign geographically feasible? Kenya

Current scenario: all delivery facilities

Future scenario: Hospitals

Average quality: 0.42
2 hour access: 92%

Average quality: 0.72
2 hour access: 90%
Urbanization will further reduce distance barriers

Will women travel to hospital? 4 in 10 bypassed nearby dispensary in Tanzania; reported better experience

Women want to deliver in advanced facilities: adding Caesarian section more than doubled delivery volumes in health centers

Mean monthly deliveries before and after C/S

Intentional health system redesign: context specific, user centered

Improve hospitals
Expand capacity and improve quality
• Upgrade existing or add new facilities
• Targeted hospital quality improvement: hire advanced staff

Boost primary care
Strengthen services they are suited to perform
• Enhance continuity and coordination of care
• Establish referral/counter referral

Enable access
Support people in getting to the right level care
• Vouchers, ambulances and public private partnerships
• Improve key roads and bridges

Build demand
Generate demand for redesign
• Educate communities: campaigns, social media; influencers
• Provide incentives if needed
• Share success stories

Change policy
Kenya example: Kakamega county

~2M people population
~72,000 deliveries per year

County stats

MMR (UNFPA, 2014)

SDG target

NMR (KDHS, 2014)

SDG target
Current model of care: nearly 1 in 3 women deliver in level 2&3 facilities

Distribution of 72,000 deliveries in Kakamega in 2018 (DHIS-2)

- Home: 37%
- Primary care (Level 2 & 3): 27%
- Hospital (Level 4 & 5): 36%

The goal of redesign would be to have all women give birth in hospitals, as occurs in most middle and all high-income countries.
Today in Kakemega 86% of facility deliveries are in low volume clinics

This is a problem because:

1. Staff and equipment are thinly distributed across many facilities—nearly 9 in 10 delivery facilities conduct less than 1 delivery per day.

2. Staff in low volume clinics cannot retain emergency skills.

Data from DHIS-2, 2018
Providers in level 2/3 facilities lack experience in managing complications

Percentage of providers who have managed key complications in past 12 months

- Pre-eclampsia
- Post-partum haemorrhage
- Obstructed labor
- Newborn resuscitation
- All 4 complications

- Percentage data for C.O.s and nurses in Level 2/3 (n=65)
- Percentage data for C.O.s and nurses in Level 4/5 (n=75)
- Percentage data for Doctors in Level 4/5 (n=11)

Data source: From primary data collection, Oct-Nov 2019
...and have lower confidence in their skills

Percentage of providers who are "very confident" in managing key complications

Data source: From primary data collection, Oct-Nov 2019
Level 4/5 facilities are well distributed across the county
Nearly all women in Kakamega currently live within 1-hour of a Level 4/5 facility

- 92% of women living within 1-hour of the 10 surgical facilities in Kakamega
- 99% of women living within 1-hour of the 19 Level 4/5 facilities in Kakamega
Strong support for redesign among health workers in both hospitals and primary care

Service delivery redesign can reduce maternal and newborn mortality more effectively than the current approach in Kakamega county

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

0% 20% 40% 60% 80%

Service delivery redesign is feasible to implement in Kakamega County

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

0% 20% 40% 60% 80%

Data source: From primary data collection, Oct-Nov 2019
The population is predisposed to facility deliveries…

“When you deliver in the hospital you are more digital; you are not analogue. You are seen to be of high status, and people therefore want to deliver in the facility” 36-year-old with recent home delivery

“In a facility, if an operation is necessary it can be easily done... Also, women with HIV can be given medication to prevent [mother to child] transmission of the virus, which cannot be done at home.” 41-year-old grandmother

…and are welcoming of service delivery redesign

“You would have saved us; it would be very good. If this hospital is set up for delivery, then there would be no delays in accessing care” 37-year-old with a recent home delivery

“If that hospital has everything, then you know that you will not be referred to another facility. Every problem will be managed there.” 57-year-old TBA

Data source: From primary data collection, Oct-Nov 2019
Challenges: transportation availability and cost is a barrier to getting to hospital

“I had my first born [in a facility] and I was treated very well. I had my next delivery at home because I went into labor in the night and the boda-boda [motorbike] I called could not come, so I delivered at home.” 20-year-old with recent home delivery

“I saw a woman dying with a TBA because we could not get a vehicle to transport her to Navakholo [a level 4 facility]. She had a placenta problem.” 49-year-old male community member

“If women think they will have a normal delivery, they would prefer to deliver at home because they would save on transportation.” 60-year-old male community member

“I may not be able to afford transportation if the place if far.” 21-year-old nulliparous woman
Challenges: person-centered and respectful care and overcrowding

“I was mistreated during one delivery, so I decided to deliver at home subsequently, where the TBA takes good care of us.” 32-year-old with recent home delivery

“All of us understand the benefits of hospital delivery, but some of us fear going to the hospital because we would be abused and beaten.” 39-year-old with recent home delivery

“All health workers may be a challenge. The health provider may be careless due to overworking.” 39-year-old with recent home delivery

Data source: From primary data collection, Oct-Nov 2019
Challenges: knowledge gaps among health workers, including doctors and nurses in level 4/5

Average scores on a 60-item maternal and newborn care knowledge test (pass score: 80%)

- **Clinical officers and nurses in Level 2/3 facilities**: 54%
- **Clinical officers and nurses in Level 4/5 facilities**: 55%
- **Doctors in Level 4/5 facilities**: 68%

Data source: From primary data collection, Oct-Nov 2019
Redesign should be led locally, backed by research, and updated through learning

Engage
• Assess interest and motivation for structural reform from local leaders

Analyze
• Facility distribution, coverage, quality, management
• Utilization patterns and people’s preference
• Road network and transportation options

Design, implement, evaluate, adapt, scale
• Local leaders and users design relevant system model
• Evaluate impact on health, confidence, costs (selected settings)
• Build feedback and accountability channels; measure
• Adjust model through learning health system
• Adapt for other settings
Context specific delivery site options

- More beds in hospitals
- Adjacent birthing units
- Linked network of maternity centers
Context specific access options

- CEmONC Centers
  - 1 hour
  - 2 hour
  - >2 hours

- Strategic maternity centers
- Emergency transport
- Maternity waiting options for all women

- Taxis/ride share in early labor
- Emergency transport
- Maternity waiting options

Early labor in hospital

Emergency transport

Transport from home to hospital

Taxis/ride share

Context specific access options

Strategic maternity centers

Emergency transport

Maternity waiting options for all women

Taxis/ride share in early labor

Emergency transport

Transport from home to hospital

Taxis/ride share
Mitigating negative unintended consequences

• Overcrowding: planning and gradual shifts, using adjacent facilities
• Overmedicalization, excess C-sections, disrespect: midwifery led care, monitoring, supervision, quality reviews
• Inequities in access to hospital, financial hardship: targeted roads/bridges, focused subsidies, transport on-call
• Other: build emergent effects into evaluation and adjust as model evolves
Health and system benefits of redesign

- Rapid access to lifesaving care
- Improves health system efficiency
- Concentrates improvement efforts in fewer facilities
- Care teams; optimized human resources
Discussion