Title

Sustainability of Maternal and Newborn Health Programs: What Can We Learn From Tanzania?

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The findings and conclusions in this abstract are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Short Abstract

Reducing maternal and newborn mortality is a global priority. During 2013–2018, a donor-supported *Program to Reduce Maternal Deaths* was successfully implemented in Kigoma, Tanzania, a region with high maternal and newborn mortality. The program increased access to emergency obstetric and reproductive health care, resulting in 43% maternal and 29% neonatal mortality declines. Because health benefits may diminish or disappear after donor funding ends, assessing ongoing trends in maternal, newborn and reproductive health services and outcomes is critical to understand program sustainability. To better understand program sustainability, we compared the status of maternal and newborn health services and outcomes in 2018 with the status 4 years after the program ended (2022). We used multiple data collection methods. They included health facility assessments, pregnancy outcomes monitoring, and Rapid Ascertainment Process of Institutional Death methodology to extract, verify, and triangulate data on maternal deaths from all available sources (e.g., patient records, birth registers, nurses' notebooks, morgue) in 202 maternities. The sustainability evaluation found that maternal and newborn health services and outcomes continued to improve after the Program ended, demonstrating that a well-designed and implemented transition of key program strategies and activities to local leadership helped maintain and expand the program gains.

Keywords: maternal health, reproductive health, program sustainability, Tanzania, low- and middle-income countries

Extended Abstract

Background:

The United Republic of Tanzania has historically had some of the highest numbers of maternal deaths in sub-Saharan Africa and the world. In 2016, its maternal mortality ratio (MMR) was estimated to be 566 maternal deaths per 100,000 live births[1] with little change since 2000. The MMRs in the Kigoma Region of northwest Tanzania were among the highest in the country, and the region had some of the greatest needs for improved reproductive, maternal, and neonatal health services and outcomes.

Beginning in 2008, the government of Tanzania intensified its efforts to improve maternal and newborn health. The government's *National Road Map Strategic Plan to Accelerate Reduction of Maternal, Newborn and Child Deaths in Tanzania 2008–2015* [2] established an ambitious MMR goal of 75% decline to be achieved through the following operational targets:

- Increasing institutional delivery to 80% of births
- Increasing modern contraceptive prevalence to 60% among women who are married or in a consensual union
- Ensuring all hospitals provide comprehensive emergency obstetric and neonatal care (CEmONC)
- Upgrading 50% of health centers to provide CEmONC
- Increasing the number of facilities that provide basic emergency obstetric and neonatal care (BEmONC) to 70%

Subsequent updates to the national strategy aimed for 100% of health centers and 50% of dispensaries to provide BEmONC services by 2020.[3] The government continues to work to increase access to high quality emergency obstetric and neonatal care (EmONC) and to strengthen reproductive health services at all health care facilities.[4]

Kigoma Region in Western Tanzania had some of the greatest needs for improving maternal and neonatal health services and outcomes. With a population of 2.3 million (5% of Tanzania's total population in 2015), over 80% rural, Kigoma lagged behind the national average for facility-based births, delivery by cesarean section, and contraceptive use.[1] Kigoma also had an extreme shortage of skilled health providers; in 2013, the density of skilled birth attendants (4.6 per 10,000 population),[6] was nearly 10 times lower than the minimum recommended by the World Health Organization (44.5 per 10,000 population).[7] Bloomberg Philanthropies funded a regional program in Kigoma to reduce maternal deaths during 2006–2018. The *Program to Reduce Maternal Deaths in Tanzania* (2006–2018)[5] promoted three broad strategies:

- To increase and sustain availability of high-quality maternal and reproductive health services
- To improve and sustain access to maternal and reproductive health services

- To create and sustain demand for maternal and reproductive health services

Interventions supporting these strategies were implemented in and around the catchment areas of an increasing number of supported health facilities (the Program supported 3 out of 6 hospitals, 13 out of 27 health centers, and 67 out of 164 dispensaries by 2018).[6] The Government of Tanzania participated in the Program implementation at multiple levels: nationally through the Ministry of Health, Community Development, Gender, Elderly and Children (MoH), and the President's Office, Regional Administration and Local Government (PO-RALG); regionally through the health management team; and at the district level via council health management teams. Tanzanian program partners Thamini Uhai and EngenderHealth implemented interventions such as upgrading facilities, including renovating and building surgical wards; supplying essential drugs and equipment for EmONC; increasing access to emergency obstetric care, including supporting timely referrals; staff retention; providing training and supportive supervision in EmONC and contraceptive technology; ensuring adequate contraceptive supplies; providing comprehensive postabortion care, and supporting birth companionship and respectful care at birth in program-supported facilities.[5,6,8,9] Since 2010, the United States Centers for Disease Control and Prevention, Division of Reproductive Health (CDC/DRH) collaborated as one of the Program's partners by supporting the monitoring and evaluation activities.

Sustainability strategies were a key aspect of the program transition.[5] They focused on the program elements that were the most amenable to continuation after the Program ended, and on what resources would be needed to sustain their implementation by the governmental partners (i.e., regional and national health authorities). Examples included strengthening the strengthening structural/institutional policies, identifying human and financial resources, encouraging maintenance of key program activities such as EmONC training, mentoring and supportive supervision, referral strategies, companionship at birth, and use of program-developed approaches to help build capacity and stimulate demand for services through increased community awareness.

In 2019, the Program was taken over by the Tanzania health authorities. In 2023, a sustainability evaluation was conducted using the same monitoring and evaluation approaches and tools as the corresponding activities that documented the Program progress and outcomes.
Scheirer defines program sustainability as "the continued use of program components and activities [at sufficient intensity] for the continued achievement of desirable program and population outcomes."[10] Metrics of program sustainability may include: program's duration, resources needed to continue program's core strategies, program's capacity to scale-up, and the duration of the program's benefits.[11-13]

Sustainability Evaluation Objectives:

The evaluation measured (1) the sustainability of Emergency Obstetric and Neonatal Care (EmONC) lifesaving interventions and (2) the sustainability of obstetric care and maternal and newborn health benefits four years after the end of donor funding to the Program and its

transition to the regional authorities. By examining the obstetric services and maternal and perinatal health status four years after the Program ended, the sustainability evaluation provides the MoH and regional and local authorities with critical knowledge about their ability to continue the Program's strategies and sustain its accomplishments in Kigoma region, and potentially scale up successful approaches to other regions with similar health disparities and needs.

Study Design:

The evaluation measured program sustainability in all 202 Kigoma health facilities using 3 methods:

1. Health facility assessments to assess status of routine and emergency obstetric and neonatal care (EmONC) during 2023[14,15]
2. Pregnancy outcome monitoring to enumerate all individual birth records during 2019–2022[16]
3. Rapid Ascertainment Process of Institutional Deaths (RAPID) methodology to extract, verify, and triangulate data on maternal deaths from available sources (e.g., patient records, birth registers, nurses' notebooks, morgue records) during 2019–2022[16]

We compared 2018 data (the last year of the Program implementation) with 2022 data to assess the sustainability of EmONC lifesaving interventions and obstetric care and outcomes (Table 1). We calculated the percent change comparing data in 2018 to 2022. We tested for significance using z-test for proportions and rates. A p-value of <0.05 was considered statistically significant.

Results:

From 2018 to 2022, the number of facility births rose from 85,187 to 88,421. The number of facilities providing all elements of emergency obstetric and newborn care (EmONC) rose from 21 to 27; partial EmONC was available in 43 low- and 13 mid-level facilities. The population cesarean section rate increased by 69% (from 4.5% to 7.6%). The proportion of women with childbirth complications treated in EmONC facilities rose by 26% (from 48.3% to 60.9%). Facility case-fatality rate in all facilities fell by 21% (from 1.4% to 1.1%). Maternal mortality in EmONC facilities declined 25%, from 378 to 283 maternal deaths per 100,000 live births (Figure 1), as did the total stillbirth rate (13%, from 12.8 to 11.2 stillbirths per 1,000 births) and pre-discharge neonatal mortality rate (25%, from 7.6 to 5.7 neonatal deaths per 1,000 live births).(Table 1)

Conclusion:

EmONC lifesaving interventions continued to be maintained and obstetric care and maternal and newborn health outcomes continued to improve in Tanzania after the Program ended, demonstrating that program gains can be sustained. Lessons learned from Tanzania can inform

program sustainability where similar approaches are used to reduce preventable maternal and newborn deaths.

Table 1: Comparison of EmONC lifesaving interventions and key obstetric care and outcomes in 2018 and 2022 in all health facilities, including EmONC facilities, Kigoma region, Tanzania

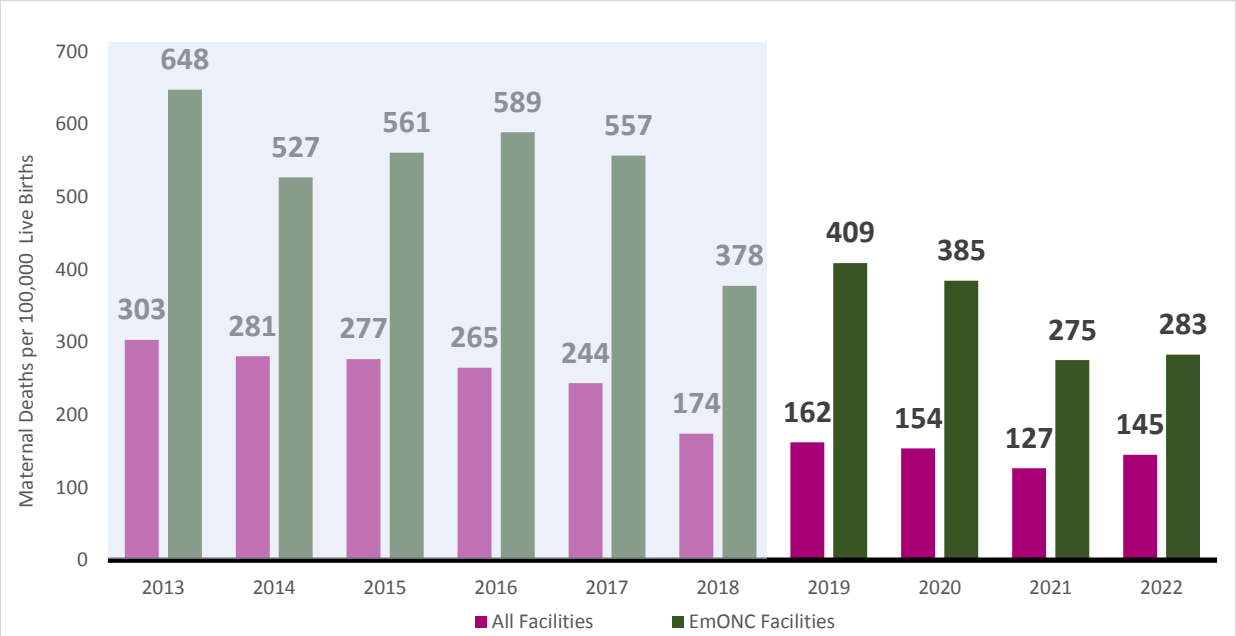
Indicator	2018[a]	2022[a]	%Change
Number of health facilities including EmONC	197	202	+ 2.5%
Number of EmONC health facilities	21	27	+ 29%
EmONC lifesaving interventions			
Administer parenteral antibiotics[a]	99.5%	100%	+0.5%
Administer parenteral oxytocin[a]	100%	100%	0.0%
Administer parenteral anti-convulsants[a]	92.9%	93.6%	+0.8%
Perform manual removal of the placenta[a]	10.7%	15.3%	+43.0%
Perform procedure for removing retained products of conception[a]	58.9%	74.3%	+26.1%*
Perform vacuum-assisted delivery/assisted vaginal delivery[a]	6.1%	9.9%	+62.3%*
Perform neonatal resuscitation with bag and mask[a]	80.7%	84.7%	+5.0%
Perform cesarean section surgery[a]: *hospitals*	100%	100%	0.0%
Perform cesarean section surgery[a]: *health centers*	55.6%	82.8%	+48.9%*
Perform blood transfusion[a]: *hospitals*	100%	100%	0.0%
Perform blood transfusion[a]: *health centers*	59.3%	89.7%	+51.3%*
Obstetric care and outcomes			
Institutional delivery rate	84.9%	97.8%	+ 15.2%*
Percentage of all births taking place in EmONC facilities	36.7%	44.3%	+ 20.7%*
Obstetric complications treated in *EmONC facilities*	48.3%	60.9%	+ 26.1%*
Population-based Cesarean section rate	4.5%	7.6%	+ 68.9%*
Facility-based C-section rate: *all facilities*	13.6%	14.8%	+ 8.8%*
Direct obstetric case fatality rate: *all facilities*	1.4%	1.1%	- 21.4%*
Facility-based maternal mortality ratio: *all facilities*	174	145	- 16.7%
Maternal mortality ratio: *EmONC facilities*	378	283	- 25.1%*
Institutional total stillbirth rate: *all facilities*	12.8	11.2	- 12.5%*
Pre-discharge neonatal mortality rate: *all facilities*	7.6	5.7	- 25.0%*

Acronyms: EmONC, Emergency Obstetric and Neonatal Care.

Notes: Percentage change calculations are based on numbers rounded to the first decimal. Asterisks indicate significance at $P<0.05$ level of the difference between 2018 and 2022 calculated with a z-statistic test.

[a] experience or performance during the previous 3 months preceding the assessment. While the EmONC assessments were conducted in early 2019 and 2023, respectively, the status extends to the end of the preceding years (2018 and 2022)

Figure 1: Maternal Mortality Ratio, 2013–2022
All Health Facilities and EmONC Facilities, Kigoma Region, Tanzania



Abbreviation: EmONC, Emergency Obstetric and Neonatal Care
Note: The shaded portion of the figure marks the time period when the Program to Reduce Maternal Deaths in Tanzania was in operation.
Source: 2013, 2016, 2018, 2019 Pregnancy Outcomes Monitoring System in Kigoma Region, Tanzania (CDC, 2014b; CDC, 2016b; CDC, 2018b; CDC, 2019b)

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