



Key Performance Indicator

Training Manual

February 2018



PROGRAM IN GLOBAL SURGERY
AND SOCIAL CHANGE

Harvard Medical School





Table of Contents

Figures	3
Tables	3
Acknowledgements	4
Saving Lives Through Safe Surgery (SaLTS)	5
Safe Surgery 2020	6
SaLTS Indicators	7
Background	7
Key Elements of the HPMI Framework	8
Relationship of SaLTS Indicators to HPMI and HMIS	9
Collection and Reporting SaLTS Data	10
Key Performance Indicators	10
Facility-Level Indicators	10
SaLTS Indicator Categories	10
HPMI Key Performance Indicators (KPIs)	12
KPI 7: Delay for Elective Surgical Admission	12
KPI 9: Surgical Site Infection (SSI) Rate	13
KPI 11: Peri-operative Mortality Rate (POMR)	15
KPI 12: Rate of Safe Surgery Checklist Utilization	16
KPI 13: Mean Duration of In-Hospital, Pre-Elective Operative Stay	17
KPI 14: Surgical Volume	18
KPI 15: Anesthetic Adverse Outcome	19
KPI 21: Blood Availability Ratio for Surgical Patients	20
Facility-level Indicators	22
Surgical Patient Satisfaction (related to HPMI KPI 26)	22
Surgical Bed Occupancy Rate (related to HPMI KPI 35)	23
Other Data	25
Surgical Referrals Out	25
Conclusion	27



Figures

Figure 1. SaLTS Logical Framework

4

Tables

Table 1. Key Elements of the SaLTS M&E Framework

5

Table 2. SaLTS Indicators Including New and Existing National KPIs and Facility-Level Indicators

7



Acknowledgements

The members of Harvard's Program in Global Surgery and Social Change, through the support of GE Foundation's Safe Surgery 2020, would like to sincerely thank the following individuals and organizations for their invaluable contributions to the content of this training manual. The SaLTS Technical Working Group at the Ethiopian Federal Ministry of Health created and defined the Key Performance Indicators for surgery through an iterative process with the Harvard team. We appreciate the support of all who contributed.

Dr. Hassen Beshir	FMOH
Dr. Daniel Burssa	FMOH
Dr. Atlibachew Teshome	FMOH
Dr. Samson Esseye Workneh	FMOH / Jhpiego
Dr. Rediet Shimeles	Ethiopian Society of Anesthesiologists
Dr. Abebe Bekele	Addis Ababa University
Dr. Andualem Beyene	Surgical Society of Ethiopia
Dr. Samuel Zemenfeskudus	FMOH
Dr. Abraham Endeshaw	Jhpiego
Dr. Robel Wondemagegnehu	FMOH
Dr. Ayele Teshome	FMOH
Mr. Kasu Tola	FMOH
Mr. Essayas Mesele	FMOH

Surgical Society of Ethiopia
Ethiopian Society of Anesthesiologists
Ethiopian Society of Anesthetists
Ethiopian Society of Obstetricians and Gynecologists
Jhpiego / Safe Surgery 2020
Assist International / Safe Surgery 2020

Saving Lives Through Safe Surgery (SaLTS)

Since 1997, the Ethiopian Federal Ministry of Health (FMOH) has implemented four successive Health Sector Development Plans (HSDPs 1-4). The Health Sector Transformation Plan (HSTP) is a five-year national strategy (July 2015 – June 2020) intended to build upon the previous HSDPs, with a particular emphasis on four transformation agendas:

1. Transformation of quality and equity of health care
2. Woreda transformation
3. Movement towards compassionate, respectful, and caring health professionals
4. Information revolution

In an effort to address the quality and equity transformation agenda and improve access to essential and emergency surgical and anesthesia care, the FMOH designed *Saving Lives Through Safe Surgery* (SaLTS) in 2016. The SaLTS initiative was launched in response to the World Health Assembly resolution-68/15 and aims to make essential and emergency surgical and anesthesia care accessible and affordable as part of the universal health coverage.

SaLTS is a national flagship initiative prioritizing safe, quality surgery and anesthesia at all levels of Ethiopia's healthcare system. The program aligns with existing health sector reforms, including the National Health Care Quality Strategy (quality planning, improvement, and control), Ethiopian Hospitals Service Transformation Guidelines (EHSTG) (professional hospital management), and Ethiopian Hospitals Alliance for Quality (EHAQ). EHAQ is designed to address a specific public health priority and has previously focused on (1) patient satisfaction and (2) MNCH services. The third EHAQ cycle priority is access to safe and affordable surgical and anesthesia care through SaLTS. The existing successful EHAQ platform will be used for rapid scale-up of best practices.

The SaLTS initiative was developed with the objective to ensure the delivery of quality, safe, essential and emergency surgery throughout the country to alleviate the national burden of diseases, disability and death that are preventable through safe surgery. SaLTS brings surgery to the forefront of the health agenda as an essential component of universal health care.



Safe Surgery 2020

GE Foundation's Safe Surgery 2020 (SS2020) aims to reduce preventable death and disability from surgically treatable conditions by increasing the quality and volume of surgical and anesthesia care in 3 – 5 countries by 2020. SS2020 is a multilateral collaboration of governments, implementers, researchers, and advocates.

Since 2016, SS2020 has been working in Ethiopia, partnering with the Federal Ministry of Health and the Saving Lives Through Safe Surgery (SaLTS) initiative. They have assisted with the development of the SaLTS five-year strategic plan and have provided support for implementation along three pillars: (1) leadership & governance, (2) innovation, and (3) monitoring & evaluation. Partners involved in this effort include the Ministry of Health, industry partners (GE), non-profit organizations (Jhpiego), innovation designers (Assist International), and academic institutions (Harvard's Program in Global Surgery and Social Change). Efforts began in ten hospitals in two regions (Amhara & Tigray) of Ethiopia and have since expanded based on early results.

The SaLTS Technical Working Group in conjunction with the Harvard Program in Global Surgery and Social Change developed a robust monitoring & evaluation strategy to baseline the current state of the surgical system in Ethiopia, provide a mechanism for regular monitoring of surgical capacity and quality in hospitals, and evaluate the impact of the SaLTS implementation efforts. This manual highlights the results of these efforts, focusing on the surgical Key Performance Indicators.



SaLTS Indicators

Table of Contents

Figures	3
Tables.....	3
Acknowledgements.....	4
Saving Lives Through Safe Surgery (SaLTS).....	5
Safe Surgery 2020.....	6
SaLTS Indicators.....	7
Background	7
Key Elements of the HPMI Framework.....	8
Relationship of SaLTS Indicators to HPMI and HMIS.....	9
Collection and Reporting SaLTS Data	10
Key Performance Indicators	10
Facility-Level Indicators.....	10
SaLTS Indicator Categories	10
HPMI Key Performance Indicators (KPIs)	12
KPI 7: Delay for Elective Surgical Admission	12
KPI 9: Surgical Site Infection (SSI) Rate	13
KPI 11: Peri-operative Mortality Rate (POMR)	15
KPI 12: Rate of Safe Surgery Checklist Utilization	16
KPI 13: Mean Duration of In-Hospital, Pre-Elective Operative Stay	17
KPI 14: Surgical Volume	18
KPI 15: Anesthetic Adverse Outcome	19
KPI 21: Blood Availability Ratio for Surgical Patients	20
Facility-level Indicators	22
Surgical Patient Satisfaction (related to HPMI KPI 26).....	22
Surgical Bed Occupancy Rate (related to HPMI KPI 35)	23
Other Data	25
Surgical Referrals Out	25
Conclusion.....	27

Background

During the SaLTS M&E framework development, an M&E specialist team within the FMOH Medical Services General Directorate drafted a logical framework to design, monitor, and evaluate the 5-year national surgical plan:

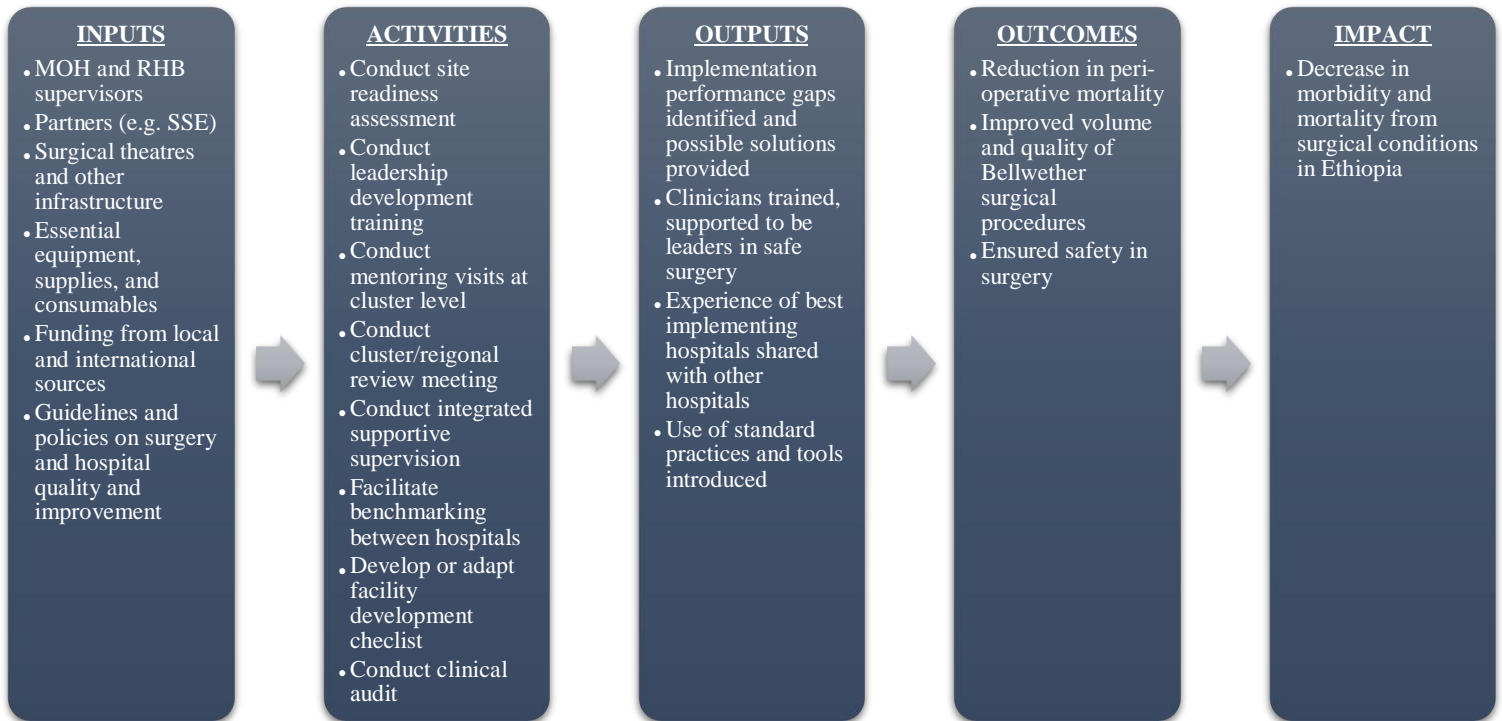


Figure 1. SaLTS Logical Framework

The logical framework facilitated the development of a list of 21 SaLTS indicators designed to evaluate the short-term and long-term efficacy of SaLTS implementation activities across all facility levels of Ethiopia's healthcare system. The indicators were designed by an M&E specialist team and presented to the FMOH SaLTS technical working group and implementing partners for review. Primary factors guiding indicator selection included their construct validity, collective measure of performance across multiple categorical domains, including (1) access, (2) quality, (3) safety, and (4) financing, and representation of both national and facility level measurements. Indicators were removed if they created duplicated efforts of existing Key Performance Indicators (KPIs) within the Hospital Performance Monitoring and Improvement (HPMI) framework (see HPMI Manual Second Edition, 2016). After critical assessment, the SaLTS indicators were refined from the original list of 21 to an optimal 15. These indicators were proposed at the national level, and a total of 9 have been integrated into Ethiopia's national HPMI. All indicators will be collected at the facility level to empower hospital management with site-level decision-making and will be reported to the RHBs, which will report to the FMOH in aggregate form. The following sections detail key elements of the HPMI framework that a majority of the SaLTS indicators will abide by, as well as a detailed description of each SaLTS indicator and their respective collection methods.

Key Elements of the HPMI Framework

The HPMI framework was designed to systematically coordinate hospital performance monitoring across all regions and hospital levels of Ethiopia and consists of three key elements:

(1) key performance indicators, (2) supportive supervision site visits, and (3) review meetings at the regional and national level (refer to HPMI Manual Second Edition, 2016 for detailed descriptions of each element). The framework was subsequently adapted by the FMOH M&E specialist team for the SaLTS framework to include additional facility-level indicators (Table 1).

Table 1. Key Elements of the SaLTS M&E Framework

Element	Description
SaLTS KPIs	<ul style="list-style-type: none"> • A set of core hospital KPIs that meets the needs of Governing Boards, Curative and Rehabilitative Core Processes Teams (CRCPTs), HSQD and the public will streamline reporting processes, prevent duplication of efforts by the different stakeholders and minimize the burden on hospitals. • SaLTS KPIs will allow hospital performance on surgery to be tracked over time and comparisons made between hospitals and regions. • SaLTS KPIs can be used by Governing Boards to monitor hospital performance. Problems will be identified at an early stage, allowing the Governing Board to take remedial action where necessary. • SaLTS KPIs should be reported by each hospital to the RHB CRCPT every month. Comparisons between hospitals can be made to identify best practices, as well as areas where improvement is needed. • The SaLTS team at HSQD can review cluster, regional and hospital performance and identify areas where additional support is needed.
Facility-level indicators	<ul style="list-style-type: none"> • A set of indicators used to monitor performance of surgical units at each hospital but not reported to CRCPTs and HSQD. Site level indicators will be used by surgical teams and hospitals to improve their performance routinely. Clinical mentors assigned in each cluster will also use the site level indicators for routine performance improvement.
Supportive supervision site visits	<ul style="list-style-type: none"> • Supportive supervision site visits to hospitals should be conducted in order to check (validate) hospital performance in relation to the SaLTS KPIs, to identify good practice, and to provide supervision and guidance to help surgical units of hospitals improve areas that require strengthening. • Supervision should be conducted by a team of supervisors which could include cluster mentors, RHB CRCPT staff, HSQD staff, staff from other hospitals (e.g. CEOs) and other partners such as SSE. It would not be necessary for all stakeholders to attend every supervision visit, rather the team for each visit can be drawn from different stakeholders. • All supervision should be under the direction of the respective CRCPT. No stakeholder should conduct supervision without the approval/awareness of the CRCPT.
Review meetings	<p>Regional</p> <ul style="list-style-type: none"> • Review meetings between the CRCPT and hospitals (either region wide or in clusters) will allow for benchmarking and the dissemination of good practices. • At each review meeting, hospitals should present a performance report based on SaLTS KPIs. Hospitals will have the opportunity to share successes and challenges in order to learn from each other. These meetings can also be used to discuss other relevant topics. <p>National</p> <ul style="list-style-type: none"> • Review meetings between HSQD and all regional CRCPTs will allow for benchmarking and the dissemination of good practices between regions. • At each review meeting, CRCPTs should present a regional performance report based on their KPIs. Regional CRCPTs will have the opportunity to share successes and challenges in order to learn from each other. • HSQD/CRCPT meetings can also be used to discuss other relevant topics.

Relationship of SaLTS Indicators to HPMI and HMIS

The Health Management Information System (HMIS) is a robust M&E framework designed to evaluate program implementation of the Health Sector Development and Transformation Plan (HPMI Second Edition, 2016). The HMIS was also designed to measure progress of the Plan for Accelerated and Sustained Development to End Poverty and the Sustainable Development Goals.

Additionally, the HPMI was designed to allow the Federal Ministry of Health (FMOH), Regional Health Bureaus (RHBs), hospital Senior Management Teams (SMTs), and hospital Governing Boards (GBs) to evaluate hospital operational performance.



Both the HPMI and HMIS will serve as valuable resources for collecting data elements of several SaLTS KPIs and facility-level indicators. Data elements that are not currently collected in the HPMI and HMIS will be integrated into these frameworks accordingly.

Collection and Reporting SaLTS Data

Key Performance Indicators

Refer to HPMI section 4 for data collection and reporting methods of SaLTS KPIs (HPMI Manual Second Edition, 2017).

Facility-Level Indicators

The collection of data for each facility-level indicator will be assigned to one hospital staff representative. This representative will most often be the KPI focal person. The surgical team member who takes primary responsibility for maintaining the original data source from which indicators are collected, will be delegated the task of ensuring that documentation of necessary data is accurate and of high quality. When an indicator requires multiple data sources for its calculation, recording and documenting tasks will be delegated to appropriate surgical team members in order to ensure that all relevant data is collected. At the end of each reporting period, staff members will be responsible for reporting data to the data focal person. The data focal person will aggregate indicator data from each hospital staff member, verify the accuracy of the reported data, calculate the indicators from their respective data elements and inform hospital management of findings at the end of the reporting period.

SaLTS Indicator Categories

The SaLTS indicators include (1) existing Key Performance Indicators (KPIs) within the national Hospital Performance Monitoring and Improvement (HPMI) framework, (2) newly designed facility-level indicators to inform hospital management on site-level decision-making. Additional data specific for Safe Surgery 2020 evaluation purposes will also be collected. Table 2 stratifies the SaLTS indicators that will be collected during this intervention by their categorical domains.



Table 2. SaLTS Indicators Including New and Existing National KPIs and Facility Level Indicators

Category	SaLTS Indicators
HPMI (Current National Indicators)	7. Delay for Elective Surgical Admission
	9. Surgical Site Infection Rate (SSI)
	11. Peri-operative Mortality Rate (POMR)
	12. Rate of Safe Surgery Checklist Utilization
	13. Mean Duration of In-Hospital, Pre-Elective Operative Stay
	14. Surgical Volume
	15. Anesthetic Adverse Outcome
	21. Blood Availability Ratio for Surgical Patients
Facility-level Indicators	Surgical Bed Occupancy Rate Note: Bed Occupancy Rate is an HPMI indicator
	Surgical Patient Satisfaction Note: Patient Satisfaction is an HPMI indicator
Safe Surgery 2020	Surgical Referrals Out



HPMI Key Performance Indicators (KPIs)

The following section provides detailed guidance on quality data collection of each SaLTS indicator. Indicator information includes: definition, importance, data elements, formula, unit of measurement, data sources, and frequency of reporting. Additional information and resources are included after the table for each indicator as needed.

KPI 7: Delay for Elective Surgical Admission

<p>Why is this important?</p>	<p>Delays in surgery for different conditions are associated with a significant increase in morbidity and mortality.</p> <p>Through BPR, the Government has set a strict objective that any outpatient who requires a bed should receive the service within 2 weeks.</p> <p>By monitoring the waiting time for surgical admission, hospitals can assess the adequacy of surgical capacity and identify the need for improved efficiency in systems and processes, and/or the need for additional surgical staff and/or resources.</p>
<p>Definition</p>	<p>The average number of days that patients who underwent major elective surgery during the reporting period waited for admission (i.e. the average number of days between the date each patient was added to the waiting list until his/her date of admission for surgery)</p>
<p>Unit of measurement</p>	<p>Days</p>
<p>Numerator</p>	<p>Sum total of number of days between date added to surgical waiting list to date of admission for surgery for all patients.</p> <p>EXCLUDE: Elective Caesarean Sections Emergency Surgery Ophthalmic Surgery</p> <p>Notes: If a patient is admitted on the same day (i.e. the same calendar date) that the decision for surgery is made, then their number of days on the waiting list should be counted as zero.</p>
<p>Denominator</p>	<p>Number of public patients who were admitted for elective (non-emergency) surgery during the reporting period.</p>
<p>Formula</p>	$\frac{\text{Total sum (Date patient was admitted – Date patient was added to surgical waiting list)}}{\text{Total number of patients admitted for elective surgery during the reporting period}}$
<p>Data sources</p>	<p>Liaison Registration Book: Date that a patient was admitted for surgery and the date that patient was added to surgical waiting list Inpatient Admission/Discharge Register: Total number of patients admitted for elective surgery during the reporting period</p>



Frequency of reporting	Monthly	
Data entry	Data elements	Sum total of number of days between date added to surgical waiting list to date of admission for surgery Total number of elective surgery patients during the reporting period
	Responsibilities	<p>Liaison Office Personnel records dates that a patient is added to the surgical waiting list and the date they are admitted for surgery.</p> <p>Ward nurse collects the number of admitted elective surgical patients during the reporting period in the IP A/D Registry.</p> <p>KPI focal person will complete the data collection from registries, data entry, and analysis.</p>

KPI 9: Surgical Site Infection (SSI) Rate

Why is this important?	<p>The surgical site infection rate is an indicator of the quality of medical care received by surgical patients and an indirect measure of infection prevention practices in the hospital. Infection at the site of surgery may be caused by poor infection prevention practices in the operating room or on the ward after completion of surgery.</p> <p>Incidence rate of SSIs in Ethiopia is unknown, but estimates found in the literature range from approximately 10 to 75%. Discrepancies are often due to a lack of quality data.</p> <ul style="list-style-type: none"> ✦ Kotisso & Aseffa (1998): 21% ✦ Taye (2005): 14.8% ✦ Amenu, Belachew, Araya (2011): 11.4% ✦ Gelaw et al. (2017): 6.8% ✦ Leloto et al. (2017): 19.1% <p>By monitoring surgical site infection hospitals can assess the adequacy of infection prevention practices in the hospital and take action to address any problems identified.</p>
-------------------------------	--



Definition	<p>Proportion of all major surgeries with an infection occurring at the site of the surgical wound <i>prior to discharge</i>. <u>One or more</u> of the following criteria should be met:</p> <ul style="list-style-type: none"> ✦ Purulent drainage from the incision wound ✦ Positive culture from a wound swab or aseptically aspirated fluid or tissue ✦ Spontaneous wound dehiscence or deliberate wound revision/opening by the surgeon in the presence of: pyrexia > 38C or localized pain or tenderness <p><u>Any two</u> of the following:</p> <ul style="list-style-type: none"> ✦ wound pain, tenderness, localized swelling, redness or heat ✦ An abscess or other evidence of infection involving the deep incision that is found by direct examination during re-operation, or by histopathological or radiological examination <p>NB: A <u>major surgical procedure</u> is defined as any procedure conducted in an OR under general, spinal or major regional anesthesia.</p> <p>Suggested operational definition: To diagnose an incisional SSI (superficial or deep) a patient must have at least one of:</p> <p style="padding-left: 40px;">Purulent drainage from the incision Abscess within the wound (detected clinically or radiologically)</p> <p><i>Or one of the following combinations:</i> Pain or tenderness or localized swelling or redness or heat or fever AND the incision is opened deliberately or spontaneously opens (dehisces)</p>
Unit of measurement	Percentage (%)
Numerator	<p>Total number of inpatients who received surgery with new surgical site infection arising before discharge (recorded at discharge). INCLUDE:</p> <ul style="list-style-type: none"> ✦ Patients undergoing surgery in public facility ✦ Private wing surgical cases
Denominator	Total number of major surgical procedures (both elective & non-elective, and public & private) performed during the reporting period
Formula	$\left(\frac{\text{Total number of inpatients with new SSI arising during reporting period}}{\text{Total number of major surgical procedures performed in OT in reporting period}} \right) * 100$
Data sources	<p>SSI surveillance logbook: daily tracking of SSI presence per patient, to be cross-checked with IP A/D Registry SSI column OR Registry: Number of major surgical procedures performed during the reporting</p>
Frequency of reporting	Monthly



Data entry	Data elements	Number of inpatient SSIs recorded during the reporting period Number of major surgical procedures performed during the reporting period
	Responsibilities	Ward Nurse will complete SSI surveillance logbook daily and record any presence of SSI in the designated column of the IP/AD Registry. The ward physician or IESO is responsible for recording absence or presence of SSI and condition of patient at discharge on the discharge summary. If an SSI is positively diagnosed , then the ward nurse will complete the subsequent 'Wound Surveillance' sheet for inclusion in the patient chart. KPI focal person will complete the data collection from registries, data entry, and analysis.

KPI 11: Peri-operative Mortality Rate (POMR)

Why is this important?	Peri-operative mortality rate is a Lancet Commission on Global Surgery (2015) indicator that demonstrates safety and quality of surgical and anesthesia care. Surgical and anesthesia safety is an integral component of care delivery. Peri-operative mortality encompasses deaths in the operating theatre and in the hospital after the procedure (prior to discharge). This indicator informs policy and planning regarding surgical and anesthesia safety, as well as surgical volume when number of procedures is the denominator.
Definition	All-cause death rate prior to discharge among patients who underwent a major surgical procedure in an operating theatre during the reporting period Note: Stratified by emergent and elective major procedures
Unit of measurement	Percentage (%)
Numerator	Total number of deaths prior to discharge among major surgical cases
Denominator	Total number of major surgical procedures (both elective & emergent)
Formula	$\left(\frac{\text{Total number of deaths prior to discharge among major surgical cases}}{\text{Total number of major surgical cases}} \right) * 100$
Data sources	OR Registry: - All major surgical cases listing operation outcome as "died" - All major surgical cases Inpatient Admission/Discharge Registry: All major surgical cases listing patient as deceased at discharge
Frequency of reporting	Monthly



Data entry	Data elements	Total number of deaths prior to discharge among major surgical cases Total number of major surgical cases
	Responsibilities	Surgeon/IESO records patient outcome in the OR Registry Ward Nurse records patient condition at discharge in the Inpatient Admission/Discharge Registry KPI focal person will complete the data collection from registries, data entry, and analysis.

KPI 12: Rate of Safe Surgery Checklist Utilization

Why is this important?	The WHO Safe Surgery checklist is a safety check that should be performed in any operating room. It is designed to reinforce accepted safety practices and foster better communication and teamwork between clinical disciplines. The Checklist is intended as a tool for use by clinicians interested in improving the safety of their operations and reducing unnecessary surgical deaths and complications. This is an important aid to ensure patient safety.	
Definition	Proportion of surgical procedures where the safe surgery checklist was fully implemented.	
Unit of measurement	Percentage (%)	
Numerator	Number of WHO Surgical Safety Checklists in patient charts that were completed entirely	
Denominator	Total number of WHO Surgical Safety Checklists in patient charts reviewed ✦ 25 charts minimum	
Formula	$\frac{\text{Number of WHO Surgical Safety Checklists in patient charts that were completed entirely (}}{\text{Total number of WHO Surgical Safety Checklists in patient charts reviewed}} \times 100$	
Data sources	Patient charts	
Frequency of reporting	Monthly	
Data entry	Data elements	Number of WHO Surgical Safety Checklists in patient charts that were completed entirely Total number of WHO Surgical Safety Checklists in patient charts reviewed



	Responsibilities	<p>Runner Nurse or Delegated Operating Theater Staff read the Surgical Safety Checklist aloud to surgical team and checks off the appropriate boxes as action is completed.</p> <p>Anesthetist indicates in the Anesthesia Logbook whether the Surgical Safety Checklist was completed.</p> <p>KPI focal person conducts the random sample of patient charts (see below) and is responsible for the aggregation of data, entry and analysis.</p>
--	-------------------------	--

Additional Information:

The KPI focal person is responsible for review of a random sample of 25 charts for the completeness of the safe surgery checklist. The safe surgery checklist is considered incomplete if one of the following occurs:

1. In the chart, the checklist is missing
2. There is **any** box unchecked
3. If in the anesthesia registry the box indicating if the safe surgery checklist has been filled out is recorded as NO

The responses recorded by the anesthetist in the column on Surgical Safety Checklist in the Anesthesia Registry can be cross-checked with the random sample to check data collection quality.

KPI 13: Mean Duration of In-Hospital, Pre-Elective Operative Stay

Why is this important?	Long in-hospital pre-operative stay results in unnecessary bed occupancy as well as increases the risk of colonization by antibiotic resistant hospital flora. It is indicative of insufficient pre-admission preparation or inefficient OT management that may result in cancellations. Longer durations of waiting can also indicate an overburdened hospital system and too high of a caseload.
Definition	The average number of days patients waited in-hospital (after admission) to receive major elective surgery during the reporting period.
Unit of measurement	Number
Numerator	Total sum of pre-operative length of stay
Denominator	Total number of major elective surgical procedures during the reporting period
Formula	$\frac{\text{Total sum of (Date patient received elective surgery – Date of admission)}}{\text{Total number of major elective surgical procedures during the reporting period}}$
Data sources	Inpatient Admission/Discharge Registry
Frequency of reporting	Monthly



Data entry	Data elements	Total sum of pre-operative length of stay (Date patient received elective surgery – Date of admission) Total number of elective surgical procedures during the reporting period
	Responsibilities	Ward nurse records date of admission and date of operation in the Inpatient Admission/Discharge Register, as well as number of admitted elective surgical patients during the reporting period from the IP A/D Registry. KPI focal person will complete the data collection from registries, data entry, and analysis.

KPI 14: Surgical Volume

Why is this important?	Surgical volume is a Lancet Commission on Global Surgery (LCoGS) indicator that captures met need for surgical and anesthesia care. The LCoGS established a target surgical volume of 5,000 procedures per 100,000 population in every country by 2030. The number of surgical procedures done per year is an indicator of met need for surgical and anesthesia care. With the high surgical need of the population, this indicator will show progress toward meeting this need across time. It will also inform policy and planning regarding met and unmet need for surgical services.
Definition	Total number of major surgical procedures performed in operating theater per 100,000 population per year. NB: A major surgical procedure is defined as any procedure conducted in an OR under general, spinal or major regional anesthesia.
Unit of measurement	Proportion
Numerator	Total number of major surgical procedures performed in OT per reporting period
Denominator	Total regional catchment population
Formula	$\left(\frac{\text{number of major surgical procedures performed in OT per reporting period}}{\text{Total regional catchment population}} \right) * \frac{100,000}{\text{Total}}$
Data sources	OR Registry: Total number of major surgical procedures performed in an operating theater per month Regional Health Bureau records: Regional catchment population Note: Must cross-check with Inpatient Admission/Discharge Register for number of major surgical procedures reported in OR Register
Frequency of reporting	Monthly



Data entry	Data elements	Number of major surgical procedures performed Total regional catchment population
	Responsibilities	Surgeon/IESO records complete count of major surgical procedures. KPI focal person will complete the data collection from registries, data entry, and analysis, and is responsible for determining the catchment population from RHB.

KPI 15: Anesthetic Adverse Outcome

Why is this important?	Anesthesiology is described as the invisible sister of the neglected stepchild of global health. A large difference in post-operative mortality rates between developed countries and LMICs is caused by differences in anesthesia mortality rates. The rate of anesthetic adverse outcomes assesses the safety and quality of anesthesia services.
Definition	<p>Percentage of surgical patients who developed any one of the following:</p> <ol style="list-style-type: none"> (1) Cardio-respiratory arrest (2) Inability to secure airway (3) High spinal anesthesia <p>Cardiorespiratory arrest defined as: cessation of cardiac activity evidenced by:</p> <ul style="list-style-type: none"> ✦ Chest compressions being performed ✦ Loss of femoral, carotid and apical pulse with ECG changes <p>High spinal defined as: Within 15 minutes of administration of spinal anesthesia:</p> <ul style="list-style-type: none"> ✦ Patient experiences loss of sensation in the shoulder <i>AND</i> ✦ Need for positive pressure ventilation after administration of spinal anesthesia <p>Includes any administration of spinal anesthesia extending above T4 level.</p> <p>Inability to secure airway defined as:</p> <ul style="list-style-type: none"> ✦ Having to awaken patient due to inability to intubate ✦ Cardiac-respiratory arrest due to failure to intubate
Unit of measurement	Percentage (%)
Numerator	Number of major surgical procedures with at least one anesthetic adverse outcome (high spinal anesthesia, failed intubation, or cardio-respiratory arrest) during reporting period
Denominator	Total number of major surgical procedures performed in OR during reporting period



Formula	$\frac{\text{Number of surgical procedures with an anesthetic adverse outcome in reporting period ()}}{\text{Number of major surgical procedures performed in OR in reporting period}} * 100$	
Data sources	Anesthesia Registry	
Frequency of reporting	Monthly	
Data entry	Data elements	<p>Number of major surgical procedures with at least one anesthetic adverse outcome (high spinal anesthesia, inability to secure airway, or cardiorespiratory arrest) during reporting period</p> <p>Total number of major surgical procedures performed in OR during reporting period</p>
	Responsibilities	<p>Anesthetist records all complications noted from the time of anesthesia induction to time of full recovery from anesthesia in the Anesthesia Logbook daily.</p> <p>Note: When recording adverse events, more than one item can be marked. For example, if a patient dies due to a high spinal, they should tick high spinal, cardiorespiratory arrest, and death if applicable.</p> <p>Any other adverse events directly related to anesthesia care should be recorded in the 'Other' column, including intra-operative death due to anesthesia.</p> <p>Please use the 'Remarks' column to include more information regarding the reason for the adverse event if information is available.</p> <p>KPI focal person will complete the data collection from registries, data entry, and analysis.</p>

KPI 21: Blood Availability Ratio for Surgical Patients

Why is this important?	Timely access to blood is a factor in surgical morbidity and mortality especially in obstetric and trauma care where hemorrhage is a major cause of mortality.
Definition	The percentage of major surgical/obstetric cases which are referred or cancelled because of unavailability of blood.
Unit of measurement	Percentage (%)
Numerator	Total number of major surgical/obstetric procedures cancelled plus major surgical/obstetric patients referred because of lack of blood for transfusion
Denominator	Total number of major surgical procedures performed in the period
Formula	$\frac{\text{(Total \# of major surgical procedures cancelled + Total \# of patients referred due to lack of blood)}}{\text{(Total number of major surgical procedures performed in the period)}} * 100$



Data sources	IP A/D Registry: Total number of major surgical procedures performed OR Scheduling Registry: Total number of major surgical procedures cancelled due to lack of blood	
	Referral Registry: Total number of patients referred because of lack of blood for transfusion	
Frequency of reporting	Monthly	
Data entry	Data elements	Total number of major surgical/obstetric procedures cancelled plus major surgical/obstetric patients referred because of lack of blood for transfusion Total number of major surgical procedures performed in the reporting period
	Responsibilities	OR Nurse will record major surgical procedures cancelled due to lack of blood in the OR Scheduling Registry Liaison Officer will record number of patients referred because of lack of blood in the Referral Register Data entry and analysis completed by KPI focal person



Facility-level Indicators

The following indicators are included for a hospital level in the HMPI (KPI 26: Patient Satisfaction and KPI 35: Bed Occupancy Rate). Within the SaLTS framework, data for these two indicators should be collected specific to surgical patients.

Surgical Patient Satisfaction (*related to HPMI KPI 26*)

Why is this important?	<p>Patient satisfaction with the health care they receive at the hospital is a measure of the quality of care provided. By monitoring patient satisfaction hospitals can identify areas for improvement and ensure that hospital care meets the expectations of the patients served.</p> <p>The Out-Patient Assessment of Healthcare Survey (O-PAHC) and In-Patient Assessment of Healthcare Survey (I-PAHC) have been developed for use in Ethiopian health facilities. These survey tools measure the patient experience related to service availability, cleanliness, communication, respect, medication (prescription, availability and patient information) and cost in OPD, IPD, maternity and emergency departments.</p> <p>Patient satisfaction is KPI 53 in the National Health Performance Monitoring and Improvement (HPMI) plan.</p>	
Definition	Average rating of a hospital on a score of 0-10 from surgical I-PAHC surveys	
Unit of measurement	Absolute number, on a scale of 0-10	
Numerator	Sum total of surgical I-PAHC scores	
Denominator	Number of I-PAHC surveys completed with surgical patients	
Formula	$\frac{\text{(Sum total of I – PAHC rating scores)}}{\text{(Number of I – PAHC surveys completed)}}$	
Data sources	<p>Survey protocol for the patient satisfaction survey is presented in the Appendix.</p> <p>Data entry and analysis can be undertaken using the electronic access database and Excel pre-programmed analytical tool through which summary tables, charts and the average satisfaction rating can be calculated.</p>	
Frequency of reporting	Quarterly	
Data entry	Data elements	<p>Sum total of I-PAHC rating scores</p> <p>Total number of I-PAHC surveys completed</p>
	Responsibilities	KPI focal person conducts surveys when surgical patients are discharged and is responsible for data aggregation, entry and analysis.

Additional Information:

- ✦ KPI focal person should begin each survey by asking the interviewee if they received surgical services during their hospital stay. If the patient responds *yes*, then the KPI focal person should write SURGERY at the top of the paper survey. All inpatient surveys labeled with SURGERY should be placed in a designated and secure collection location such as a folder, drawer, or basket where all surveys from surgical patients can be collected.
- ✦ Quarterly, the KPI focal person will retrieve all surveys that have been collected from surgical patients and determine the data elements described above. It is recommended that collection and calculation of totals happen more often (such as monthly) to prepare for quarterly reporting and ensure data accuracy.

Surgical Bed Occupancy Rate (*related to HPMI KPI 35*)

Why is this important?	Surgical bed occupancy rate is a measure of the efficiency of surgical services. If the bed occupancy rate is low, there may be underutilization of resources. If bed occupancy rate is high, there may be low capacity to deal with sudden increases in demand for services.	
Definition	The average percentage of occupied surgical beds during the reporting period.	
Unit of measurement	Percentage (%)	
Numerator	The sum total surgical patient length of stay (days) during the reporting period	
Denominator	(Average number of surgical beds during the reporting period) x (Number of days in reporting period)	
Formula	$\left(\frac{\text{Sum total surgical patient length of stay during reporting period}}{\text{Average number of surgical beds} * \text{Number of days in reporting period}} \right) * 100$	
Data sources	<p>Inpatient Admission/Discharge Register: Length of stay (patient-level information used to determine numerator (see instructions in ‘Additional Information’ below)</p> <p>Ward nurse: Number of surgical beds in hospitals</p>	
Frequency of reporting	Monthly	
Data entry	Data elements	Sum total length of stay (days) Average number of surgical beds during reporting period Number of days in reporting period
	Responsibilities	Ward nurse records length of stay (LOS) of each surgical patient in Inpatient Admission/Discharge Register. KPI focal person will complete the data collection from registries, data entry, and analysis.

Additional Information:



Note: The length of stay should ONLY be counted for the actual reporting period. If a patient was admitted during a previous reporting period, their length of stay during that time should not be counted. Instead, for this KPI, the patient's length of stay should be counted from the first day of this reporting period to the time of discharge, death, or to the end of the reporting period (whichever is first).

In order to calculate the indicator, the KPI focal person must first determine the sum total surgical patient length of stay in days during the reporting period. To complete this patient-level calculation, the following data elements need to be determined from the Inpatient Admission/Discharge Registry:

1. Date of admission (DD/MM/YY)
2. Date of discharge (DD/MM/YY)

By taking the difference between the dates of admission and discharge for each patient, calculate their length of stay. The numerator of this indicator can then be calculated by finding the sum total length of stay among all surgical patients who stayed on the inpatient ward during the reporting period.



Other Data

Additional data concerning the rate of referrals for surgical services will be collected in addition to the KPIs. Though the rate of referral has not been selected as a national KPI at this time, the collection of this data and calculation of this indicator is valuable for ongoing monitoring and evaluation of SS2020 programs that are implemented at a facility level.

Surgical Referrals Out

Why is this important?	The number of referrals for surgery at a facility level are indicative of the capability to provide surgical services. The data collected regarding referrals will allow hospitals to track number of referrals out and better recognize areas for improvement that may be contributing to these referrals.	
Definition	Total number of patients referred out of the hospital for surgical services after an on-site assessment by a medical professional per month	
Unit of measurement	Number	
Formula	<i>Total number of patients referred out of the hospital for surgical services in the reporting period</i>	
Data sources	Referral Registry: - All cases referred out of the hospital for surgical services	
Frequency of reporting	Monthly	
Data entry	Data elements	Total number of patients referred out of the hospital for surgical services in the reporting period Reason for referral
	Responsibilities	Liaison officer is responsible for filling out the Referral Registry completely. KPI focal person will complete the data collection from the registry, data entry, and any analysis.

Additional Information:

The KPI focal person is responsible for reviewing the Referral Registry and recording the number of surgical referrals per month, as well as the reasons recorded for referral. Reasons for surgical referral should be found in the registry, tallied up, and reported as an aggregate.

Example: “Need for specialist care (2)” with the number of referrals out with this reason listed should be reported as a component of the total number of surgical referrals out.

The reasons for referral should be from one of the following categories:

Training:

- A. Need for specialist care
- B. Need for diagnostic equipment training



C. Need for equipment training (other)

Staff:

D. Medical or surgical personnel not available

Equipment:

E. Lack of diagnostic equipment

F. Non-functional diagnostic equipment

G. Non-functional equipment (other)

Drugs/Supplies:

H. Lack of medical supplies/consumables

I. Lack of drugs

J. Lack of blood

Infrastructure:

K. Lack of inpatient beds

L. OR occupied

M. Lack of electricity

N. Lack of water

O. Lack of oxygen

P. Need for ICU-level care

Other:

Q. Please specify

R. Patient preference



Conclusion

The collection and reporting of the SaLTS KPIs is central to monitoring and evaluating surgery and anesthesia care in Ethiopia at a national, regional, and facility level. The indicators can be used to guide decision making and performance improvement at all levels. Analyzing data at each level will be useful for tracking changes in the surgical system.

In order for the SaLTS indicators to be utilized properly, data elements should be collected regularly at a facility level (according to the reporting frequency for each indicator) and reported to a regional and national level. An electronic DHIS2 or Hospital KPI Database will be created (in Microsoft Excel spreadsheet) into which the KPI focal person should enter all KPI data elements. The KPI Database will automatically generate KPI results and related tables and charts enabling KPI reports to be printed from this database.

Data should be submitted to the RHB as well; the KPI focal person should regularly email the electronic KPI Database to the RHB. If this is not possible, the KPI focal person should print a copy of the data elements and a copy of the KPI results directly from the KPI Database and fax these to the RHB. Each RHB should assign a focal person to receive KPI reports from all hospitals and regional data should be aggregated and analyzed using electronic Regional KPI Database/DHIS2 that will automatically generate results and related tables and charts, including regional averages. Every quarter, the RHB should email electronic copies of the Regional KPI Database to the FMOH for national aggregation.

When compared over time, the SaLTS KPIs can be instrumental in helping determine how all levels of the healthcare system can improve performance in surgical and anesthesia care.