

REPUBLIC OF KENYA



MINISTRY OF HEALTH

# Confidential Enquiry into Maternal Deaths in Kenya

First Report  
Summary of Findings  
2017



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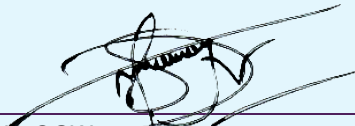
Special recognition to all maternal death assessors who were part of multidisciplinary teams that spared their valuable time to participate in regional assessors workshops where individual reviews of maternal deaths were carried out. This process ensured that every maternal death counts. We commend the editorial team

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## List of abbreviations

<b>ANC</b>	Antenatal Care
<b>BP</b>	Blood Pressure
<b>C/S</b>	Cesarean Section
<b>CEMD</b>	Confidential Enquiry into Maternal Death
<b>CEMONC</b>	Comprehensive Emergency Obstetric and Newborn Care
<b>CPD</b>	Continuous Professional Development
<b>CPR</b>	Cardiopulmonary Resuscitation
<b>CRVS</b>	Civil Registration and Vital Statistics
<b>DFID</b>	Department for International Development
<b>DHIS</b>	District Health Information System
<b>DHS</b>	Demographic Health Survey
<b>DIC</b>	Disseminated Intravascular Coagulation
<b>DPHK</b>	Development Partners for Health in Kenya
<b>FBO</b>	Faith Based Organisations
<b>FSB</b>	Fresh Stillbirth
<b>GA</b>	Gestational Age
<b>HAART</b>	Highly Active Anti-Retroviral Therapy
<b>Hb</b>	Haemoglobin
<b>HELLP</b>	Haemolysis Elevated Liver Enzymes and Low Platelet levels
<b>HIS</b>	Health Information System
<b>HIV</b>	Human Immunodeficiency Virus
<b>ICD</b>	International Statistical Classification of Diseases and Related Health Problems
<b>ICD-10</b>	ICD, 10th revision
<b>ICD-MM</b>	The WHO application of ICD-10 to death during pregnancy, childbirth and the puerperium: ICD-maternal mortality

<b>ICD-PM</b>	The WHO application of ICD-10 to death during the perinatal period: ICD perinatal mortality
<b>ICU</b>	Intensive Care Unit
<b>IU</b>	International Units
<b>IV</b>	Intravenous
<b>JKUAT</b>	Jomo Kenyatta University College of Agriculture and Technology
<b>KMPDB</b>	Kenya Medical Practitioners and Dentists Board
<b>KNCHR</b>	Kenya National Commission on Human Rights
<b>KOGS</b>	Kenya Obstetrical and Gynaecological Society
<b>LSTM</b>	Liverpool School of Tropical Medicine
<b>MAMAS</b>	Maternal Mortality Audit System
<b>MD</b>	Maternal Death
<b>mmHg</b>	Millimetres of Mercury
<b>MPDSR</b>	Maternal Perinatal Death Surveillance and Response
<b>MSB</b>	Macerated Stillbirth
<b>MVA</b>	Manual Vacuum Aspiration
<b>NCK</b>	Nursing Council of Kenya
<b>RMHSU</b>	Reproductive and Maternal Health Services Unit
<b>SPSS</b>	Statistical Package for Social Sciences
<b>TBA</b>	Traditional Birth Attendant
<b>UKaid</b>	United Kingdom Agency for International Development
<b>UNFPA</b>	United Nations Population Fund
<b>UNICEF</b>	United Nations Children Education Fund
<b>USAID</b>	United States Agency for International Development
<b>VDRL</b>	Venereal Disease Research Laboratory
<b>VE</b>	Vaginal Examination
<b>WHO</b>	World Health Organization



## Definition of terms

<b>Associated factors</b>	These are non-medical factors associated with maternal deaths based on the 3-delay model. They also include health system factors.
<b>Confidential Enquiry into Maternal Death (CEMD)</b>	A confidential enquiry into maternal death can be defined as a systematic multidisciplinary anonymous investigation of all or a representative sample of maternal death occurring at an area, regional (state) or national level which identifies the numbers, causes and avoidable or remediable factors associated with them. Through the lessons learnt from each woman's death, and through aggregating the data, confidential enquiries provide evidence of where the main problems in overcoming maternal mortality lie and an analysis of what can be done in practical terms, and highlight the key areas requiring recommendations for health sector and community action as well as guidelines for improving clinical outcomes.
<b>Contributing conditions</b>	Conditions that may have contributed to or may be associated with, but should not to be reported as sole condition on the death certificate or selected as the underlying cause of death. Contributing causes may predispose women to death, as either a pre-existing condition or a risk factor.
<b>Direct maternal death</b>	Direct obstetric deaths are those deaths resulting from obstetric complications of the pregnancy state (pregnancy, labour and the puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above.
<b>ICD-10</b>	International statistical classification of diseases and related health problems, Tenth revision (ICD-10). It's the standard tool to guide the collection, coding, tabulation and reporting of mortality statistics based on civil registration.



**ICD-MM**

The WHO Application of ICD-10 to death during pregnancy, childbirth, and the puerperium: ICD-Maternal Mortality (ICD-MM) is based upon the 10th revision of the ICD (ICD-10) and its coding rules. It is intended to facilitate the consistent collection, analysis and interpretation of information on maternal death.

**Indirect maternal death**

Maternal death resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by physiologic effects of pregnancy.

**Maternal death**

A maternal death is the death of a woman while pregnant or within 42 days of the termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

**Maternal and Perinatal Death Surveillance and Response (MPDSR)**

MPDSR is a form of continuous surveillance that links the health information system and quality improvement processes from local to national levels, which includes the routine identification, notification, quantification and determination of causes and avoid ability of all maternal and perinatal deaths, as well as the use of this information to respond with actions that will prevent future death.

**Maternal death assessors**

A multi-disciplinary group of healthcare providers (different cadres) trained to assign the cause of death for each maternal death using the ICD-MM classification system.

**Underlying cause of death**

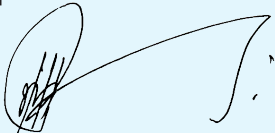
The disease or condition that initiated the morbid chain of events leading to death. The single identified cause of death should be as specific as possible. There can only be one underlying cause of death to which an ICD-10 code can be allocated.

## Foreword

Saving Mothers' Lives 2017, Confidential Report into Maternal Deaths in Kenya is the premier report of its kind towards saving the lives of mothers. The report focuses on maternal deaths that occurred in major county and national referral hospitals during the year 2014. It recognizes the fact that "every mother counts" and that understanding why a woman died during pregnancy and childbirth, and taking steps to address contributing factors are important 'first' step towards preventing other women dying in the same way.

The Maternal and Perinatal Death Surveillance and Response (MPDSR) process responds to the Global Strategy for Women's, Children's, and Adolescent's Health (2016-2030) which seeks to end preventable maternal, new-born, child and adolescent death and still births. The Ministry of Health has developed national guidelines for MPDSR to provide guidance on how to conduct reviews of maternal and newborn death and stillbirths, and near misses at both facility and community levels. The guidelines also look at the reporting pathways and documentation of avoidable factors with a clear response to avoid future death.

The Confidential Enquiries into Maternal Death (CEMD) is as a systematic multidisciplinary anonymous investigation of all or a representative sample of maternal death occurring at an area,



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Dr Mohamed A. Sheikh,  
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regional (state) or national level, which identifies the numbers, causes and avoidable or remediable factors associated with them. The enquiry process highlights key areas for improvement as well as actionable recommendations to prevent future death.

Learning from experiences of CEMD conducted in the United Kingdom (MBRRACE-UK; Knight 2015) and Republic of South Africa (RSA 2015), the findings presented in this report have been drawn after intense reviews and discussions with multidisciplinary teams of health providers who were trained as national maternal death assessors. The maternal death assessors are composed of a mix of cadres including obstetrician gynaecologists, paediatricians, anaesthetists, surgeons, medical officers, clinical officers, midwives, health information officers and public health providers drawn from different organisations including universities, Ministry of Health and County Health teams and professional organisations.

This CEMD report highlights the leading causes of maternal death, identifies the contributing conditions, and the associated factors. It also points out actionable recommendations at the different levels of policy, county, health facility and community /individual to stimulate action towards addressing avoidable factors, and preventing future maternal deaths.

# 1. Key messages from the report

Fifty-one percent (**484**) of the **945** maternal deaths reported in the District Health Information System (DHIS) for the year 2014 were assessed and included in the analysis of this first CEMD report.



The median age of women who died was 27 years. The youngest woman who died was 14 years while the oldest was 47 years.



**8.9%** of the women who died were young mothers aged below 20 years.



Most women (**42.4%**) that died were having their first or second pregnancy.



Only **5 in 10** of women who died had antenatal care.



Only **2 in 10** who attended ANC had at least 4 ANC visits.



**5 out of 10** deaths occurred in the Intrapartum and post partum period.



**1 out of 10** women who died were undelivered at the time of death.



**3 out of 10** women who died had stillbirths.

## The leading cause of maternal deaths for all women is obstetric haemorrhage.



**2 out of 5** women died due to obstetric haemorrhage.



**1 out of 5** maternal deaths were due to non-obstetric complications mainly HIV/AIDS and anaemia.

## Quality of Care



Sub-standard care was identified in **9 out of 10** maternal deaths

One or more associated factors related to health worker, administration, patient and community factors were identified in majority (**89.3%**) of maternal deaths



Delay in starting treatment, inadequate clinical skills and inadequate monitoring were the most frequently identified health work force related factors



Obstetricians were involved in the emergency care of **1 in 10** women who died.



Over **7 out of 10** deaths occurred out of office hours (between 5pm and 8am on weekdays, weekends and public holidays).



The majority (91%) of women who died of obstetric haemorrhage received sub-optimal care, where different management would have resulted in a different outcome



Half (50%) of all maternal deaths were among women who had been referred from another facility, mostly from level 4 to level 5 or 6 health facilities



Poor record keeping/documentation was noted in most cases of maternal death

## 2.0 Summary of key findings

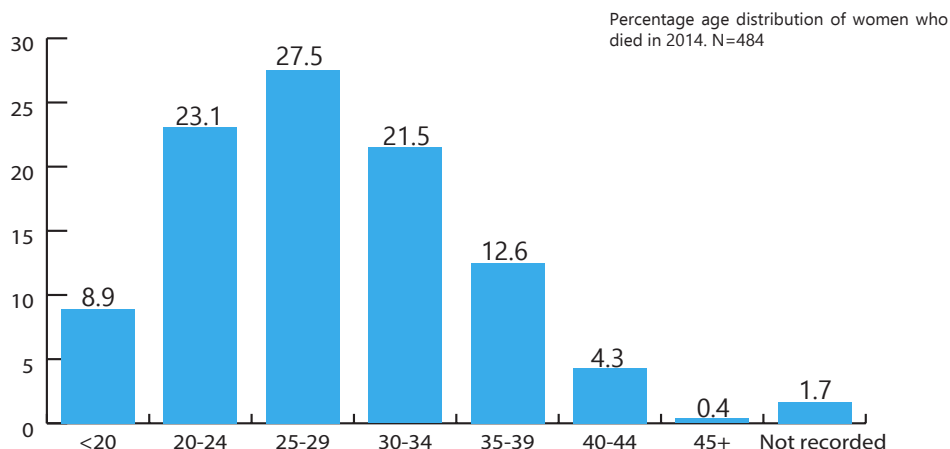
The first CEMD in Kenya was conducted between July 2015 and June 2016. It covered maternal deaths that occurred in 2014. Centre for Maternal and Newborn Health, Liverpool School of Tropical Medicine supported the Kenya Ministry of Health Reproductive and Maternal Health Services Unit to establish support systems (National MPDSR Committee, National MDSR secretariat, National maternal death assessors and CEMD report writing team to produce this report. The report was approved by the Kenya National MPDSR committee on the 12th of October 2016. A summary of the key findings, recommendations, lessons learnt and further research are presented below. Also, a table of key recommendations, responsibilities and timelines for implementation is provided.

Fifty-one percent (**484**) of the **945** maternal deaths reported in the District Health Information System (DHIS) for the year 2014 were assessed and included in the analysis of the CEMD report.

### 2.1. Demographic and obstetric characteristics

The median age of women who died was **27years**. The youngest women who died was 14 years while the oldest was 47 years (**Figure 1**).

**Figure 1: Percentage age distribution of women who died in 2014**



- **54.5% (264)** of women who died were having their first, second or third pregnancy.
- **50% (242)** of the women had been referred from other health facilities; mostly Level 4 (sub-County hospitals) to level 5 and 6 health facilities
- Within the regions, majority of the direct maternal deaths were from Rift Valley **21.3% (80)** while most of the indirect maternal deaths were from Nyanza region **24.7% (24)** and Nairobi **23.7% (23)**.

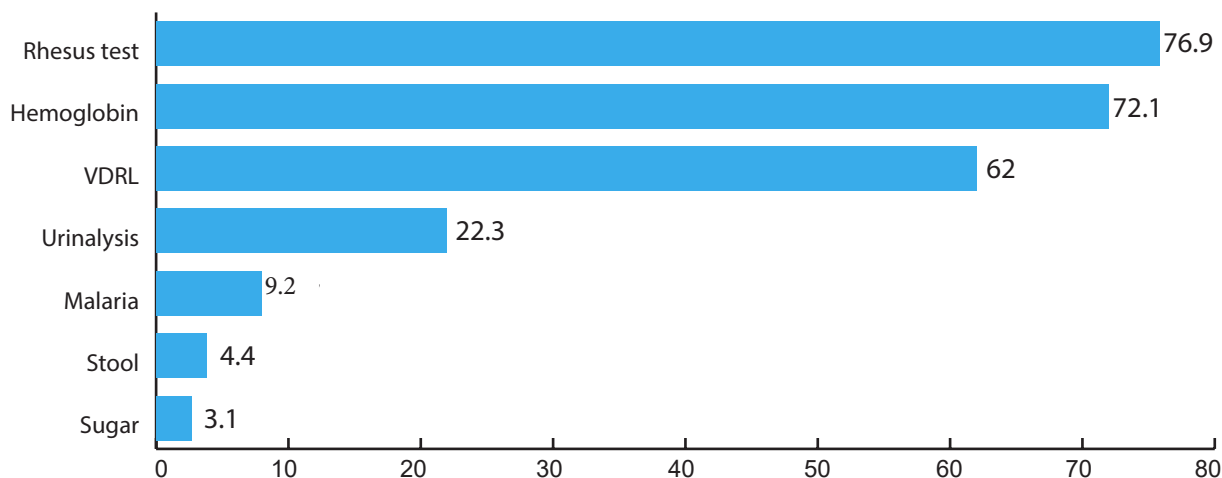
## 2.2. Antenatal care

- **47.3% (229)** of the women who died received Antenatal Care (ANC), **11.4% (55)** did not receive ANC while records of **41.3% (200)** women did not have documentation of ANC attendance.
- Only **15.7% (36)** women who received ANC had 4 or more ANC visits

**Table 1: Characteristics of women who received ANC**

Characteristic	Categories	n=229	
		Frequency	Percent
Booked <16w?	No	17	7.4
	Yes	14	6.1
	No record	198	86.5
No. of visits	One	16	7
	Two	23	10
	Three	22	9.6
	Four	23	10
	> Four	13	5.7
	No record	132	57.6

**Figure 2: Proportion of women where ANC tests were performed (n=229)**



- Among the **229** women who had ANC, Rhesus test was reported to have been done for **76.9% (176)** women followed by Hemoglobin for **72.1% (165)** and VDRL **62.5% (142)**. Urinalysis was performed for only **22.3% (51)** of the women (**Figure 2**).
- HIV status was not recorded in **45.2% (219)** of the cases. Of the **265** deaths in which the HIV status was recorded, **73.6% (195)** were HIV negative, **26.4% (70)** were HIV positive.

### **2.3. Labour and childbirth**

- **77% (374)** of women who died had given birth, **8% (40)** had a pregnancy with abortive outcome while **14% (70)** died before childbirth (undelivered)
- Of the **374** women who had delivered, **88.8% (332)** delivered in a hospital, **7.5% (28)** delivered at home or on the way to the hospital and the place of delivery was not specified for **3.7% (14)** the maternal deaths.
- Of the **374** women who died after childbirth, **50.5% (189)** had a live birth, **33.2% (124)** had a still birth, and the delivery outcome was unspecified for **16.3% (61)**.



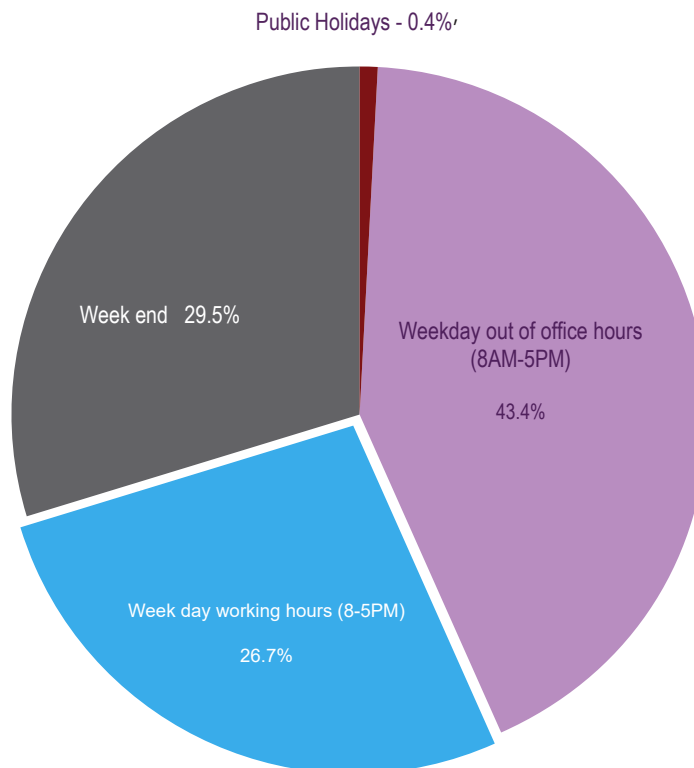
**Table 3: characteristics of women who had delivered at the time of death (n=329)**

Characteristic	Categories	Frequency	Per cent
Place of delivery	Health Facility	332	88.8
	Home	26	7.0
	Born en route	2	.05
	Not recorded	14	3.7
Mode of Delivery	Vaginal Delivery	229	61.3
	Caesarean section	138	36.9
	Assisted vaginal delivery	7	1.9
Pregnancy outcome	Live Births	189	50.5
	Still Births	124	33.2
	Not recorded	61	16.3

### Mode of delivery by timing of death

- **37.4% (181)** of the maternal death occurred in the postpartum period.
- **18.4% (89)** of the deaths occurred during the intrapartum period
- **70.8% (63)** of intrapartum deaths were delivered by ceaserean section
- **For 70% (126)** of postpartum deaths, the mode of delivery was vaginal.
- Of the maternal deaths, most occurred during the post-partum period **62.2% (301)**
- Cumulatively most women died outside working hours (5pm-8am on week days, weekends and public holidays) **73.3% (355)** (Figure 4).

**Figure 4: Percentage distribution of period of death**

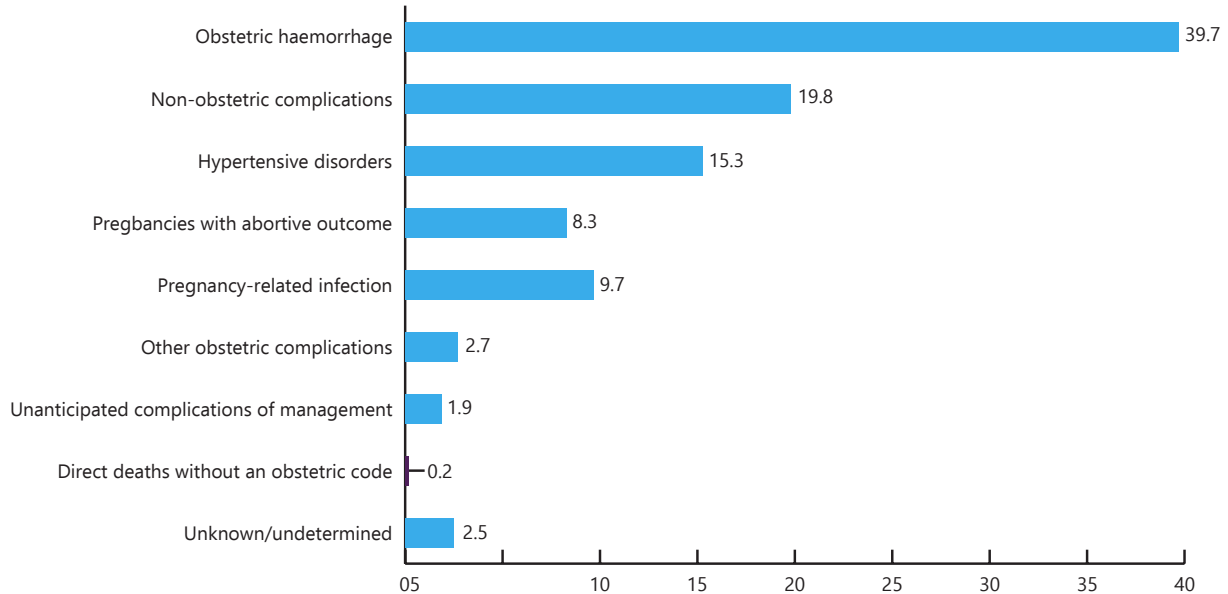


#### 2.4. Underlying cause of maternal death

- **77.7% (376)** were direct MDs while **19.8% (96)** were indirect MDs.
- Obstetric haemorrhage **39.7% (192)**, non-obstetric complications/indirect MDs **19.8% (96)** and hypertensive disorders associated with pregnancy **15.3% (74)** were the most common causes of all maternal deaths (**Figure 4**).
- The 3 leading causes of direct maternal deaths (376) were obstetric haemorrhage **51.1% (192)**, hypertensive disorders associated with pregnancy **19.7% (74)** and pregnancy related infection **12.5% (47)**

- The leading causes of indirect maternal deaths were HIV-related complications **22.9% (22)**, Anaemia **14.6% (14)**, Protozoal diseases e.g. Malaria **10.4% (10)** and Diseases of the circulatory system **10.4% (10)**. Mental disorders and diseases of the nervous system constituted **3.1% (3)**.

**Figure 5: Underlying cause of maternal Death based on ICD 10 classification**



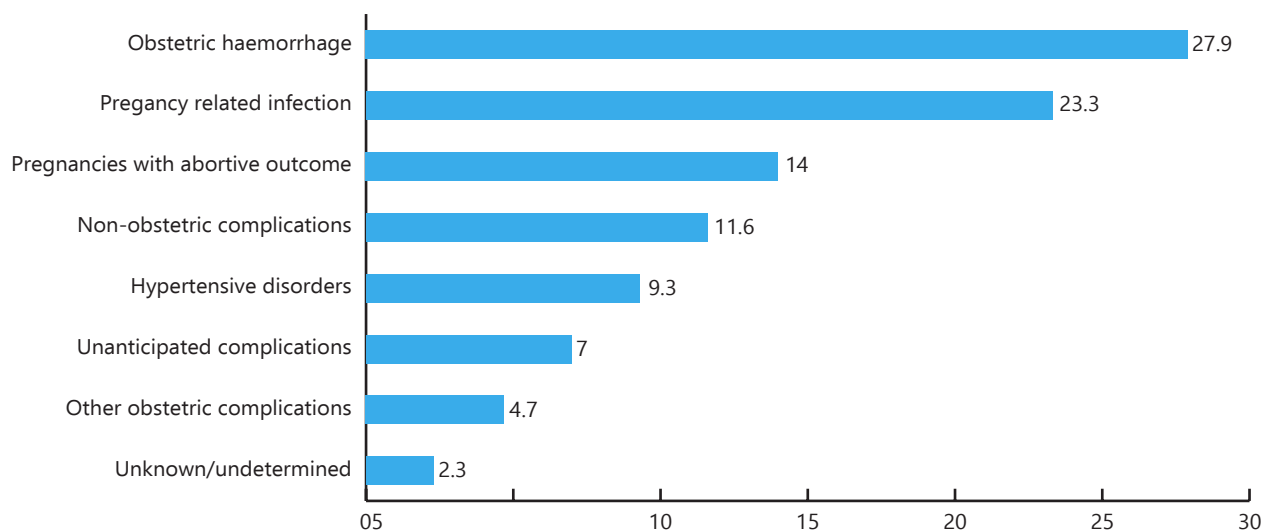
## 2.5. Women who had stillbirths and women who died before childbirth

- 25.6% (124)** of women who died had a still birth.
- 14.5% (70)** of women died before childbirth (undelivered).
- For women who had stillbirth, **54% (67)** of the maternal death were due to obstetric haemorrhage and **21% (26)** were due to hypertensive disorders in pregnancy, childbirth and the puerperium period.
- 40% (28)** of women who died before childbirth died due to non-obstetric complications **21.4% (15)** due to hypertensive disorders and **18.6% (13)** due to obstetric haemorrhage.

## 2.6. Maternal death among adolescent mothers

- **8.9% (43)** of the women who died were young mothers aged below 20 years.
- **62.8% (27)** of them were having their first and **20.9% (9)** were having their second pregnancy. One adolescent mother was having their 4th pregnancy.
- **81.4% (35)** of the deaths in adolescents, were due to direct causes and **11.6% (5)** were due to indirect causes.
- Most adolescents died of obstetric haemorrhage **27.9% (12)** (**Figure 6**).

**Figure 6: Underlying cause of death among adolescent mothers**





## 2.7. Quality of care

- Medical officers were involved in the management of **54.1% (262)** of women who died and obstetricians were involved in the care of only **11.4% (55)** of cases.
- Most of the maternal death that occurred in the antenatal period were due to non-obstetric complications (indirect causes) **46.6% (34)** and hypertensive disorders **24.7% (18)**.
- Most **73.3% (355)** maternal deaths occurred outside working hours (after 5pm to before 8am), on weekends and public holidays. **26.7% (129)** died during weekday normal working hours (8am-5pm).
- Of the 484 maternal deaths assessed, **447 (92.4%)** received sub-optimal care, where different management **would have definitively** made a difference to the outcome.
- The most frequent gaps in care of women who died at all levels of care were, incorrect management when a correct diagnosis was made, infrequent monitoring and prolonged abnormal observation noted but no action.

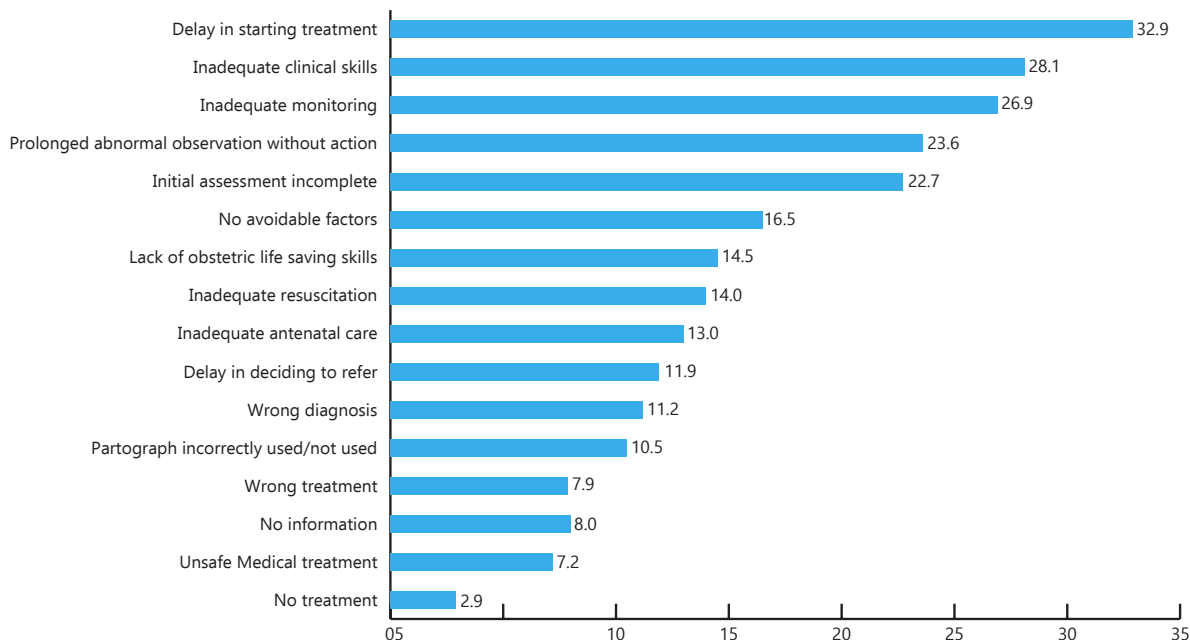
## 2.8. Contributory and associated factors

- Of the 484 maternal deaths assessed, one or more associated factors were identified in **89.3% (432)** of the maternal deaths.
- One or more health worker related factors were identified in **75.4% (365)** of the maternal deaths.
- One or more patient/family and administrative factors were identified in **41.9% (203)** and **34.9% (169)** of MDs respectively.
- For **64.5% (312)** of the maternal deaths there was insufficient information to identify community associated factors.

## Healthcare worker factors

The most frequent health worker related factors identified were: delay in starting treatment **32.9% (159)**, inadequate clinical skills **28.1% (136)**, inadequate monitoring **26.9% (130)**, prolonged abnormal observation without action **23.6% (114)** and incomplete initial assessment **22.7% (110)**.

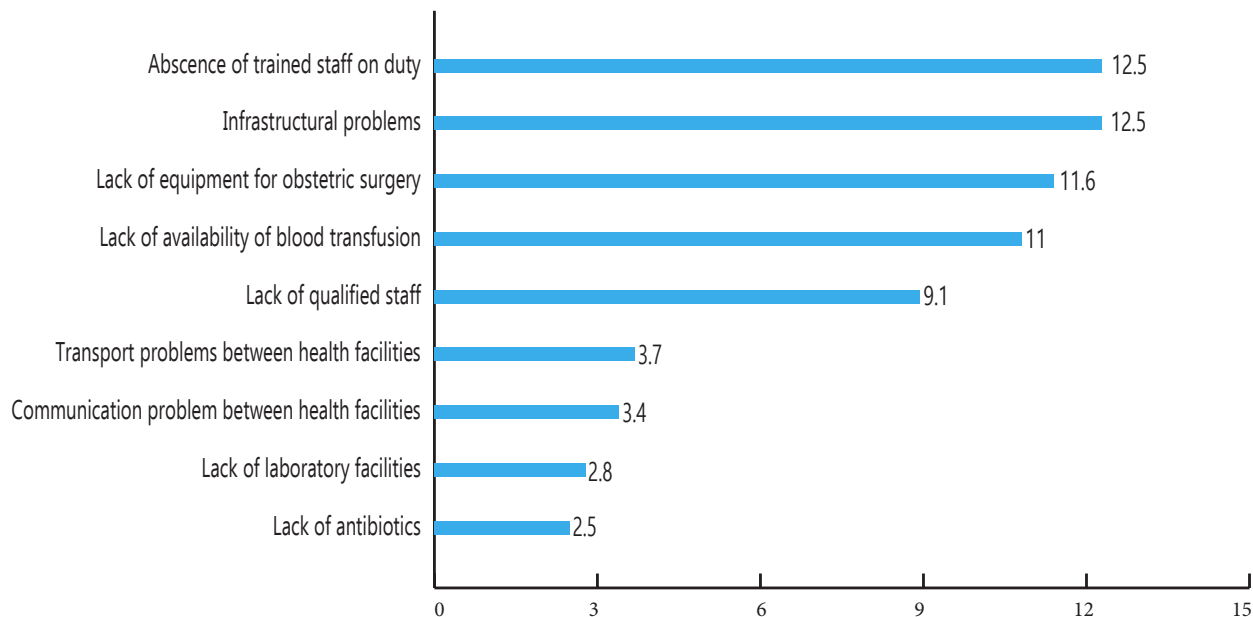
**Figure 7: Health workforce related factors**



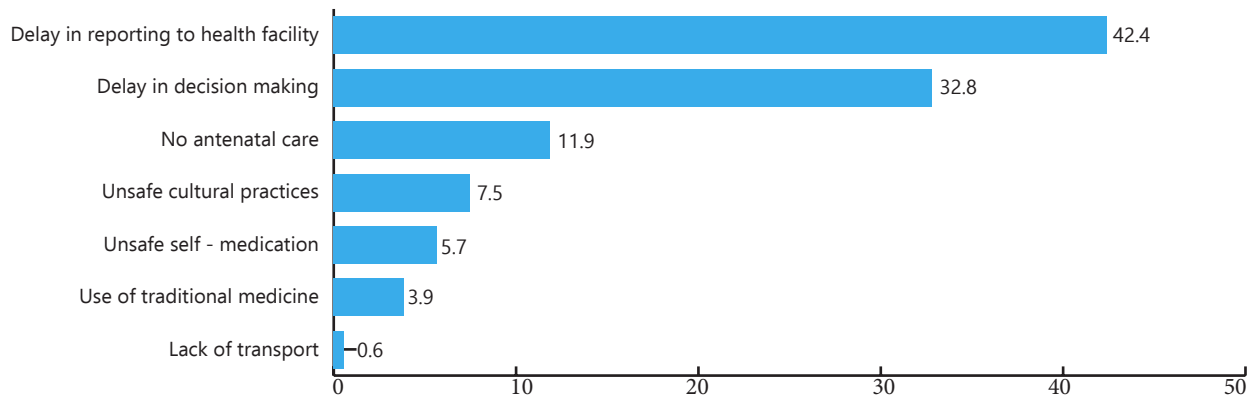
## Administrative factors

- Among the **353** deaths in which information was available, **47.9% (169)** had avoidable administrative factors that may have affected the quality of care provided.
- The most frequent administrative factors identified included absence of trained staff on duty **12.5% (44)**, infrastructural problems **12.5% (44)**, lack of equipment for obstetric surgery **11.6% (41)**, lack of availability of blood transfusion **11.0% (39)** and lack of qualified staff **9.1% (32)**.

**Figure 8: Summary of administrative factors identified**



**Figure 9: Summary of patient/family factors identified**





## Patient/family factors

- Of the 335 deaths in which information was available, the most frequent patient/family associated factors were delay in reporting to health facility **42.4% (142)** and delay in decision making **32.8% (110)**. There were no avoidable patient/family factors identified in **132 (39.3%)** of the deaths.

## Community factors

- Failure to recognize danger signs **12.2% (21)** and delay in deciding to refer **11.0% (19)** were the most frequently identified community factors associated with maternal deaths.
- Of the 172 maternal deaths in which information was available; there were no avoidable community factors identified in **143 (83.1%)**.

# 3. Recommendations

Several recommendations for different levels of health care administration and management, and the community are as follows:


## 1. Leadership

While tremendous investments have been made in maternal and newborn health in Kenya, related health indicators do not match the investments. This report illustrates a need for accountability for results in maternal and newborn health by the highest level of leadership from the National and County governments.

## 2. National Level

- Develop relevant policy and legislative backup for the confidential enquiry into maternal death process by anchoring the MPDSR process in legislation - MNCH Bill.
- Strengthen the maternal death surveillance system to improve the notification of maternal deaths.




- 
- Integrate a qualitative enquiry in the confidential enquiry into maternal death surveillance and response process.
  - Standardize patient record documentation to improve quality of records at healthcare facility level.
  - Explore use of electronic medical records in maternal and newborn health.
  - Providers of maternity care should have regular and mandatory updates in emergency obstetric and newborn care.
  - Expand on diagnostic capacity including laboratory services and point of care tests in MNCH.
  - Embrace and scale up innovations that increase blood and blood products availability and safety e.g. delivering blood using drones.
  - Rationalise staffing norms and models for remuneration of specialists through output-based modalities such as fee for service, capitation, and mixed method payment.
  - Provide up-to-date treatment protocols in a user-friendly format including in electronic formats and applications for all maternity care providers.
  - Develop policy to expand access to post abortion care (PAC) services.
  - Strengthen adolescent sexual and reproductive health policies and implementation models to address teenage pregnancies.
  - Embrace and scale up the use of technology to enhance access and availability of quality care in maternal and neonatal health (MNH).
  - Institute mechanisms for perinatal death reviews in all health facilities and produce a national report biannually.

### **3. County level**

County governments through the Department of Health should:

- Within a year, increase performance of facilities to above 70% with all signal functions in BEMONC and CEMONC facilities in each county; and, secure financial arrangements for county department of health especially MNH.

- 
- Embrace and scale up innovations that increase blood and blood products availability and safety e.g. delivering blood using drones.
  - Ensure capacity building and mentorship of healthcare workers at all levels of care and retention within the appropriate department for at least 2 years.
  - Ensure specialists are available- rationalise working hours, remuneration and incentives.
  - Improve data quality and use - stock taking of maternal and newborn health indicators against set targets.
  - Link MNH to critical care - using available resources to improve care for women.

#### **4. Health Facility Level**

- Enforce and supervise proper documentation of the care provided to mothers in all health facilities.
- Maternity care providers should have regular (2 years) and mandatory updates in emergency obstetric and newborn care (including triage and referral), antenatal care (ANC) and postnatal care (PNC).
- Embrace and scale up innovations that increase blood and blood products availability and safety.
- Provide the minimum package of care in ANC and PNC to all clients at all levels of the health system (public and private).
- Improved monitoring of women in ANC, labour and in the post-partum period.
- Regular audit and feedback of care should be conducted to continuously improve the quality of care.
- Reorganization of care to ensure that high risk pregnancies are managed by specialist teams supported by appropriate resources (test reagents/kits, drugs, equipment, intensive care unit etc.).
- Training in the use of spinal anaesthesia and provision of resources needed is important especially at levels 3 and 4 hospitals.



#### 4. Community Level

- Expand community level health services (level 1).
- Preventive and promotive health services.
- Data generation and use at community.
- Strengthen linkages between the community and the health facility.
- Referral of all women to the health facility.
- Strengthen community reporting of maternal deaths.

## 4. Lessons learnt

The first CEMD conducted in Kenya contains limited information on perinatal deaths. Consultations will be made with relevant stakeholders to map the resources required to include perinatal deaths in future reports.

Some improvements to the assessor's forms have been identified, the form and MAMAs software have been updated and will be used in subsequent CEMDs in Kenya.

## 5. Further research

Further research into factors associated with post-partum deaths, caesarean sections, quality of care for ANC and post-partum care is needed. Also, further exploration of the factors associated with deaths outside normal working hours is needed to develop measures to reverse the pattern observed.

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