Perioperative Mortality Review and Response Guide

April 2021

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Acronyms

ASA- American Society of Anesthethiology

CDC-Center of Disease Control

CRCP-Curative and Rehabilitative Core Process

DHIS-2-Demographic Health Information System-2

EMS-Emergency Medical Service

EAS-Ethiopian Anesthetic Society

ESS-Ethiopian Surgical Society

ESOG-Ethiopian Society of Obstetrics and Gynecology

FBSDA- Facility Based Surgical Death Abstraction format

HAI-Healthcare Associated Infection

HIC-High Income Country

HMIS-Health Management Information System

HSQD-Health Service Quality Directorate

HSTQ-Health Sector Transformation for Quality

HSTP-Health Sector Transformation Plan

KPI-Key Performance Indicator

LCoGS-Lancet Commission on Global Surgery

LMICs-Low and Middle Income Countries

MDG-Millennium Development Goal

M&E-Monitoring and Evaluation

MoH-Ministry of Health

POMR-Peri-operative Mortality Review

QI-Quality Improvement

RHB-Regional Health Bureau

SaLTS-Saving Lives through Safe Surgery

SDG-Sustainable Development Goal

SOP-Standard Operative Procedure

SSI-Surgical Site Infection

TWG-Technical Working Group

UHC-Universal Health Coverage

UMIC-Upper Middle-Income Country

WHO-World Health Organization

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Forward

Ethiopia has been committed to ensuring that Essential and emergency surgical care is accessible and affordable to its citizens. During the first Health Sector Plan, the Ministry of Health has developed and implemented two strategies- the National Healthcare Quality Strategy (NQS) and Saving Lives Through Save Surgery Strategy (SaLTS)- that mainly aimed to improve the quality and safety of the care. Besides the SaLTS initiative was launched in response to the World Health Assembly resolution-68/15 and visioned to make essential and emergency surgical and anesthesia care accessible and affordable as part of the universal health coverage.

Among the key pillars in the SaLTS, strategy has been quality management. In line with quality improvement projects improving surgical care has been initiated and showed encouraging results. However, the data use at the facility level for improvement and data quality at all levels has been an issue.

This guide, therefore, provides detailed directions and procedures to improve the spectrum of activities in the process of reducing all preventable perioperative mortality. In addition, it standardizes the death review, improvement, and learning among the department and facilities.

As an improvement demands teamwork and a multidisciplinary approach, I would like to call upon all relevant stakeholders: Surgical society, anesthesia and anesthesiologist society, and nursing society; partner organizations, all care providers and health managers and leaders at all level to work hand in hand in to reduce the preventable perioperative mortality through implementing and institutionalizing death review, response plan and implementing those recommendation to the causes and contributing factors through quality improvement methods.

Finally, I would like to take this opportunity to extend warm appreciation to all individuals and organizations who have actively participated in the development of this guide.

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1. Introduction:

Access to surgical care been and remain an integral part of effective health systems, with surgical disease accounting for 30% of the global burden of disease and Low- and middle-income countries (LMICs) bear the majority of the burden of surgical disease. Rapid improvements in increasing access surgical care been observed during the last decades, However, this increasing access has not been associated with the desired outcomes observed in LMIC surgical facilities, where 6.3 billion of the world's population resides and the unmet global burden of surgical disease is substantial. The Lancet Commission Global Surgery reported that nearly 5 billion people do not have access to safe, affordable surgical and anesthesia care, clearly demonstrating the need to improve both access and quality and safety in this setting. Reduction of death and disability hinges on access to surgical and anaesthesia care, which should be available, affordable, timely, and safe to ensure good coverage, uptake, and outcomes. The perioperative mortality rate (POMR) has been observed to stagnate, with the number of deaths following surgery estimated to be twice than the global average and estimated to be the third leading cause of death globally, highlighting the need to assess the barriers to high quality surgical care systematically.

Ethiopia context

During the MDG era, the government of Ethiopia initiated several efforts to improve access to, despite recognized concerns of equity (2). With 0.41 surgeons per 100,000 patients, Ethiopia is behind the falls far short of the targeted 20 surgical, anesthetic, and obstetric providers recommended by the Lancet Commission. For instances, 48% of surgeons were practicing around the capital Addis Ababa , where only 3.7% of the country’s population is concentrated and 80% of surgeons practicing in the public sector.

The MoH has identified surgical quality and safety improvement as one of the health priorities (3) which led to the development and execution of several strategies including Saving Lives through Safe Surgery (SaLTS) aimed to critically review the safety of surgery and anaesthesia care.

The government also developed and implemented three roadmaps for General Surgery Human Resources, an Anaesthesia Human Resources, and National Essential Anaesthesia Equipment and Supplies Roadmap.

Aligned with the global strategies and with aim of meeting the United Nations' ambitious universal health coverage (UHC) and Sustainable Development Goals(SDGs) and targets, recently HSTPII, and NQPS strategy outlined quality and safety as a priority to improve access along with ensuring quality, safety of the surgical procedure.

Now, the global community began to look beyond access and develop solutions to deliver high quality perioperative care equitably. Surgical services must also continuously measure patient outcomes to identify shortcomings, inform improvements, and maintain high levels of quality care. Audit of perioperative mortality perioperative or review has been recognized as an important approach to assess the quality of surgical and anaesthetic services and the quality systematically with the aim of identifying shortfalls in service and taking remedial measures. Global target was also set that includes that 80% of countries by 2020 and 100% of countries by 2030 tracking perioperative mortality.

Thus POMR should be reported as a health indicator by all health facilities. POMR reporting is feasible, credible, achieves a consensus of acceptance for reporting at national level. Hospital and Service level POMR requires interpretation using simple measures of risk adjustment such as urgency, age, the condition being treated or the procedure being performed and ASA status. The national target is not yet set; however taking the global target in to consideration the national target should be set.

The perioperative period is a term used to describe the three distinct phases of any surgical procedure, which includes the preoperative phase, the intraoperative phase, and the postoperative phase. By maintaining a strict adherence to procedures and a clear chain of command, hospital teams are able to deliver consistent, optimal care from the moment a surgery is ordered to the time when a person is fully recovered

Development of regular M&E framework is recognized as important steps to continuously track performance surgical care, and understanding of issues of quality and safety particularly linked to the perioperative mortality to understand causes circumstance led to the

outcome. The information generated in these regard provide information on quality of care gap and to develop and implement intervention to improve care quality aimed at preventing similar deaths in the future.

Therefore, we must first count the dead, death review or audit and then develop and implement response actions to improve care.

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2. Rationale:

The ministry of health Ethiopia has developed the saving lives through safe surgery strategic plan with the aim to improve the access and quality of essential and emergency surgical service in the country, with the surgical service key performance indicators (KPIs) were also introduced in to the routine DHIS-2 data reporting plat form one of which is the perioperative mortality rate. The national perioperative mortality rate is 1.1% and 0.83% in 2011and 2012 EC which is far from the expected surgical deaths in LMICs, which may be due to either under reporting or difficulty in capturing the perioperative deaths. Surgical facilities should record perioperative mortality and use this information for quality improvement and learning processes. In general, perioperative mortality data that has not been risk-adjusted should be aggregated and tracking progress on surgical, obstetric, and anesthesia system strengthening to make strategic and tactical decisions about the national surgical, obstetric and anaesthesia plans.

Thus the rationales behind the perioperative death review and response guide are:

- Absence of uniform Perioperative death data capturing and auditing, reviewing and responding among surgical facilities.
- Providing information about avoidable factors that contribute to perioperative death and using the information to guide actions that must be taken at the surgical facility, RHB and at MOH level with the aim to improve the quality of care being provided.
- To establish a system of learning for improved quality of surgical care at health facilities.
- Establishing the framework for an accurate assessment of the magnitude of perioperative mortality

3. Purpose of the guide:

This preoperative mortality review guidance introduces the critical concepts of POMRR including its goals, objectives, and specific instructions for implementing each component.

This guideline will help to:

1. Clarify definitions, principles, processes and concepts used in POMRR
2. Clarify roles and responsibilities of different actors
3. Emphasizing on death audits and for identification and responding to the major causes and contributing factors for perioperative mortality

Users of this guidance:

A variety of health programmers, health service providers and institutions working on surgical services can benefit. It is designed for use by:

1. Surgeons, gynecologists, Anesthetists, OR nurses at facility level
2. Facility level surgical services improvement team
3. Health managers at all levels

4. Goal and Objectives:

Goal: To reduce preventable Peri-operative mortality in the health facility.

Overall objectives:

- To provide information that effectively guides actions to reduce preventable Peri-operative mortality in the health facilities
- To count every Peri-operative mortality in the health facilities and asses trends in Peri-operative mortality rate and the impact of actions taken to reduce it.

Specific objectives:

1. To collect accurate data on all Peri-operative mortality in the health facilities through identifying and reporting of Peri-operative mortality and cause of death and contributing factors,
2. To use the data to make evidence-based recommendations for surgical care quality improvement to prevent similar Peri-operative death in the facility ,
3. To analyze and interpret data collected, including:
    - Trends in peri-operative mortality;
    - Perioperative mortality causes of death (medical) and contributing factors (quality of care, nonmedical factors);
    - Preventability of the deaths, focusing on those factors that can be remedied;
    - Risk factor and groups at increased risk;
    - Demographic profiles
4. To ensure implementation of response plans designed and implemented in accordance with the recommendations.

5. Definitions:

Perioperative mortality

All death occurs in hospital before discharge in patients who have undergone a procedure under general or regional anesthesia in an operating theatre.

Perioperative mortality rate

All-cause death rate before discharge in patients who have undergone a procedure in an operating theatre, divided by the total number of procedures, presented as a percentage

Perioperative mortality review

Perioperative Mortality Review (POMR) is a systematic review process to examine issues relating to the quality of surgical and anesthetic services and the quality of supporting and logistic services systematically with the aim of identifying shortfalls in service and taking remedial measures. .

6. Guiding principles:

The review will be carried out in accordance with the following principles:

- No blame policy - Death reviews focus on health systems not individuals.
- Confidentiality of all reports and data.
- Anonymity of all parties involved (i.e. doctors, staff, patients & hospital)
- Objectivity in assessment/ review of cases.
- Evaluation of the quality of care.
- Referring to a professional standard/ benchmark

7. Conceptual model

As the emerging global consensus is lining to augment the three-delay model for perioperative mortality death review which also incorporate other mortality contributing factors that are outside of the facilities. This model termed as 'Three Delay Model' which consist of:

1. Delays in seeking care: factors that influence the socioeconomic and cultural reasons for seeking health services.
2. Delay in reaching care: factors that include geographical accessibility and availability of transportation to reach obstetric health services.
3. Delays in receiving care: factors that influence service delivery delays within a healthcare facility.

With perioperative mortality rate as the key indicator for surgical and anesthesia quality care at facility level we follow the, three broad phases of the perioperative pathway where the health system operates but with quality gaps that contribute to perioperative death.

The Three Perioperative Phases of Surgery

The perioperative period is a term used to describe the three distinct phases of any surgical procedure, which includes the preoperative phase, the intraoperative phase, and the postoperative phase. Every surgery is broken down into these phases to differentiate tasks and establish who is responsible for overseeing and delivering each stage of care. By maintaining a strict adherence to procedures and a clear chain of command, hospital teams are able to deliver consistent, optimal care from the moment a surgery is ordered to the time when a person is fully recovered.

Preoperative Phase

The initial phase, called the preoperative phase, begins with the decision to have surgery and ends when the patient is wheeled into surgery. Its objective is the preparation of the patient for surgery.

Intraoperative Phase

The second phase, known as the intraoperative phase, involves the surgery itself. It starts when the patient is wheeled into the surgical suite and ends when the patient is wheeled to the post-anesthesia care unit (PACU).

During this phase, the patient will be prepped and typically given some form of anesthesia, either general anesthesia (for complete unconsciousness), local anesthesia (to prevent pain while awake), or regional anesthesia (such as with a spinal or epidural block).

As the surgery begins, the patient's vital signs (including heart rate, respiration, and blood oxygen) will be closely monitored. In addition to the roles of the surgeon and anesthesiologist, other team members will be responsible for assisting the surgeon, ensuring safety, and preventing infection during the course of the surgery

Postoperative Phase

The final phase, known as the postoperative phase, is the period immediately following surgery. As with the preoperative phase, the period can be brief, lasting a few hours, or require months of rehabilitation and recuperation.

Once the patient is awake and ready to leave PACU, the post-anesthesia nurse will typically transfer the responsibility of care back to the perioperative nurse. (In smaller hospitals, the same person may be tasked with both responsibilities.)

Postoperative care is mainly focused on monitoring and managing the patient's physiological health and aiding in the post-surgical recovery. This may include ensuring hydration, monitoring urination or bowel movements, assisting with mobility, providing appropriate nutrition, managing pain, and preventing infection.

8. Component of the review process:

The perioperative mortality review system is a continuous-action cycle designed to provide real-time, actionable data on perioperative mortality levels, causes of death, and contributing factors, with a focus on using the findings to plan appropriate and effective preventive actions that aims to improve the quality of surgical care.

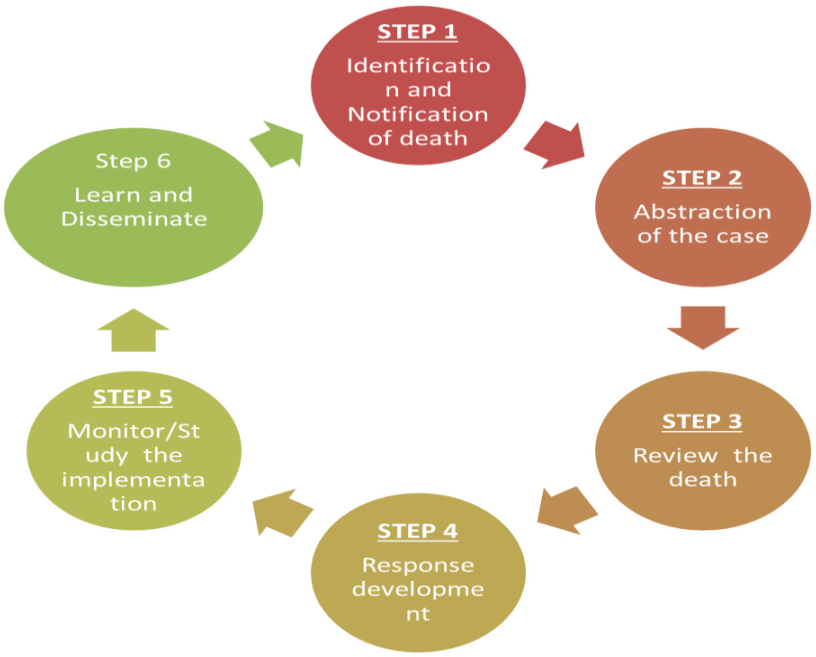


Fig1. Perioperative mortality Review Cycle

i. Identification and Notification of death:

Identification of all Perioperative death in facilities (maternity, surgical emergency, and other wards) followed by immediate notification within 24 to the focal person.

ii. Abstraction of the case:

This is a step to collect information about the death using the structured tool. This information is to be gathered and addressed by the focal person within 1 week. The sources of information to complete the abstraction format will be the medical record (client chart, registers, death logs, operation notes) and healthcare providers in the facility (involved in the provision of health care).

In most cases, at the initial phases of the perioperative mortality review process, data abstracted from the patient's medical records may not be complete thus more detailed discussions at the review meeting on data completeness issue might be required.

iii. Review of the death

In this step the review committee reviews the data collected to ascertain the causes of death and identify modifiable factors and formulating appropriate recommendations or Action plans

A written summary of each death, including key findings, is prepared and presented to the review Committee or team that discusses the case and reviews all pertinent data. The committee meeting reviews the path to death, all the events leading up to the death to identify the immediate and underlying causes of death and reach on the exact cause of death.

Once the medical cause of death has been established, the review committee meeting should also examines the information collected and identifies potentially modifiable factors

The ultimate goal of mortality review is to learn from events and improve patient care. Once the committee identified the key problems, then the problem analysis will be done through brain storming.

The committee then issues recommendations and develop action plan which may be broad or specific, to address avoidable factors noted by the review to prevent similar deaths and further improve the quality of care in the future.

iv. Response

A death review without subsequent action will not improve the quality of care or reduce the number of deaths. If the recommendations made are not implemented, staff will be frustrated and demoralized and may refuse to participate in reviews

At this step the team develops an action plan based on the recommendations that were proposed. The type of action taken will depend on the level at which the decisions are being made, the findings of the analysis, and the stakeholders involved. Improving quality of care is an important

element of response at the health facility. During the action plan development the team should consider the following points:

- ✓ It may be more effective to first focus on the recommendations that can be implemented by health workers and to use success in those activities to advocate for further action or resources for recommendations to be implemented by the administration
- ✓ Just follow evidence-based approaches;
- ✓ Prioritize actions based on prevalence, feasibility, resources,
- ✓ Set timeline
- ✓ Monitor to ensure recommendations are being implemented and its progress
- ✓ Assign a team member for the follow up

v. Monitor/Study the implementation

The final step in the audit and review cycle is determining what worked – in the audit itself, in the changes made and in patient outcomes – and what did not, in order to adapt approaches for quality improvement.

The committee should act on feedback from participants and use indicators to determine improvements of quality and safety of patient care, facility performance and professional learning

vi. Learn from the lessons

The purpose of the death review and planning and implementing the response plan is ultimately for the improvement of the care. For continuous improvement to happen, learning from the lessons is very critical element in the review cycle. It also strengthens the effort to institutionalize the quality and safety culture. Thus the committee should also give emphasis in documenting the lessons learned and disseminate interventions that worked well for learning ad scaling up institution wide and as well as to other facilities.

8. Potential Risk Factors in Perioperative Mortality :

Known of potential factors influencing perioperative mortality

Patient related factors

- Comorbidities
- Age
- Severity and nature of illness

Health systems related factors

- Prehospital transport
- Delay to admission,
- Delay referral facilities
- Appropriate center for condition

Postoperative surveillance for complications

- Nursing availability and level of training
- Provider: patient ratio
- Frequency of physician assessments
- Availability of diagnostic testing

Provider related factors

- Adherence to operational standard/ evidence-based practice

Data related factors

- Document completeness
- **Risk adjustment methods (**Crude measures reported, Risk-adjusted outcomes reported & Risk-stratified outcomes reported**)**

Ability to rescue after complications

- Availability of preoperative care
- Availability of intravenous antibiotics
- Availability of blood bank
- Availability of image-guided interventions
- Availability of critical care beds
- Availability of ventilators
- Availability of dialysis
- Availability of cardiac interventions

1. **Operative related factors**
2. **Urgency** (Planned emergent)
3. **Surgical Approach** (Open, minimal invasive)
4. **Intrinsic procedure risk** (By specialty, By procedure & By complexity score)
5. **Surgeon skill** (Specialty versus non specialty surgeon, Surgeon versus non-Surgeon physician, Physician versus non physician Surgeon, Trainee versus fully-trained surgeon & Inter-surgeon variation)
6. **Anesthetic modality** (General, regional, local)
7. **Anesthetists skill** (Specialty versus non specialty Anesthetist, Anesthetist versus non- Anesthetist physician, Physician versus non physician Anesthetist, Trainee versus fully-trained Anesthetist & Inter-Anesthetist variation)

Description of The risk factors

Surgical approach

The approach is defined as the technique used to reach the site of the procedure. So basically - how did they enter the body to get to the site that needed to be operated on. There are seven different approaches. External Open with Percutaneous Endoscopic Assistance, Via Natural or Artificial Opening Endoscopic, Via Natural or Artificial Opening, Percutaneous Endoscopic, Percutaneous, open surgery

Anesthetic modality

There are four main categories of anesthesia used during **surgery**: general anesthesia, **regional anesthesia**, sedation (sometimes called "monitored anesthesia care"), and **local anesthesia**.

Standard operating procedures (SOP) and protocols

- **SOP** can be seen as more specific than guidelines, defined in greater detail.
- **Protocols** provide a comprehensive set of rigid criteria outlining the management steps for single clinical Condition or aspects of organization

Perioperative care

Perioperative care, is the practice of patient-centered, multidisciplinary, and integrated medical care of patients from the moment of contemplation of surgery until full recovery.

Image-guided interventions

Image-guided interventions are medical procedures that use computer-based systems to provide virtual **image** overlays to help the physician precisely visualize and target the surgical site

Emergency medical services (EMS),

Also known as **ambulance services** or **paramedic services** are emergency services that provide urgent pre-hospital treatment and stabilization for serious illness and injuries and transport to definitive care.

Appropriate center for condition

For surgical service to be appropriate safer, minimized mortality and morbidity for specific procedure , the health facilities must equipped with medical equipment, trained and skilled health professionals, standardized procedures and cares for that specific surgical condition. The facility also equipped with the capability of managing complication related to the procedure or service provided.

Delay referral facilities

Is the inability of the referring health facility to transfer the patient for next level of care and the inability of the receiving health facility to perform procedures before critical time because of the skill of the health professionals, unavailability diagnostic facilities, and poor adherence for protocols and standards.

Delay to admission

Is a delay happened during appointing surgical patients for surgical procedure? The inability of the health facility to prioritize the patients based on the severity, and in efficient use of surgical tables Mentioned contributing factors for perioperative mortality are depending on the facility, working environment and other factors, each facility might have different influencing factors for perioperative mortality.

Modifiable factors

Social and environmental risk factors

Sometimes the patient environment is inadequate for health and development. It is important to recognize social and environmental modifiable factors when reviewing deaths. These may include an unsafe home environment, with poor household sanitation or unsafe household water supply; or loss to medical follow-up, low health literacy or poor adherence to medication. The patient may suffer from neglect, with lack of adequate adult supervision, or the family may be homeless or live-in extreme poverty. There may be domestic violence in the family, parental drug or alcohol abuse, with previous notification to child protection services or social welfare services.

Delay in seeking or reaching care

Delay in seeking care may be a result of several factors. Parents or caregivers may not recognize signs and symptoms of illness or danger signs, or they might first seek care from traditional

medicine practitioners. They may be reluctant to seek care at health facilities because they perceive poor quality of care (e.g., long waiting times, unpredictable opening hours, regular stock-outs of medicines or rude health workers). Other factors are poor access due to distance, lack or cost of transport and poor roads. Other reasons might be delayed referral to a higher level from a first-level health facility or delay in transfer to receive effective care, or seeking care in facilities with no capacity for emergency treatment or no staff with expertise in the management of severe acute illnesses.

- The relationship between the location of health care facilities with the capacity to provide appropriate services, the location of the population needing them, and the transport opportunities available
- The ability and willingness of care providers to serve the population in accordance with the type and severity of the presenting condition
- The timing and hours of available services and the times patients seek care
- The range, quantity, and quality of services provided and the nature and extent of the health needs of people seeking care

In primary care and referral systems

Some modifiable factors in patient deaths are delays or problems in primary health services or referral systems. Improvements might have to be made, for example, in ensuring reliable drug supplies, avoiding delayed referrals, increasing the competence of health workers and ensuring the safety and speed of transfer of sick patients.

Potentially modifiable factors in prehospital care include:

- Closure or lack of peripheral health facilities
- Lack of essential medicines or medical supplies such as oxygen at peripheral health center
- Delays in referring severely ill patients or in escalating care;
- Lack of transport or inadequate care during referral
- Referral of a severely ill patients without an accompanying health worker or
- Incorrect advice or treatment by a primary health worker.

Lack of triage or delayed emergency treatment

There are often delays in immediate assessment and initial treatment of severely ill who present to hospital emergency. In busy emergency departments, a severely ill patients may die because the attendee does not know that he or she is very ill, and it is too late by the time the attendee is seen. Health workers must be understanding of parents' concerns when they show them and be vigilant for severe illness patient of quiet attendee. Emergency treatment may be delayed in very busy emergency that do not have a system for identifying severely ill patients and triaging them to urgent or immediate care. There may be insufficient clinical staff for the number of patients or staff absences. In some facilities, there are no clear directions or signs in outpatient or emergency departments indicating where and how attendee should take their severely ill patient for immediate care. The area of the facility in which severely ill patient first present may lack emergency life-saving medicines, supplies and equipment, or there may be a lack of competent health workers to assess, resuscitate and provide emergency care.

- Skill of health professional for triaging (under triage)
- Standards SOP
- Tools for screening severely ill patients

Problems in clinical assessment, diagnosis and treatment

A correct or working differential diagnosis is important for appropriate care. It involves taking a good history, conducting an examination and laboratory tests and pre anesthetic evaluation. The diagnosis should be as specific as possible from the presenting clinical symptoms and signs; for example, Preoperative evaluation will result in under-treatment. It is often not possible to be absolutely sure of a diagnosis; however, treatment should be given on the basis of the most likely diagnosis or problem. If they are uncertain, health workers should seek a second opinion, and reassess the patient. An incorrect diagnosis may be made because the health worker lacks knowledge, skills and experience or because the condition is rare.

Problems in monitoring and supportive care

The clinical progress of every sick patients must be monitored after admission to hospital to identify changes in their condition or early clinical deterioration in order to protect them from harm or errors. Routine monitoring of vital signs (temperature, pulse, blood pressure, respiratory

rate and oxygen saturation and, in the most critically ill patients, convulsions, pain, level of consciousness,

Surgical Site-infections

Some patient dies not from the surgery performed but from complications of being in hospital, including infections, poor infection control practices, Adherence of SOP for sterilization methods, barriers, surgical technique, and availability and timely use of antimicrobial prophylaxis and intravenous access complications. The CDC healthcare-associated infection (HAI) prevalence survey found that there were an estimated 110,800 surgical site infections (SSIs) associated with inpatient surgeries in 2015. But Significant improvement have been made in infection control practices, including improved operating room ventilation, sterilization methods, by introducing barriers, introducing improved surgical technique, and availability of antimicrobial prophylaxis. In addition to the above mentioned, Surveillance of SSI with feedback of appropriate data to surgeons has been shown to be an important component of strategies to reduce SSI risk. A successful surveillance program includes the use of epidemiologically-sound infection definitions and effective surveillance methods, stratification of SSI rates according to risk factors associated with SSI development, and data feedback

Time of death

In some hospitals, a disproportionate number of deaths occur at night, when there are fewer staff to monitor patients and respond to deterioration of a patient condition.

Anesthesia Safety

The safe provision of anesthesia is a critical consideration in establishing and expanding the capacity for surgical care. Improvements in anesthetic monitoring and techniques have led to dramatic improvements in its safety profile in HICs and UMICs. In many settings with low levels of human resources, however, anesthesia is provided by no- physician clinicians or technicians, or even by the operating surgeons. Poor Training, supervision, and monitoring standards all contribute to high mortality from the administration of anesthesia. Anesthesia in HICs and UMICs has improved only relatively recently, with changes in monitoring and increased standardization responsible for a 100-fold reduction in mortality over the past 40 years—34 deaths per million instances of anesthetics.

Intra-operative Safety

Surgical intervention, by its nature, involves risks. High-quality and high-resource systems still fail to provide proven interventions every time for every patient. Use of WHO safe surgery checklist, following Standard operating procedures, keeping infection prevention and control rules, minimizing time of surgery, improving surgical skill and managing traffic flow in operation theater are some of the best method of avoiding surgical related morbidity and mortality.

Postoperative Care and Safety

In addition to the risks during surgery, patients are at high risk during postoperative recovery. The two most common causes of complications within the first week of surgery are bleeding and infections. Additional causes of delayed morbidities include blood clots, heart attacks, pneumonia, and stroke. Anticipating potential complications, and either preventing them (for example, by prophylaxis for venous thromboembolism) or identifying the signs and symptoms and intervening early and aggressively, are essential to reduce these risks

Blood service and utilization

Blood transfusions play a major role in the resuscitation and management of surgical patients and ordering of blood is usually a common practice in elective and emergency surgical procedures .surgical procedures are very dependent on blood service.

Patient blood management should start in primary care at the time of referral for surgery; working closely with the preoperative assessment clinic at the hospital is very critical to manage blood related gaps

Preoperative optimization

- Anemia (and other relevant health problems) should be identified and treated in a timely fashion before surgery.
- Patients at increased risk of bleeding, especially those on anticoagulants or antiplatelet drugs, should be recognized.
- The use of blood conservation techniques in appropriate patients should be planned in advance.

Minimizing blood loss at surgery

- Drugs that increase bleeding risk should be withdrawn if safe to do so (discuss with prescribing clinician).
- Blood-sparing surgical and anesthetic techniques should be used.
- Anti-fibrin lytic drugs, tissue sealants and intraoperative cell salvage procedures should be used when appropriate.

Avoiding unnecessary transfusion after surgery

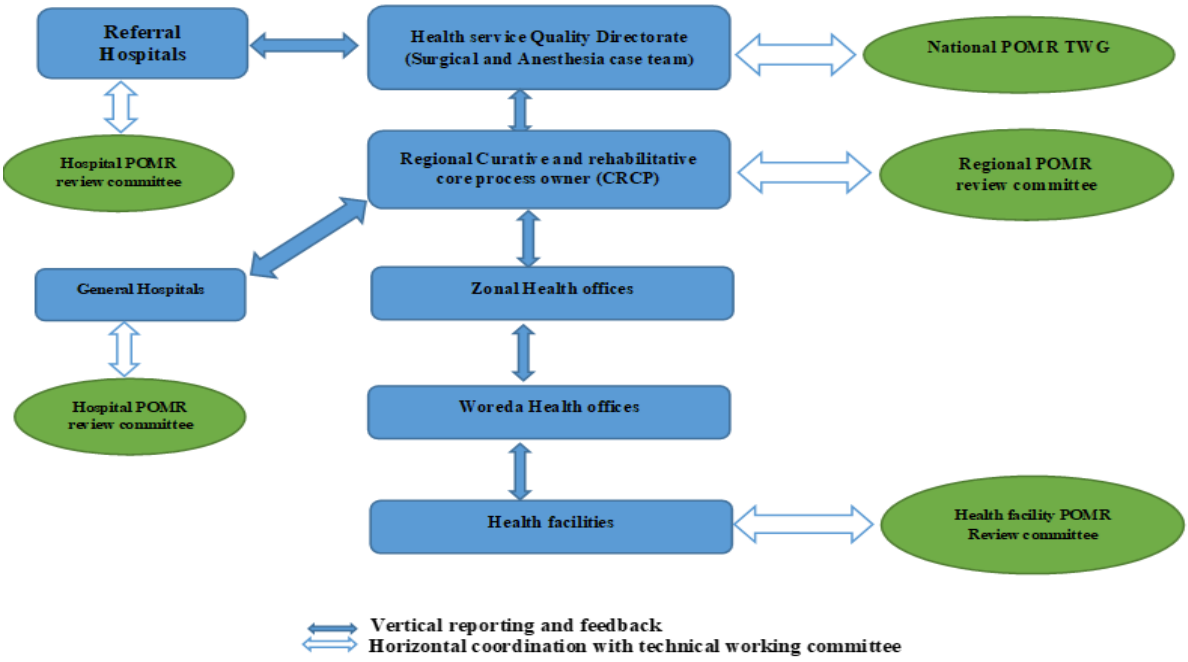
- Use restrictive ‘transfusion triggers’, balancing safety and effectiveness in individual patients.
- Minimize blood loss from blood tests.
- Use postoperative red cell salvage and reinfusion where appropriate.
- Prescribe iron and other stimulants to red cell production as needed.

9. Structure, governance and roles and responsibilities:

The Ethiopian Peri-operative mortality audit system (POMRS) will be managed by the Ministry of Health- Health service quality Directorate (HSQD). The existing surgical services case team structures under the HSQD in collaboration with other Quality improvement team will directly responsible for the overall coordination, implementation and monitoring of the system.

Moreover, Peri-operative mortality audit working group or review committee will also be established at National, Regional and Health facility level to provide technical advisory support to their respective POMRS system.

Figure: Structure POMRS system under the Health service Quality Directorate.



At Ministry of Health level:

- At national level, Health service Quality Directorate will lead and oversee the Peri-operative mortality audit system. Moreover, the national Peri-operative mortality working group/Surgical and Anesthesia service TWG led by the HSQD Director/Salt case team will be established.

- The Health service quality Directorate will provide capacity building support to Regional counterparts and federal Hospitals through providing POMRS training and support RHBs in cascading the training to lower levels,
- The HSQD will print and distribute guidelines, recording and reporting formats to initiate the implementation of the POMR system
- The national Peri-operative mortality working group/Surgical and Anesthesia service TWG membership includes relevant experts from Ministry of health-relevant directorates, Professional associations (ESOG,ESO,ESAS), universities and relevant development partners and will be established to provide the overall technical and coordination support of the program including periodical review of nationally aggregated perioperative deaths and constructing recommendation for programmatic responses.
- The national HSQD- Surgical and anesthesia PORS focal person receives monthly Peri-operative death case summary data from RHBs and city administrations monthly basis (based on the HMIS calendar reporting month)
- The national HSQD- Surgical and anesthesia PORS focal person will provide Quarterly reporting progress feedback to regional Health Bureau, and Referral Hospitals on PORS data quality and reporting performance.
- On Quarterly basis, the HSQD-SaLT case team will compile and analyze the monthly HMIS data and case based surgical death review summary reports and share with the Peri-operative mortality audit committee for interpretation and development of an action plan.
- The HSQD collaborating with the Technical working group will organize a dissemination meeting for Surgical and Anesthesia service stakeholders to plan and implement responses included in national recommendation. During implementation the HSQD – SaLT case team will ensure/ monitor that identified responses are undertaken as planned.

At Regional Health Bureau level:

- At RHB level, curative and rehabilitative core process owner or equivalent structures will lead and oversee the implementation of Peri-operative mortality audit system.
- There should also be regional Peri-operative mortality review committee led by the curative and rehabilitative core process owner head or assigned surgical and anesthesia

service focal person. The Regional Peri-operative mortality committee comprises experts from RHB CRCP unit (Quality officers and surgery and anesthesia care), Planning M&E Directorate, universities and relevant development partners working on the area.

- The regional CRCP owner will cascade training to lower administration levels and ensure the distribution of POMR Guidelines and tools.
- The regional CRCP owner case owner receives monthly notification summary from Woreda health offices/zonal health offices and referral hospitals (depending on the existing structure) on a monthly basis and sends the rest of aggregated notification to the HSQD, as per the HIMS reporting calendar.
- On monthly basis the CRCP unit will compile and analyze surgical death notification and case based data, and produce monthly report. The report will be shared with Regional mortality review committee for interpretation and development of the action plan.
- The Regional Surgical and anesthesia PORS focal person will provide monthly reporting progress feedback to regional Health Bureau, and Referral Hospitals on PORS data quality and reporting performance.
- The regional CRCP owner, will organize a dissemination meeting for regional surgical and Anesthesia care stakeholders to plan and implement recommendation identified in the action plans of the Regional review committee. During action plan implementation, the CRCP unit will ensure/ monitor that identified responses are undertaken as planned.

Zonal Health Office (where applicable)

At zonal level there should be a Quality officer/focal person who receiving death notification and case based summary reports from Worda Health offices and hospitals on a monthly basis. He/She regularly ensure the data quality of the report and send the rest of the copies to the Regional CRCP owner, keeping one copy in the zone.

Woreda Health Office:

- At woreda level there should be a Quality officer/focal person who receiving death notification and case based summary reports from Health facilities on a monthly basis. He/She regularly ensure the data quality of the report and send the rest of the copies to the Zonal Health offices, keeping one copy in the woreda.

Health facility level:

- At the health facility level, surgical and Anesthesia care unit/Department will led and oversee the overall implementation and monitoring of the Peri-operative mortality audit system in the respective Health facility.
- The Health facility Peri-operative mortality review committee led by surgical and anesthesia care department head comprising Surgical department QI team members, Quality , HMIS, laboratory and pharmacy departments.
- Any health care provider of a health facility (HC, hospitals and clinics) will immediately notify confirmed surgical deaths to Peri-operative mortality audit focal person of the facility, who will also be documenting the notified surgical death using the identification and notification format within 24 hours of initial notification.
- The health facility Peri-operative mortality audit focal person will complete the facility based surgical death abstraction format (FBSDA) for every confirmed surgical deaths notified from the facility within 1 week of initial notification.
- The facility Peri-operative mortality audit review committee will review the surgical deaths within a week, and complete the POMR summary forms (POMRS) in five copies. Besides, the committee will develop a response action plan for every reviewed surgical deaths based review findings.
- The Health facility Peri-operative mortality audit focal person will submit aggregated notification and the POMR summary forms (POMRS) to respective district on monthly basis.
- The Health facility Peri-operative mortality audit focal person will ensure implementation of the response action plan and update the surgical department head and Peri-operative mortality audit review committee on implementation status.
- The Health facility surgical and anesthesia department unit in collaboration with Health facility Quality unit will systematically and document the best practices and lesson learnt and share within the hospitals and beyond.

10. Response plan management:

Timing of responses

Immediate response

Findings from reviews of nearly every perioperative deaths review can lead to immediate action to prevent similar deaths, by identifying gaps that should be addressed quickly with in the health facilities.

Periodic response

Monthly, quarterly, or six monthly reviews of aggregated findings will show patterns of specific problems contributing to perioperative mortality. Such findings should result in a more comprehensive approach to addressing the contributing factors Issues such as staffing, knowledge, skill levels and deficiencies in local infrastructure. These may be amenable to continuous responses for system improvement throughout the year.

Annual response

The Perioperative mortality review and response system relies on annual aggregation and presentation of data, particularly at regional and national level although woredas can also act on an annual basis. Findings and recommendations can then be incorporated in relevant annual planning cycles.

Level of Response

Facilities respond to every death in with in the month that the death happened. The responses mainly focus on surgical service improvement including implementation of responses using QI approach. However, facilities with higher number of deaths should use the aggregated data periodically or annually for response planning.

Similarly at regional and national level, the HSQD/unit/team in collaboration with the SaLT TWG use the review of aggregated and makes recommendations for actions. The findings and recommendations will guide the development of strategic plans for different sectors

11. Monitoring and Evaluation system :

Monitoring and Evaluation framework

The Monitoring and Evaluation of the Preri-operative review and response (PORS) itself is necessary to ensure that the major components of the system are functioning adequately and improving with time. It also help to monitor coverage of the system and assessment of the relevance, effectiveness and impact of activities in the light of the objectives of Peri-operative review and response (PORS) system. The components of the Peri-operative review and response system targeted for M&E were identified based on the WHO surveillance and response framework system and component identified in the PORS system. Accordingly four components were identified and used as basis for the identification of relevant indicators.

- The structure of the system
- Core functions of the system
- Support functions of the system
- Quality of the system

The structure of the system: The structure of the Peri-operative mortality review and response system is defined as availability of notification of Peri- Operative deaths, the strategy for implementing activities, the implementers and stakeholders, and how they relate to each other and to the various networks and partnerships. The indicators that measure different aspects of the structure of a system constitute part of the Monitoring and evaluation indicators;

Core Functions of the System: The indicators related to the core functions measure the processes and outputs which includes death detection, registration, confirmation, reporting, data analysis and interpretation, and public health response including reports and feedback from the Peri-operative review and response system.

Support Functions of the System:

The support functions are those that facilitate implementation of the core functions of the system and include, standards and guidelines, training for staff, Supervisory activities, communication facilities, resources (human, financial, logistical), monitoring and evaluation and coordination .

Quality of the System: The quality of the Peri-operative review and response system is defined by attributes such as completeness, timeliness, usefulness, simplicity, flexibility, acceptability, and reliability of the system. While monitoring will help identify changes in the attributes over time, periodic evaluations should assess the extent of the improvements in the quality of the Peri-operative mortality review and response system, the data it generate, and the type and quality of the public health responses.

Indicators:

As per the identified the Peri-operative mortality review and response M&E framework, relevant indicators categorized by components and elements were identified and further refined by including by the indicator type, e.g. input, process, output, outcome and impact, frequency of data collection, data sources and collection methods. As this indicators target setting vary according to the selected implementation approaches targets not included in this Guidance.

Table: List of indicators by category and elements with proposed data collection frequency, data sources, potential methods of data collection

No	Element	Indicator	Type & purpose of indicator	Expressed as	Reporting level	Frequency of data collection	Data source	Method	Category of indicator
1	Structure (Coordination body)	Presence of functional Peri – operative death review & response committee. /TWG	Input E	Y/N	National/Regional	Every years	Organogram in MOH, minutes of TWG meeting	Review	Structure
2	Structure (Coordination body)	% of Health facilities with established Perioperative death review committees	Input E	Y/N	Health facilities	Every years	Terms of reference	Review	Structure
3	Structure (Coordination body)	% of Health facilities with someone responsible for PORS	Input E	Y/N	Health facilities	Every years	minutes of Committee meetings	Review	Structure
4	Scheduled Peri operative death review and response coordination/ TWG meetings	Proportion of scheduled functional Peri – operative death review & response committee meetings held	Process M&E	Percent	National/Regional/District/Health facility	Semi-Annual	Minutes of meetings	Review of minutes	Structure
5	Existence of documented roles & responsibilities	Roles and responsibilities are well- documented at each level of PORS system	Input E	Y/N	National, Regional, Woreda, Health facility	Every 3years	Documented functions and responsibilities, terms of reference, guidelines,	Document review, KI interview	Structure
6	Inter-sectoral collaboration, networking and partnership	Existence of collaboration, networking and partnerships with relevant stakeholders(Universities, Professional associations, MOH , Directorates and agencies etc)	Process E	Y/N	National and	Every years	Administration report /TWG minutes of meetings	review of documents	Structure
7	Case detection	Proportion of health facilities with standard case definitions for Perioperative deaths to be reported regularly in the PORS system	Input M & E	Percentage	National, Regional, Woreda	Annually	Available standard case definitions in the facility	Observation	Core function

No	Element	Indicator	Type & purpose of indicator	Expressed as	Reporting level	Frequency of data collection	Data source	Method	Category of indicator
8	Death registration	Proportion of health facilities with standardized registers that document Perioperative deaths	Input M&E	Percentage	National, Regional, Woreda	Annually	Health facility Registers/charts	Review of registers	Core function
9	Death investigation confirmation	Proportion of Health facilities that conduct peri operative death abstraction for all Perioperative deaths that occurred in the facility	Process M&E	Percentage	National, Regional, Woreda	Annually	Filled FBAF	Review	Core function
10	Review of deaths	Proportion of Health facilities that conduct review of investigated maternal or perinatal deaths	Process M&E	Percentage	National, Regional, Woreda	Annually	RRT meeting minutes , Filled MDRF/PDRF	Review of MDRF/PDRF pad	Core function
11	Case-based reporting rate	Proportion of Peri operative deaths reported using case-based reporting forms in the past completed 3 months	Process M&E	Percentage	National, Regional, Woreda, Health facility	Quarterly, annually	Reporting forms, and data bases	Document review	Core function
12	Routine Data analysis	Proportion of RHBs/Woreda with evidence of data analysis by time, place and person, causes and contributing factors	Output M&E	Percentage	Regional, district	Annually	Summary reports, charts on the walls, computerized analysis output, review meeting reports, Prepared presentation	Observation. Review of documents	Core function
13	Responses for Singe Perioperative deaths	Proportion of Health facilities with developed action plans for every Peri operative deaths	Output	Percentage	National, Regional, Woreda	Annually	Meeting Minutes and action plans	Document review	Core function
14	Responses for aggregated Perioperative deaths	Availability of programmatic responses for aggregated Peri-operative deaths	Output	Y/N	National, Regional, Woreda	Semi-Annually	Meeting Minutes and Plan of action	Document review	Core function
15	Responses implemented	proportion of health facilities that responded to the identified causes and contributing factors of Peri operative deaths	Output	Y/N	National, Regional, Woreda	Semi-Annually	Meeting Minutes, Plan of action, response monitoring sheet	Document review	C
16	Feedback disseminated	Proportion of PORS feedback reports/bulletins disseminated	Output M&E	Percentage	National, Regional, Woreda	Quarterly	KI, MPDSR feedback reports/ bulletins	KI interview, observation	Support functions

No	Element	Indicator	Type & purpose of indicator	Expressed as	Reporting level	Frequency of data collection	Data source	Method	Category of indicator
17	updated guidelines	Proportion of Regions/Woreda/Health facilities with updated guidelines for PORS	Input M & E	Percentage	National, Regional, Woreda	Annually	KI, existing surveillance guidelines	observation	Support functions
18	Availability of investigation and reporting forms at Health facility	Proportion of Health facilities that were not short of abstraction, investigating and reporting forms in the previous 6 months	Input	Percentage	District, Regional, national	6-monthly	KI	KI interview, observation	Support functions
19	Staff trained on MPDSR	Proportion of Regional/Woreda/Health facilities sufficient staff trained on PORS	Input M & E	Percentage	National, Regional, Woreda/Health facility	Annually	KI, training reports	KI interview, document review	support function
20	training in Pre Service curriculum	Availability of Pre service curriculum for Health science and medical schools	Input E	Y/N	National , Regional	2-3 years	Curriculum	Review of documents	support function
21	Supervisions conducted	Proportion of supervisions conducted according to plan	Process	Percentage	National, Regional , Woreda	Annually	supervisory reports	Supervision report	support function
22	Identify, document and share best practices on PORS	Number of best practices identified, documented and shared	Output	Number	National, Regional, Woreda, facility	Biannually	report, Review of action plan and response	Supervision, KI interview, observation	support function
23	Timeliness of reporting	Proportion of surveillance units that submitted surveillance reports (case based and weekly to the next higher level on time	Output M&E	Percentage	National, Regional ,Woreda	Annually, quarterly	Reporting log, Bulletins, Weekly and case based electronic databases	Review of documents and databases	Quality
24	Timeliness of response to Peri operative deaths	Proportion of suspected and confirmed peri-operative deaths reviewed within 14 days of detection	Output M&E	Percent-age	National, regional and Woreda	6-monthly	Case based report, meeting minutes and reports	Review of documents	Quality
25	Completeness of data reported	Proportion of case based Peri-operative death surveillance reports with no missing required information	Output M&E	Percentage	National, regional and Woreda	Annually	Reports	Quality	Quality
26	Impact	Peri –operative mortality at the target year	Impact	Ratio	National	Every 5 years	HMIS/PORS	Quality	Quality

12. **Reference**:

1. National Technical Guidance For Maternal And Perinatal Death Surveillance And Response, EPHI 2017
2. Improving the quality of pediatric care: an operational guide for facility-based audit and review of pediatric mortality; World Health Organization; 2018
3. Ng-Kamstra JS, Arya S, Greenberg SLM, et al. Perioperative mortality rates in low-income and middle-income countries: a systematic review and meta analysis. BMJ Glob Health 2018;3:e000810. doi:10.1136/ bmjgh-2018-000810
4. John G Meara, Andrew J M Leather: Paul E Farmer: Making all deaths after surgery count, the lancet Vol 393 June 29, 2019
5. Surgical care systems strengthening: developing national surgical, obstetric and anaesthesia plans, WHO, 2017
6. Communicable disease surveillance and response systems. Guide to monitoring and evaluating, WHO, 2016
7. McCullough, Meghan, et al. "A traveling fellowship to build surgical capacity in Ethiopia: the Jimma University specialized hospital and operation smile partnership." IJS Global Health 3.2 (2020): e17.

ANNEX **A. Perioperative deaths Identification and Notification Form**

(To be filled in two copies, one copy kept at reporting ward and the remaining one copy will be documented at health facility Surgery department)

Notification (section one)		
1.	MRN number of the deceased	_____
2.	Age of the deceased (in yeas)	_____
3.	Sex of the deceased	Male ☐ Female ☐
4.	Peri operative death Notification is reported from	Ward ☐ OR ☐ PACU ☐ Ward on which death occurred _____)
5.	Type of Admission	Urgent ☐ Emergence ☐ Elective ☐
6.	Places of Death:	OR table ☐ PACU ☐ ICU ☐ Ward ☐
7.	Date of admission	DD/MM/YYY ____/____/_____ Time _____
9.	Date of identification of the death	DD/MM/YYY ____/____/_____ Time _____
10.	Data of notification	DD/MM/YYY ____/____/_____ Time _____
11.	Surgeon's view (before any surgery) of overall risk of death	Minimal ☐ Small ☐ Moderate ☐ Considerable ☐ Expected ☐
12.	Time of death	

Name of reporting person_____ signature_____

ANNEX B. Peri operative mortality abstraction form

<table>
<tr><td colspan="7">Perioperative mortality audit tools</td></tr>
<tr><td>1.</td><td>Deceased Information</td><td>Deceased MRN</td><td>Sex: - Male ☐ Female ☐</td><td>Age----</td><td>Date of Death DD/MM/YYYY
_____/_____/_____</td><td>Date of Admission DD/MM/YYYY
_____/_____/_____</td></tr>
<tr><td rowspan="3">2.</td><td colspan="2" rowspan="3">Referring from other facility
Yes ☐ If yes,
Referring facility: ----------
Reason for referral: -

Referring physician

NO ☐</td><td>3. Places of Death: -
• OR table ☐
• PACU ☐
• ICU ☐
• Ward ☐</td><td></td><td>4. Total Length of stay---------
Length of stay in PACU -----
Length of stay in ICU-----
Length of stay in HDU-----
Length of stay in Ward-----</td><td>5. Type of Admission
Urgent ☐
Emergence ☐
Elective ☐</td></tr>
<tr><td colspan="5">6. Was trauma involved? Yes ☐ (continue) NO ☐ Don't Know ☐</td></tr>
<tr><td>(a) Was trauma the result of a fall?
Yes ☐ (continue)
No ☐ (go to b)
If yes, specify……</td><td colspan="2">b) Was trauma the result of a road traffic accident?
Yes ☐ (continue)
No ☐ (go to c)
If yes, specify……</td><td>(c) Was trauma the result of violence?
Yes ☐ (continue)
No ☐
If yes, please indicate</td></tr>
<tr><td>7</td><td colspan="6">Were there significant co-existing factors increasing risk of death? (tick all that apply)
Cardiovascular ☐ Hepatic ☐ Neurological ☐ Respiratory ☐ Advanced malignancy ☐
Diabetes ☐ Renal ☐ Age ☐ Other (specify) ……</td></tr>
<tr><td>8</td><td colspan="6">Was preanesthetic evaluation performed for this patient prior to or on admission? Yes ☐ NO ☐ If not go to question number ☐
If YES, Evaluation performed by
Fellow ☐ Anesthesiologist ☐ Resident ☐ Anestheti ☐</td></tr>
<tr><td>9</td><td colspan="6">Patient status based on ASA grade was assessed: - Yes ☐ NO ☐ If not go to question number
If yes tick the patient status based on the ASA grade ☐
ASA 1 - A normal healthy patient ☐</td></tr>
</table>

	ASA 4 - A patient with an incapacitating systemic disease that is a constant threat to life ☐ ASA 2 - A patient with mild systemic disease ☐ ASA 3 - A patient with severe systemic disease which limits activity, but is not incapacitating ☐ ASA 5 - A moribund patient who is not expected to survive 24 hrs, with or without an operation ASA 6 - A brain-dead patient for organ donation	
10	Necessary investigation result was updated & analyze before the surgery performed Yes ☐ NO ☐	
11	Vital sign at preanesthetic evaluation BP---------- PR---------- RR---------- T^{o} ----------	
12	**Was DVT prophylaxis used pre and during this admission?** If **NO**, state reasons Not appropriate Ac☐e decision to withhold ☐ (If **YES,** tick all that apply) Not considered ☐ and please comment on why **NOT** used • Heparin (☐y form) ☐ Warfarin ☐ Sequential compression device ☐ TED Stocking Aspirin ☐ • Other (specify) ……	
13	**Main surgical diagnosis on admission** (as suspected by clinicians after initial assessment)??? Q 7 •	
14	Operation site was marked Yes ☐ NO ☐	
15	Was an Operation Performed Within the Last Admission?	
16	Type of procedure ----------	17.Type of anesthesia performed: - Sedation ☐ Local ☐ Regional ☐ ☐inal ☐ Epidural ☐ GA ☐
19	4 Was an operation performed by? Senior Surgeon ☐ Fellow ☐ Resident ☐ GP ☐ IESO ☐ Specialty …… Specify ----------	18.Was an Anesthetis☐ Anesthesiolog☐ Resid☐ Fel☐ Present at the Operation? 20.Duration of surgery
21	Was there Intra Op complication Yes No if there specify ----------	
22	During Intra OP blood transfused Yes ☐ NO ☐ if yes number of units transfused----------	
23	**Confirmed main surgical diagnosis** (taking into account test results, operations, postmortem) ----------	

24	Was the Operation abandoned on finding a terminal situation? Yes ☐ No ☐
25	Was there a definable post-operative complication? Yes ☐ NO ☐ go to question 26 Anastomotic leak (specify), Oesophageal ☐ Gastric ☐ Pancreas/biliary ☐ Small bowel ☐ Colorecta ☐ Procedure related sepsis ☐ Significant post-op bleeding ☐ Endoscopic perforation ☐ Tissue ischaemia ☐ Vascular graft occlusion ☐ Other (specify) ☐
26	Was there an unplanned return to theatre? Yes ☐ NO ☐ if yes specify ----------
27	Was there an unplanned admission to the ICU/HDU? Yes ☐ NO ☐ if yes specify----------
28	**infection acquired** Before this admission ☐ go Q 30) During this admission ☐
29	**If acquired during this admission, was the infection** Acquired pre-operatively ☐ A surgical site infection ☐ Acquired post-operatively ☐ Other invasive-site infection ☐
30	**Was the infection** Pneumonia ☐ Intra-abdominal sepsis ☐ Septicaemia Other (Specify) ☐

ANEEX C. Peri-operative Mortality Case Based Reporting Form (POMCBRF0)

I. Reporting Facility Information

Reporting Health Facility name & type (H.C/Cl./Hosp): _____ Woreda: _____

Zone : _____ Region: _____Date of Reporting DD/MM/YYYY _____/_____/_____

II. Deceased Information

Deceased ID (code):	Sex:- Male ☐ Female ☐		Age	Date of Death DD/MM/YYYY _____/_____/_____
Residence of deceased Urban Rural	Region_____ Zone_____ Woreda_____ Kebele			
Place of Death	At health center	At Hospital	On transit	Other specify _____
Marital status	. Single 2. Married 3. Divorced 4. Widowed			
Religion: _____			Ethnicity: _____	
Level of Education	No formal education 2. No formal education, but can read and write 3. Elementary school 6. I do not know 4. High school 5. College and above			
Timing of death	Pre-OP	Intra OP	Post- OP	

III. Preanesthetic evaluation

1.Was preanesthetic evaluation performed for this patient prior to or on admission? 1. Yes 2. No 3. Not known

2. If yes, Evaluation performed by 1. Fellow 2. Anesthesiologist 3. Resident 4. Anesthetist

Co-existing factors

Cardiovascular ☐ Hepatic ☐ Neurological Respiratory Advanced ☐ Malignancy ☐
Diabetes ☐ Renal Age ☐
Other (specify)

DVT prophylaxis used pre and during this admission? Yes NO ☐ ☐
If YES, tick all that apply)

- Heparin (any form) ☐ Warfarin ☐ Sequential compression device ☐ TED Stocking ☐ Aspirin ☐
- Other (specify) …….

Contributory factors (Thick all that apply)

1.Delayed arrival to referred facility 2. Lack of transportation 3. Lack of roads 4. No facility within reasonable distance 5. Lack of money for transport

1.Delayed arrival to next facility from another facility on referral 2. Delayed or lacking supplies and equipment(specify)3. Delayed management after admission Human error or mismanagement

Was there a definable post-operative complication? Yes ☐ NO ☐
Anastomotic leak (specify), ☐ Esophageal ☐ Gastric ☐ Pancreas/biliary ☐ Small bowel ☐ Colorecta ☐
Procedure related sepsis ☐ Significant post-op bleeding ☐ Endoscopic perforation ☐ Tissue ischemia ☐ Vascular graft occlusion ☐
Other (specify)

Was there an admission to the ICU/HDU? Yes ☐ NO

infection acquired during this admission, Yes ☐ NO ☐
was the infection Acquired pre-operatively ☐ A surgical site infection ☐ Acquired post-operatively ☐
Other invasive-site infection ☐

ANNEX D: Action plan template

Name of Health Facility…….Date of death _____ Date of Review……

Sr No	Problems Identified	Response plan /Action Plan	Timeline	Responsible Person	Status of action plan(ongoing completed, not started)	Date of action completed(if completed)