KEMENTERIAN KESIHATAN MALAYSIA

TECHNICAL SPECIFICATIONS CLINICAL SERVICES QUALITY INDICATORS (CliSQI)

MEDICAL PROGRAMME

2024

Date of Update	Discipline	Indicator	Notes
9.2.2024	Geriatric	Percentage of patients undergoing Comprehensive Geriatric Assessment (CGA) within (≤) 5 days of admission to Geriatric Ward/ cubicles/ beds by at least 3 interdisciplinary team members.	Formula correction due to typing error
9.2.2024	General Surgery	Percentage of patients with waiting time ≤4 weeks to have endoscopy done from the date the patients presented with suspected GI malignancy	Changes in the technical specification from ≤3 weeks to ≤4 weeks and standard from ≥90% to ≥80%
23.2.2024	General Surgery	Percentage of patients with waiting time ≤4 weeks to have endoscopy done from the date the patients presented with suspected GI malignancy	Change in the inclusion/ exclusion criteria: Inclusion criteria: All patients with abdominal symptoms suspicious of malignancy ~~and~~ **OR** Immunochemical Faecal Occult Blood Test (IFOBT) positive. Exclusion criteria: Patients who defaulted follow up
23.2.2024	Oncology	Chemotherapy Extravasation Rate	Update on the definition of terms: Chemotherapy treatment: All types of intravenous administration of chemotherapeutic agents. The number used in this indicator is based on the number of uninterrupted chemotherapy administration given to one patient.
01.07.2024	Emergency Medicine	Percentage of patients ventilated in Emergency and Trauma Department for more than ≥ 8 hours	Dropped

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2024

CARDIOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Heart Failure Case Fatality Rate (Within hospital)	Effectiveness	≤ 8%
2	Readmission within (≤) 1 month for Heart Failure	Effectiveness	≤ 20%

Discipline	:	Cardiology
Indicator 1	:	**Heart Failure Case Fatality Rate (Within hospital)**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Heart Failure is a main cause of mortality in heart disease. 2. Mortality rate is a main KPI of quality of care. Reference: Clinical Practice Guidelines: Management of Heart Failure 2019 4th Edition; Malaysian Heart Failure Registry (MyHF).
Definition of Terms	:	**Heart Failure:** A clinical syndrome due to any structural or physiological abnormality of the heart resulting in its inability to meet the metabolic demands of the body or its ability to do so only at higher than normal filling pressures. **Within hospital:** The period of index hospitalization from admission to death. **Death due to Heart Failure**: It includes all mortality related to Heart Failure.
Criteria	:	**Inclusion**: 1. All patients admitted for Heart Failure. **Exclusion**: 1. Severe pulmonary disease or pulmonary arterial hypertension.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of death due to Heart Failure
Denominator	:	Total number of patients admitted with Heart Failure
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 8 %
Data Collection & Verification	:	1. **Where**: Data will be collected in the Medical and/ or Cardiology Ward/ CCU/ CRW. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from admission & discharge record book/ patient's case notes. 4. **How frequent** PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Cardiology**
Indicator 2	:	**Readmission within (≤) 1 month for Heart Failure**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Heart Failure is a main cause of morbidity in heart disease. 2. Readmission rate is a main KPI of morbidity. Reference: Clinical Practice Guidelines: Management of Heart Failure 2019 4th Edition; Malaysian Heart Failure Registry (MyHF).
Definition of Terms	:	**Heart Failure:** A clinical syndrome due to any structural or physiological abnormality of the heart resulting in its inability to meet the metabolic demands of the body or its ability to do so only at higher than normal filling pressures. **Readmission**: Admission of a patient that was previously managed and discharge from the same facility. Readmission for other diagnosis that is not directly related to Heart Failure is not included in this indicator.
Criteria	:	**Inclusion**: 1. All Heart Failure admission. **Exclusion**: 1. Severe pulmonary disease or pulmonary arterial hypertension. 2. Readmission of patients for Heart Failure within 1 month that were managed and discharged from another facility for the initial Heart Failure admission. 3. Readmission due to other causes that is not directly related to cardiovascular system (e.g., Uncontrolled DM, infection related). 4. Readmission due to hospital acquired infection from previous admission (e.g., Thrombophlebitis/ Urinary Tract Infection).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients readmitted for within (≤) 1 month of initial Heart Failure admission
Denominator	:	Total number of patients admitted with Heart Failure
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 20 %
Data Collection & Verification	:	1. **Where**: Data will be collected in the Medical and/ or Cardiology ward/ CCU/CRW. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: For numerator, data is suggested to be collected on the day of readmission. For denominator, data is from admission & discharge record book/ Hospital Information System (HIS). 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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DERMATOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of new Psoriasis patients assessed for quality of life within (≤) 6 months of follow up under Dermatology Outpatient Clinic	Customer centeredness	≥ 90%
2	Infection rate of skin biopsy wound	Safety	≤ 1%

Discipline	:	**Dermatology**
Indicator 1	:	**Percentage of new Psoriasis patients assessed for quality of life within (≤) 6 months of follow up under Dermatology Outpatient Clinic**
Dimension of Quality	:	Customer centeredness
Rationale	:	1. Psoriasis is an immune mediated multisystem disease which runs a chronic debilitating course. 2. It causes profound physical and psychosocial impact, hence reducing the quality of life of patients. 3. Management of Psoriasis patients can be improved by assessing their quality of life and providing holistic care.
Definition of Terms	:	**Quality of Life**: It is a measured using the Dermatology Life Quality Index (DLQI). Quality of life measures are an important adjunct to skin lesion assessments to properly assess the full effect of an illness such as Psoriasis that is not life-threatening. **Dermatology Life Quality Index (DLQI)**: It is a questionnaire that is very useful to assess the quality of life impact of Psoriasis. Aim of this 10-question validated questionnaire is to measure how much the skin problem has affected patients' life over the last week. This questionnaire is aimed to be done for all new Psoriasis patient within 6 months.
Criteria	:	**Inclusion**: 1. All new Psoriasis patients seen in Dermatology Outpatient Clinic. **Exclusion**: 1. Psoriatic patients who had quality of life assessed by other centres. 2. Patients who defaulted appointment within 6 months.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of new Psoriasis patients assessed for quality of life within (≤) 6 months of follow up under Dermatology Outpatient Clinic
Denominator	:	Total number of new Psoriasis patients seen during the specified period of time
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	**≥ 90%**
Data Collection & Verification	:	1. **Where**: Data will be collected in Dermatology Outpatient Clinic 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book/ record of DLQI forms. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 6 months retrospective cohort of data. E.g., for January 2024, it will be patients who were newly registered under Dermatology Outpatient Clinic of the hospital in July 2023, as these patients have 6 months from their first visit to be assessed for quality of life. *This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	**:**	**Dermatology**
Indicator 2	:	**Infection rate of skin biopsy wound**
Dimension of Quality	:	Safety
Rationale	:	1. Skin biopsies are performed for diagnostic or therapeutic reasons. 2. The site where a skin biopsy has been performed may be infected and this may produce a poor cosmetic result and increase morbidity.
Definition of Terms	:	**Infection:** Diagnosed clinically when there is evident of pain, erythema, swelling and purulent exudates within 2 weeks from biopsy date and/ or feedback from patients on next follow up**.** Patient is only considered not infected after 2 weeks from the date of skin biopsy. There must be documentation on post skin biopsy whether it is infected or not. *Suggestion on implementation: This can be done in the form of a slip that patient is provided with a TCA at Klinik Kesihatan or clinic to review wound. Patient needs to bring back the slip during the next TCA at Dermatology Outpatient Clinic and it needs to be reviewed & kept. If there is no slip, feedback from patient need to be documented in patient's case notes during next TCA (whether it is infected or not infected)**.**
Criteria	:	**Inclusion**: 1. All patients who underwent skin biopsy by Dermatology Department. **Exclusion**: 1. Patients with infected wound prior to biopsy. 2. Patients who defaulted TCA post skin biopsy.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients who had infected skin biopsy wound
Denominator	:	Total number of patients who had undergone skin biopsy
Formula	:	Numerator x 100 % Denominator
Standard	:	**≤ 1%**
Data Collection & Verification	:	1. **Where**: Data will be collected in Dermatology Outpatient Clinic 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ procedure record book/ skin biopsy slip. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 2 months retrospective cohort of data. E.g., for March 2024, it will be patients who had biopsy done in January 2024; as patient needs to be reviewed during the next TCA to obtain information on wound infection post biopsy. 2 months period is given as patients are usually given TCA within 6 weeks after the biopsy to review the HPE results.

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ENDOCRINOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	**Percentage of Type 2 diabetes mellitus patientswith HbA1c > 8.5%**	Effectiveness	≤ 40%
2a	**Percentage of Type 2 diabetes patients assessed chronic complications: Retinopathy**	Effectiveness	≥ 90%
2b	**Percentage of Type 2 diabetes patients assessed for chronic complications: Diabetic Kidney Disease**	Effectiveness	≥ 90%
2c	**Percentage of Type 2 diabetes patients assessed for chronic complications: Peripheral Neuropathy & Diabetic Foot**	Effectiveness	≥ 90%

Discipline	:	**Endocrinology**
Indicator 1	:	**Percentage of Type 2 diabetes mellitus patients with HbA1c > 8.5%**
Dimension of Quality	:	**Effectiveness**
Rationale	:	1. Patients with HbA1c > 8.5% have poor glycaemic control and are at increased risk of acute complications, hospitalisations and progression of chronic complications. 2. Combination therapy with oral and injectable glucose lowering drugs together with patient education and adherence to lifestyle intervention should enable improved glycaemic control within 12 months of regular follow-up at endocrinologist-led outpatient diabetes clinics. 3. CPG Management of Type 2 diabetes Mellitus (6th Edition) has proposed this KPI for management of Type 2 diabetes mellitus 4. Greatest outpatient workload for Endocrinology Service is management of Type 2 diabetes mellitus
Definition of Terms	:	**Type 2 diabetes mellitus patients:** Adult outpatients with diagnosis of Type 2 diabetes mellitus **HbA1c > 8.5%**: Blood test for HbA1c taken at 3 - 6 monthly intervals with value exceeding 8.5%
Criteria	:	**Inclusion:** 1. All adult Type 2 diabetes mellitus patients on follow-up ≥ 12 months in outpatient diabetes clinic managed by endocrine team **Exclusion:** 1. Type 2 diabetes mellitus patients on follow-up by other units (non-endocrine).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of Type 2 diabetes mellitus patients with HbA1c > 8.5%
Denominator	:	Total number of Type 2 diabetes mellitus patients attending the clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	**≤ 40%**
Data Collection & Verification	:	1. **Where:** Data will be collected from outpatient diabetes clinics where Type 2 diabetes mellitus patients are managed by endocrine team. 2. **Who:** Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect:** Data is suggested to be collected from patient's case note/ record book. 4. **How frequent:** PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	This is **a point prevalence survey.** **The survey will be conducted in June.** Therefore, all Type 2 DM patients attending the clinic in June will be included in the denominator. **Should a facility is unable to reach 100 samples in June, the survey will need to be continued in the upcoming month or months until the sample size reaches 100 patients**. The facility must guarantee that there will be no patient overlap in the denominator.

Discipline	:	**Endocrinology**
Indicator 2a	:	**Percentage of Type 2 diabetes patients assessed for chronic complications: Retinopathy**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Diabetes complications cause increased morbidity, hospitalisations, healthcare related costs and premature mortality in patients with Type 2 diabetes 2. CPG Management of Type 2 diabetes Mellitus (6th Edition) has proposed this KPI for management of Type 2 diabetes mellitus 3. Early detection of diabetes-related chronic complications with regular screening for complications is important to enable prompt management and delay in progression of complications 4. Screening for chronic complications is still suboptimal in outpatient diabetes care despite ready availability of tools and resources 5. Screening for retinopathy chronic complications should be performed at least **annually or up to once in two years if the previous screening was normal** in all Type 2 diabetes mellitus patients
Definition of Terms	:	**Type 2 diabetes mellitus patients**: Adult outpatients with a diagnosis of Type 2 diabetes mellitus **Numerator:** Those patients who had been assessed for retinopathy either with a fundus photograph and/or an ophthalmology clinic assessment. If a patient was referred for eye assessment (hospital/ clinic), he/she must attend the clinic in order to be included in the numerator.
Criteria	:	**Inclusion:** 1. All adult Type 2 diabetes mellitus patients on follow-up ≥ 12 months in an outpatient diabetes clinic managed by endocrine team **Exclusion:** 1. Type 2 diabetes mellitus patients on follow-up by other units (non-endocrine). 2. Patients with severe proliferative retinopathy and have been followed up by an ophthalmologist.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients assessed for retinopathy
Denominator	:	Total number of Type 2 diabetes mellitus patients attending the facility
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected from outpatient diabetes clinics where Type 2 diabetes mellitus patients are managed by endocrine team. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case note. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.

Remarks	:	Screening for chronic complications will be assessed within a year of assessment. This is **a point prevalence survey.** **The survey will be conducted in June.** Therefore, all Type 2 DM patients attending the clinic in June will be included in the denominator. **Should a facility is unable to reach 100 samples in June, the survey will need to be continued in the upcoming month or months until the sample size reaches 100 patients**. The facility must guarantee that there will be no patient overlap in the denominator.

Discipline	:	**Endocrinology**
Indicator 2b	:	**Percentage of Type 2 diabetes patients assessed for chronic complication: Diabetic Kidney Disease**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Diabetes complications cause increased morbidity, hospitalisations, healthcare related costs and premature mortality in patients with Type 2 diabetes 2. CPG Management of Type 2 diabetes Mellitus (6th Edition) has proposed this KPI for management of Type 2 diabetes mellitus 3. Early detection of diabetes-related chronic complications with regular screening for complications is important to enable prompt management and delay in progression of complications 4. Screening for chronic complications is still suboptimal in outpatient diabetes care despite ready availability of tools and resources 5. Screening for chronic complications should be performed at least **annually** in all Type 2 diabetes mellitus patients
Definition of Terms	:	**Type 2 diabetes mellitus patients**: Adult outpatients with a diagnosis of Type 2 diabetes mellitus **Numerator:** Those patients who have been assessed for Diabetic Kidney Disease either with (urine microalbumin **OR** urine albumin creatinine ratio (ACR) **OR** urine protein creatinine index (PCI) **AND** eGFR)
Criteria	:	**Inclusion:** 1. All adult Type 2 diabetes mellitus patients on follow-up ≥ 12 months in an outpatient diabetes clinic managed by endocrine team **Exclusion:** 1. Type 2 diabetes mellitus patients on follow-up by other units (non-endocrine).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients assessed for Diabetic Kidney Disease
Denominator	:	Total number of Type 2 diabetes mellitus patients attending the facility
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection	:	1. **Where**: Data will be collected from outpatient diabetes clinics where Type 2diabetes mellitus patients are managed by endocrine team. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of thedepartment/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case note. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Screening for chronic complications will be assessed within a year of assessment. This is **a point prevalence survey.** **The survey will be conducted in June.** Therefore, all Type 2 DM patients attending the clinic in June will be included in the denominator.

		Should a facility is unable to reach 100 samples in June, the survey will need to be continued in the upcoming month or months until the sample size reaches 100 patients. The facility must guarantee that there will be no patient overlap in the denominator.

Discipline	:	**Endocrinology**
Indicator 2c	:	**Percentage of Type 2 diabetes patients assessed for chronic complication: Peripheral Neuropathy and Diabetic Foot**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Diabetes complications cause increased morbidity, hospitalisations, healthcare related costs and premature mortality in patients with Type 2 diabetes 2. CPG Management of Type 2 diabetes Mellitus (6th Edition) has proposed this KPI for management of Type 2 diabetes mellitus 3. Early detection of diabetes-related chronic complications with regular screening for complications is important to enable prompt management and delay in progression of complications 4. Screening for chronic complications is still suboptimal in outpatient diabetes care despite ready availability of tools and resources 5. Screening for chronic complications should be performed at least **annually** in all Type 2 diabetes mellitus patients
Definition of Terms	:	**Type 2 diabetes mellitus patients**: Adult outpatients with diagnosis of Type 2 diabetes mellitus **Numerator:** Those patients who have been assessed for: 1) Peripheral neuropathy: • neurological assessment with 10g monofilament **AND** • pin prick OR vibration sense OR ankle reflexes **AND** 2) Diabetic Foot (comprehensive foot assessment)
Criteria	:	**Inclusion:** 1. All adult Type 2 diabetes mellitus patients on follow-up ≥ 12 months in an outpatient diabetes clinic managed by endocrine team **Exclusion:** 1. Type 2 diabetes mellitus patients on follow-up by other units (non-endocrine).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients assessed for Peripheral neuropathy **AND** Diabetic Foot (comprehensive foot assessment)
Denominator	:	Total number of Type 2 diabetes mellitus patients attending the facility
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where:** Data will be collected from outpatient diabetes clinics where Type 2 diabetes mellitus patients are managed by endocrine team. 2. **Who:** Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect:** Data is suggested to be collected from patient's case note. 4. **How frequent:** PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify:** PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.

Remarks	:	Screening for chronic complications will be assessed within a year of assessment. This is **a point prevalence survey.** **The survey will be conducted in June.** Therefore, all Type 2 DM patients attending the clinic in June will be included in the denominator. **Should a facility is unable to reach 100 samples in June, the survey will need to be continued in the upcoming month or months until the sample size reaches 100 patients**. The facility must guarantee that there will be no patient overlap in the denominator.

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GASTROENTEROLOGY & HEPATOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	**Percentage of oesophagogastroduodenoscopy (OGDS) performed within (≤) 24 hours of referral in patients presented with Upper Gastrointestinal Haemorrhage (UGIH)**	Timeliness	≥ 90%
2	**Percentage of repeat colonoscopy due to poor bowel preparation in elective cases undergo colonoscopy**	Efficiency	≤10%

Discipline	:	**Gastroenterology and Hepatology**
Indicator 1	:	**Percentage of oesophagogastroduodenoscopy (OGDS) performed within (≤) 24 hours of referral in patients presented with Upper Gastrointestinal Haemorrhage (UGIH)**
Dimension of Quality	:	Timeliness
Rationale	:	To monitor the timeliness of emergency OGDS for upper GI bleeding according to international guidelines
Definition of Terms	:	**Upper Gastrointestinal Haemorrhage (UGIH):** The presence of haematemesis, coffee ground vomiting, melaena or haematochezia (verified by Gastroenterologist). **Within (≤) 24 hours of referral:** Time taken from the referral to Gastroenterology team till performing of procedure
Criteria	:	**Inclusion:** 1. All emergency OGDS for upper GI bleeding **Exclusion:** NA
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of OGDS performed within 24 hours of **referral** for Upper GI bleeding
Denominator	:	Total number of emergency OGDS referred for upper GI bleeding
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in Endoscopy unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the Endoscopic Unit. 3. **How to collect**: Data is suggested to be collected from endoscopy unit/ admission/ procedure book/ patient's case notes. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Gastroenterology and Hepatology**
Indicator 2	:	**Percentage of repeat colonoscopy due to poor bowel preparation in elective cases undergo colonoscopy**
Dimension of Quality	:	Efficiency
Rationale	:	Repeat colonoscopy due to poor bowel preparation will increase the cost of procedure and increased the workload in the currently long waiting time.
Definition of Terms	:	
Criteria	:	**Inclusion criteria:** 1. Elective cases **Exclusion criteria:** 1. Emergency colonoscopy
Type of indicator	:	Rate - based outcome indicator
Numerator	:	Number of repeat colonoscopy
Denominator	:	Total number of colonoscopy
Formula	:	Numerator x 100% Denominator
Standard	:	≤10%
Data Collection & Verification	:	1. **Where:** Data will be collected from endoscopy suite. 2. **Who:** Data will be collected by the Officer/ Paramedic/ Nurse in-charge of the Endoscopic Unit. 3. **How to collect:** Data is suggested to be collected from endoscopy unit/ admission/ procedure book/ patient's case notes. 4. **How frequent:** PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify:** PVF must be verified by the Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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INTERNAL MEDICINE			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	**ST Elevation Myocardial Infarction (STEMI) Case Fatality Rate**	Effectiveness	**≤ 8%**
2	**Non-ST Elevation Myocardial Infarction (NSTEMI) Case Fatality Rate**	Effectiveness	≤ 8%
3	Percentage of medical patients with unplanned readmission to medical ward within (≤) 48 hours of discharge	Effectiveness	≤ 0.5%

Discipline	:	**Internal Medicine**
Indicator 1	:	**ST Elevation Myocardial Infarction (STEMI) Case Fatality Rate**
Dimension of Quality	:	Effectiveness
Rationale	:	Acute Coronary Syndrome is a frequent cause of hospital death. It is important to measure the quality of care and adherence to practice guidelines.
Definition of Terms	:	**ST Elevation Myocardial Infarction (STEMI):** A clinical syndrome of acute myocardial death defined by a rise in cardiac biomarkers in the presence of ST elevation on the Electrocardiograph (ECG). The biomarkers used may include any of the following; Troponin T/I, Creatinine Kinase or its MB fraction (CK, CKMB). **Death due to STEMI**: It is the death directly related to STEMI as well as complications of STEMI such as Heart Failure, arrhythmia, sudden death, Heart Block, Cerebrovascular Accident (CVA), Pulmonary Embolism and Hospital Acquired Infection
Criteria	:	**Inclusion:** 1. Patients admitted with STEMI as the primary diagnosis. **Exclusion:** 1. Patients who are 'Brought In Dead' (BID) to Emergency Department with or without resuscitation attempted. 2. Patients who developed ACS/ STEMI during their stay in hospital who were admitted for other reasons than ACS/ STEMI.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with STEMI as the primary diagnosis who died
Denominator	:	Total number of patients diagnosed with STEMI
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 8%
Data Collection & Verification	:	1. **Where**: Data will be collected in pre-determined specified medical wards that cater for the above condition/ record office. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from admission & discharge record book/ Hospital Information System (HIS) 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as UHC (Universal Health Coverage) indicator.

Discipline	:	**Internal Medicine**
Indicator 2	:	**Non-ST Elevation Myocardial Infarction (NSTEMI) Case Fatality Rate**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Cardiovascular diseases accounted for the 25.6% of deaths in Ministry of Health (MOH) Hospitals in 2011. The majority of cardiovascular deaths are attributed to acute coronary syndrome (ACS). This is a spectrum of disease with 3 accepted classes: a) ST Elevation Myocardial Infarction (STEMI) b) Non-ST Elevation Myocardial Infarction (NSTEMI) c) Unstable Angina (UA). 2. Mortality rates quoted in the Malaysian Acute Coronary Syndrome (ACS) Registry maintained by the National Heart Association of Malaysia are 9% for NSTEMI and 3% for UA between 2006 and 2010. 3. Survival is dependent on good monitoring with prompt and continued use of specific medication (anti-platelets, anti-thrombotics, hypolipidemic therapy, B-blockers and ACE-Inhibitors).
Definition of Terms	:	**Non-ST Elevation Myocardial Infarction (NSTEMI)**: A clinical syndrome of acute myocardial death defined by a rise in cardiac biomarkers in the absence of ST elevation on the Electrocardiograph (ECG). The biomarkers used may include any of the following; Troponin T/I, Creatinine Kinase or its MB fraction (CK, CKMB). It is the final main diagnosis written during discharge which is the cause of admission. It is not the admission diagnosis as it may change. **Death due to NSTEMI**: It is the death directly related to NSTEMI as well as complications of NSTEMI such as Heart Failure, arrhythmia, sudden death, Heart Block, Cerebrovascular Accident (CVA), Pulmonary Embolism and Hospital Acquired Infection.
Criteria	:	**Inclusion:** **1.** Patients with NSTEMI as the primary diagnosis. **Exclusion:** 1. Patients who are 'Brought In Dead' (BID) to Emergency Department with or without resuscitation attempted. 2. Patients who developed ACS/ NSTEMI during their stay in hospital who were admitted for other reasons than ACS/ NSTEMI.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with NSTEMI as the primary diagnosis who died
Denominator	:	Total number of patients diagnosed with NSTEMI
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 8%
Data Collection & Verification	:	1. **Where**: Data will be collected in pre-determined specified medical wards that cater for the above condition/ record office. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit.

		3. **How to collect**: Data is suggested to be collected from admission & discharge record book/ Hospital Information System (HIS) 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as Outcome Based Budgeting(OBB), NIA (National Indicator Approach) & UHC (Universal Health Coverage) indicator.

Discipline	**:**	**Internal Medicine**
Indicator 3	:	**Percentage of medical patients with unplanned readmission to medical ward within (≤) 48 hours of discharge**
Dimension of Quality	:	Effectiveness
Rationale	:	Unplanned readmission is often considered to be the result of suboptimal care in the previous admission leading to readmission.
Definition of Terms	:	**Unplanned readmission**: Patient being readmitted for the management of the same clinical condition (main diagnosis) he or she was discharged, the admission was not scheduled and it is readmission to the same hospital. This does not include readmission requested by next-of-kin or other department. **Same clinical condition:** Same diagnosis as refer to the ICD 11.
Criteria	:	**Inclusion**: 1. All medical inpatient discharges from medical wards. 2. All subspecialty patients discharged from medical ward within the same general medicine department (Includes CCU, CRW, nephrology wards etc.). **Exclusion**: 1. Patients of < 12 years of age. 2. AOR (at own risk) discharged patients during the first admission. 3. Patients that were discharged from wards under different department (e.g., Cardiology ward under Cardiology Department).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of medical patients with unplanned readmissions to medical department within (≤) 48 hours of discharge
Denominator	:	Total number of medical patients discharged during the same period of time the numerator data was collected
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 0.5%
Data Collection & Verification	:	1. **Where**: Data will be collected in pre-determined specified medical wards that cater for the above condition/ record office. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: For numerator, data is suggested to be collected on the day of readmission. For denominator, data is from admission & discharge record book/ Hospital Information System (HIS) 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as a part of HPIA indicator.

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GERIATRIC			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1a	Percentage of patients with waiting time of ≤ 60 minutes to see the healthcare worker at Geriatric Outpatient Clinic **(Two or more registration areas involved)**	Timeliness	≥ 80%
1b	Percentage of patients with waiting time of ≤ 90 minutes to see the healthcare worker at Geriatric Outpatient Clinic **(Only one registration area involved)**	Timeliness	≥ 90%
2	Percentage of patients undergoing Comprehensive Geriatric Assessment (CGA) within (≤) 5 days of admission to Geriatric Ward/ cubicles/ beds by at least 3 interdisciplinary team members.	Efficiency	≥ 70%
3	Percentage of post-falls assessments done for patients within (≤) 5 days from incident of fall in Geriatric ward	Safety	≥ 70%

Indicator 1

*Either indicator 1a **OR** 1b is to be reported, based on how many registration counters are involved.

- **Two or more registration areas are involved:** If registration of patient is first done at hospital's main outpatient / ACC complex registration counter with payment collection, following which the patient needs to re-register at the respective clinical department counter - Refer **Indicator 1a**.
- **Only one registration area is involved:** If registration of patient with payment collection is either done **ONLY** at clinical department counter **OR** it is done **ONLY** at hospital's main outpatient / ACC complex registration counter with no further re-registration required at the clinical department counter- Refer **Indicator 1b**.

Discipline	:	**Geriatric**
Indicator 1a	:	**Percentage of patients with waiting time of ≤ 60 minutes to see the healthcare worker at Geriatric Outpatient Clinic (Two or more registration areas involved)**
Dimension of Quality	:	Timeliness
Rationale	:	1. MOH aims for waiting time to see the doctor at outpatient services to be less than 90 minutes in line with patient centred services. Waiting time is time patient first registers in the hospital till the time patient is seen by doctor. (Reference: Director-General of Health Malaysia Circular No. 6/2004) 2. The waiting time is based on patient's experience from the time patient first registers at the first counter in the hospital till seen by doctor. In view of many counters are involved in some hospitals/ departments, some clinical departments have opted for monitoring of registration from department counter as any process prior to that appears out of the clinical department's control. Thus, due to involvement of 2 or more counters within the hospital, for monitoring of clinical services KPI, the target of waiting time is for less than 60 minutes within the department. This is applicable only if patient is being registered at another counter within the same hospital (e.g., at hospital's main outpatient/ ACC complex registration counter) prior to the clinical department counter. 3. For hospital to eliminate or reduce waiting time, it is important to balance between the demand for appointments and the supply of appointments. One needs to identify opportunities for improvement by strengthening policy of outpatient service in hospital, applying Queuing Theory and having contingency plans.
Definition of Terms	:	If registration of patient is first done at hospital's main outpatient/ ACC complex registration counter with payment collection, following that patient needs to re-register at respective clinical department counter (Two or more registration areas involved): **Waiting time**: Time of registration counter at department counter or time of appointment given to patient (whichever is later) till the time the patient is first seen by the healthcare worker who performed Geriatric related assessment for the patient. **Healthcare worker**: Any member of the Geriatric team that has the privileged to perform the assessment.
Criteria	:	**Inclusion**: 1. All outpatients of Geriatric Outpatient Clinic.

		Exclusion: 1. Patients who come without an appointment ("walk-in" patients). 2. Patients that need to do procedures on the same day before seeing the doctors (e.g., blood taking and imaging). **Sampling**: Using an average of total patients seen in a month, 30% of the patients in each month need to be sampled for this indicator. For example, in a case of 22 clinic days per month, 7 clinic days in a month need to be selected for data collection. Hospital/ department to ensure randomised sampling of data by ensuring each clinic day of the week is included to ensure proper representation of data.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of sampled patients with waiting time of ≤ 60 minutes to see the healthcare worker at Geriatric Outpatient Clinic
Denominator	:	Total sample of patients seen by the healthcare worker at the Geriatric Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in Geriatric Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book/ waiting time slip. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Geriatric**
Indicator 1b	:	**Percentage of patients with waiting time of ≤ 90 minutes to see the healthcare worker at Geriatric Outpatient Clinic (Only one registration area involved)**
Dimension of Quality	:	Timeliness
Rationale	:	1. MOH aims for waiting time to see the doctor at outpatient services to be less than 90 minutes in line with patient centred services. Waiting time is time patient first registers in the hospital till the time patient is seen by doctor. (Reference: Director-General of Health Malaysia Circular No. 6/2004) 2. The waiting time is based on patient's experience from the time patient first registers at the first counter in the hospital till seen by doctor. In view of many counters are involved in some hospitals/ departments, some clinical departments have opted for monitoring of registration from department counter as any process prior to that appears out of the clinical department's control. Thus, due to involvement of 2 or more counters within the hospital, for monitoring of clinical services KPI, the target of waiting time is for less than 60 minutes within the department. This is applicable only if patient is being registered at another counter within the same hospital (e.g., at hospital's main outpatient/ ACC complex registration counter) prior to the clinical department counter. 3. For hospital to eliminate or reduce waiting time, it is important to balance between the demand for appointments and the supply of appointments. One needs to identify opportunities for improvement by strengthening policy of outpatient service in hospital, applying Queuing Theory and having contingency plans.
Definition of Terms	:	If registration of patient with payment collection is done only at clinical department counter: **Waiting time**: Time of registration counter at department counter or time of appointment given to patient (whichever is later) till the time the patient is first seen by the healthcare worker who performed Geriatric related assessment for the patient. If the registration is done only at hospital's main outpatient/ ACC complex registration counter with no re-registration at clinical department counter: **Waiting time**: Time of registration counter at hospital's main outpatient/ ACC complex registration counter or time of appointment given to patient (whichever is later) till the time the patient is first seen by the healthcare worker who performed Geriatric related assessment for the patient. **Healthcare worker**: Any member of the Geriatric team that has the privileged to perform the assessment.
Criteria	:	**Inclusion**: 1. All outpatients of Geriatric Outpatient Clinic. **Exclusion**: 1. Patients who come without an appointment ("walk-in" patients). 2. Patients that need to do procedures on the same day before seeing the doctors (e.g., blood taking and imaging).

		Sampling: Using an average of total patients seen in a month, 30% of the patients in each month need to be sampled for this indicator. For example, in a case of 22 clinic days per month, 7 clinic days in a month need to be selected for data collection. Hospital/ department to ensure randomised sampling of data by ensuring each clinic day of the week is included to ensure proper representation of data.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of sampled patients with waiting time of ≤ 90 minutes to see the healthcare worker at Geriatric Outpatient Clinic
Denominator	:	Total sample of patients seen by the healthcare worker at the Geriatric Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in Geriatric Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book/ waiting time slip. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Geriatric**
Indicator 2	:	**Percentage of patients undergoing Comprehensive Geriatric Assessment (CGA) within (≤) 5 days of admission to Geriatric Ward/ cubicles/ beds by at least 3 interdisciplinary team members.**
Dimension of Quality	:	Efficiency
Rationale	:	Comprehensive Geriatric Assessment (CGA) has been proven to provide better diagnostic accuracy, functional outcome, affect or cognition and reduced medication use in the older patient. An early interdisciplinary team review is important for planning management and intervention for elderly inpatients. Reference: • CGA: Handbook of Geriatric Medicine ISBN 978-983-43917-1-3. • JKH Luk. Using the comprehensive Geriatric Assessment Technique to assess elderly patients. HKMJ Vol 6 Mac 2000:95.
Definition of Terms	:	**Comprehensive Geriatric Assessment (CGA)**: Multidimensional and multidisciplinary diagnostic instrument designed to evaluate as well as to manage elderly patients by collecting data on the identified medical, psychosocial and functional capabilities and limitations of elderly patients with the aim to maximize overall health with aging by: 1. Developing treatment and long-term follow-up plans. 2. Arranging for primary care and rehabilitative services. 3. Organizing and facilitating the intricate process of case management. 4. Determining long-term care requirements and optimal placement. 5. Making use of health care resources. **Geriatric ward:** Ward or designated cubicles/ beds for geriatric patients. **5 days:** 5 days (including weekends and public holiday)
Criteria	:	**Inclusion**: 1. All patients admitted to the Geriatric ward. **Exclusion**: 1. Patients who are discharged/ transferred out within 5 days; patients admitted for procedure/ short intervention period (e.g., MRI, further investigation). 2. The following will also be excluded: • **Terminal illness** • **Severe dementia** • **Complete functional dependence, and inevitable nursing home placement** • **Older persons who are "too healthy" to benefit (from Hazzard Geriatric Medicine and Gerontology, 7th Edition, Chapter 10)**
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of patients undergoing CGA within (≤) 5 days of admission to Geriatric ward by at least 3 interdisciplinary members
Denominator	:	Total number of patients admitted to Geriatric ward
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 70%

Data Collection & Verification	:	1. **Where**: Data will be collected in Geriatric wards or wards with designated cubicles/ beds for Geriatric patients. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case note/ records of CGA. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	**:**	**Geriatric**
Indicator 3	:	**Percentage of post-falls assessments done for patients within (≤) 5 days from incident of fall in Geriatric Ward**
Dimension of Quality	:	Safety
Rationale	:	1. Ministry of Health (MOH) gives great importance to patient safety. It is implemented and monitored through Malaysian Patient Safety Goal (MPSG). MPSG No. 5 is pertaining to rate of falls within the facility. Reference: MPSG: https://patientsafety.moh.gov.my 2. Elderly patients are more prone to fall than other individuals due to many factors namely their underlying medical conditions. Patients who have fell needs a comprehensive post fall assessment or analysis by multidisciplinary team approach. This team includes physician, nurses, physiotherapist, occupational therapist, pharmacist and others.
Definition of Terms	:	**Fall:** A sudden, unintentional change in position causing an individual to land at a lower level. (WHO Jan, 2018). **5 days:** 5 days (including weekends and public holidays) **Geriatric ward:** Ward or designated cubicles/ beds for geriatric patients.
Criteria	:	**Inclusion**: 1. All patients admitted to the dedicated Geriatric ward. 2. Dedicated ward must have an in-house Geriatrician. **Exclusion**: 1. Fall secondary to seizure(s), paralysis, loss of consciousness, cardiac arrest or overwhelming external force. 2. Intentional fall due to suicidal attempt
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of post-falls assessments done for patients within (≤) 5 days from incident of fall in Geriatric ward
Denominator	:	Total number of incidence of falls in dedicated Geriatric ward
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 70%
Data Collection & Verification	:	1. **Where**: Data will be collected in Geriatric wards or wards with designated cubicles/ beds for Geriatric patients. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case note/ post-fall assessment record book/ post-fall checklist. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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HAEMATOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of induction deaths from chemotherapy in newly diagnosed Acute Leukaemia/ Diffuse Large B-Cell Lymphoma (DLBL) patients	Safety	≤ 10%
2	Chemotherapy Extravasation Rate	Safety	≤ 0.5%

Discipline	:	**Haematology**
Indicator 1	:	**Percentage of induction deaths from chemotherapy in newly diagnosed Acute Leukaemia/ Diffuse Large B-Cell Lymphoma (DLBL) patients**
Dimension of Quality	:	Safety
Rationale	:	1. This is to ensure safety of treatment. 2. Acute Leukaemia and Diffuse Large B-Cell Lymphoma (DLBL) are the two most common conditions treated in the Haematology Department/ Unit. 3. A standard of 10% is derived based on International Standards for haematology services.
Definition of Terms	:	**Acute Leukaemia:** Consist of Acute Myeloid Leukaemia (AML)/ Acute Lymphoblastic Leukaemia (ALL). **Induction death:** It is the death due to any cause related to chemotherapy (direct/ indirect) following administration of chemotherapy. The duration of when it is considered induction death depends on the type of chemotherapy used (Which also based on whether it is Acute Leukaemia or DLBL as they have different regimes). For Acute Leukaemia, it is the death occurring within 28 days of induction chemotherapy and for DLBL, it is death occurring within 21 days of induction chemotherapy.
Criteria	:	**Inclusion**: 1. Newly diagnosed AML/ ALL/ DLBL patients. **Exclusion**: 1. Patients who defaulted before or those who were given chemotherapy in other hospitals. 2. Patients with palliative intent.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of induction deaths from chemotherapy in newly diagnosed Acute Leukaemia/ DLBL patients
Denominator	:	Total number of newly diagnosed Acute Leukaemia/ DLBL patients who were started on chemotherapy
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 10%
Data Collection & Verification	:	1. **Where**: Data will be collected in Haematology wards and Day Care. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case note/ Acute Leukaemia & DLBL registry. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 2 months retrospective cohort of data. E.g., for April 2024, it will be patients who were started on chemotherapy in February 2024.

Discipline	:	**Haematology**
Indicator 2	:	**Chemotherapy Extravasation Rate**
Dimension of Quality	:	Safety
Rationale	:	1. Extravasation is a potentially preventable complication of chemotherapy. 2. This indicator reflects quality of service delivery and also safety of chemotherapy administration.
Definition of Terms	:	**Chemotherapy extravasation**: Inadvertent leakage of intravenous drugs out of the vein into surrounding tissues. These are extravasation occurring following chemotherapy given to haematology patients in haematology ward and Day Care.
Criteria	:	**Inclusion**: 1. Infusion or IV bolus of chemotherapy. **Exclusion**: 1. Non-chemotherapy extravasations (e.g., antibiotics). 2. Local reaction/ chemical phlebitis caused by certain chemotherapy.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of chemotherapy extravasation following chemotherapy
Denominator	:	Total number of administrations of chemotherapy
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 0.5%
Data Collection & Verification	:	1. **Where**: Data will be collected in Haematology wards/ Day Care or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case note/ chemotherapy record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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INFECTIOUS DISEASE			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of HIV patients achieving undetectable HIV viral load within (≤) 6 months of commencement of anti-retroviral therapy	Effectiveness	≥ 85%
2	Percentage of inpatients started on carbapenem* in the Infectious Disease discipline who have a documented review within (≤) 72 hours of initiation	Efficiency	≥ 85%

Discipline	:	**Infectious Disease**
Indicator 1	:	**Percentage of HIV patients achieving undetectable HIV viral load within (≤) 6 months of commencement of anti-retroviral therapy**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Important to achieve treatment target i.e., undetectable viral loads to ensure optimal treatment outcome. 2. The viral load is suggested to be taken between 4 to 6 months after commencement of anti-retroviral therapy. In most hospitals/ institutions of MOH, results will be available within 1 month from the date sample was taken. Thus, it is also important to review the results as soon as possible to ensure proper monitoring of treatment and for intervention/ change of management if deemed necessary.
Definition of Terms	:	**Undetectable HIV viral loads**: Viral loads < 200 copies/ml. This is based on the date blood sample was taken; and not the date result was traced or the date patient was seen by doctor.
Criteria	:	**Inclusion**: 1. HIV patients who have been started on HIV treatment for the first time (treatment naïve). **Exclusion**: 1. HIV patients who have defaulted/ died or have been transferred out.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of HIV patients who have achieved undetectable HIV viral load within (≤) 6 months of commencement of anti-retroviral therapy
Denominator	:	Total number of HIV patients who have completed 6 months of anti-retroviral treatment
Formula	:	Numerator x 100 % Denominator
Standard	:	≥ 85%
Data Collection & Verification	:	1. **Where**: Data will be collected in Infectious Disease Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case note/ laboratory results/ database of HIV patients. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 9 months retrospective cohort of data. E.g., for January 2024, it will be HIV patients who were started on anti-retroviral in April 2023. This is to allow the 6 months period to evaluate the effectiveness of anti-retroviral treatment and also time for viral load result to be available.

Performance Data	**Date patient was initiated on anti-retroviral therapy**
January-March 2024	April to June 2023
April-June 2024	July to September 2023
July-September 2024	October to December 2023
October-December 2024	January to March 2024

Discipline	**:**	**Infectious Disease**
Indicator 2	:	**Percentage of inpatients started on carbapenem* in the Infectious Disease discipline who have a documented review within (≤) 72 hours of initiation**
Dimension of Quality	:	Efficiency
Rationale	:	1. There is increasing number of Multiresistant Organisms (MROs)/ Carbapenem Resistant Enterobacteriaceae (MRE) in the country. 2. The 72 hours review is a part of important component of Antimicrobial Stewardship (AMS) Program.
Definition of Terms	:	**Documented review**: Documented evidence that patients started on carbapenem in the Infectious Disease (ID) discipline are reviewed for continuation, cessation or de-escalation within (≤) 72 hours of initiation. This review does not need to be part of ID physician grand rounds. This review can be done by: • ID specialist or • Trainee specialist or designated medical officer or designated member of Antimicrobial Stewardship (AMS) team in the hospital but they all need to have documentation of discussion with the name of ID specialist stated. If reviews are done only during the ID physician rounds, suggestion is for rounds to be done minimum 3 times per week (e.g., Monday, Wednesday and Friday) to be able to cater reviews within 72 hours.
Criteria	:	**Inclusion**: 1. All patients on carbapenem admitted to general medical wards. 2. All patients on carbapenem admitted to other wards in the hospital and were referred to ID team. **Exclusion**: 1. Patients died or transferred out of the hospital before 72 hours of initiation of carbapenem. 2. Patients for whom carbapenem has been stopped by the primary team before 72 hours of initiation.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of patients started on carbapenem under ID discipline who have a documented review within (≤) 72 hours of initiation
Denominator	:	Total number of patients started on carbapenem under ID discipline
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 85%
Data Collection & Verification	:	1. **Where**: Data will be collected in all general medical wards and wards where those patients were referred to ID. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse/ Pharmacist in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case note/ pharmacy records. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*The choice of antibiotic may vary depending on the antibiotic use and resistance data of the hospital.

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NEPHROLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of chronic haemodialysis patients with delivered KT/V of ≥ 1.2	Effectiveness	**≥ 90%**
2	Incidence rate of peritonitis in adult patients on chronic peritoneal dialysis	Safety	**≤ 0.4 episode**

Discipline	:	**Nephrology**
Indicator 1	:	**Percentage of chronic haemodialysis patients with delivered KT/V of ≥ 1.2**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Haemodialysis is the core business of Nephrology. 2. KT/V is a measure of adequacy of haemodialysis. The survival of haemodialysis (HD) patients is dependent on dialysis adequacy and it, in turn, is under the control of HD unit staff. 3. KT/V is dependent of blood flow rate, dialysate flow rate, the type of dialyser used, the number of hours on dialysis, dialysis frequency and body weight of the patient. 4. KT/V is estimated every 3 monthly. This indicator is a measure of the on-going processes in the daily running of haemodialysis units, involving processes during the haemodialysis procedure which is carried out by paramedics and clinical management of patients by nephrologists.
Definition of Terms	:	**KT/V:** A measure of dialysis adequacy based on clearance of urea.
Criteria	:	**Inclusion:** 1. Patients on chronic haemodialysis for more than 3 months in the Centre. **Exclusion:** 1. Patients with acute renal failure on haemodialysis.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of chronic haemodialysis patients with delivered KT/V of ≥ 1.2
Denominator	:	Total number of chronic haemodialysis patients tested for KT/V
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	**≥ 90%**
Data Collection & Verification	:	1. **Where**: Data will be collected in Haemodialysis Unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case note/ haemodialysis patient record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Nephrology**
Indicator 2	:	**Incidence rate of peritonitis in adult patients on chronic peritoneal dialysis**
Dimension of Quality	:	Safety
Rationale	:	1. Peritoneal dialysis (PD) is one of the main modes of renal replacement therapy which is found in Nephrology Units in the Ministry of Health (about 37% of all dialysis patients in MOH in 2020). It cost the MOH RM 31,635 per life year saved in 2001. 2. One of the indicators of safety and efficacy is the peritonitis rate. It is affected by the training of patients, the peritoneal dialysis system used and the long-term care of the PD patient especially in preventing and treating exit site infection. 3. Peritonitis is the main cause of technique failure. It causes pain, suffering and impacts on the workload of the haemodialysis unit as the patient may have to go on acute or permanent haemodialysis. 4. The indicator is a measure of the work done by PD nurses and the clinical care and counselling given to patients in clinic.
Definition of Terms	:	**Peritonitis:** Presence of at least 2 of the following criteria: • Symptoms (abdominal pain or turbid fluid). • White cells in the peritoneal fluid of more than 100 cells/ml with at least 50% polymorphs. • Positive peritoneal fluid culture.
Criteria	:	**Inclusion:** 1. All hospitals with PD program. 2. All adult patients on chronic PD. 3. All peritonitis occurring from the first day of PD training. **Exclusion:** 1. PD unit that has <25 patients in a year 2. PD performed due to acute kidney failure
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Cumulative number of peritonitis episodes in patients on chronic PD
Denominator	:	Cumulative total number of patient-months of treatment on chronic PD
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 12$
Standard	:	**≤ 0.4 episode per year**
Data Collection & Verification	:	1. **Where**: Data will be collected in Nephrology wards or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case note/ PD patient record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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NEUROLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of Ischaemic Stroke (IS) patients receiving IV recombinant tissue plasminogen activator (IV rt-PA) therapy within (≤) 35 minutes of CT brain initiation. (From *CT brain initiation to needle time*)	Efficiency	≥ 65%
2	Percentage of Acute Ischaemic Stroke (AIS) inpatients obtained Neurology consultation within (≤) 24 hours of referral	Customer centeredness	≥ 85%

Discipline	:	**Neurology**
Indicator 1	:	**Percentage of Ischaemic Stroke (IS) patients receiving IV recombinant tissue plasminogen activator (IV rt-PA) therapy within (≤) 35 minutes of CT brain initiation. (From *CT brain initiation to needle time*)**
Dimension of Quality	:	Efficiency
Rationale	:	1. Intravenous rt-PA is proven by randomised control trials to reduce disability from Ischaemic Stroke at 90 days. 2. Delay in thrombolysing patients is associated with higher risk of in-hospital mortality and symptomatic intracranial bleed. **Table 5. ED-Based Care** Action — Time Door to physician — ≤10 minutes Door to stroke team — ≤15 minutes Door to CT initiation — ≤25 minutes Door to CT interpretation — ≤45 minutes Door to drug (≥80% compliance) — ≤60 minutes Door to stroke unit admission — ≤3 hours CT indicates computed tomography; and ED, emergency department. Source: Bock.[96] *35 minutes is obtained by subtracting the door to CT initiation time from door to needle time (25 minutes from 60 minutes).
Definition of Terms	:	**Ischaemic Stroke (IS):** It is defined as an episode of neurological dysfunction caused by focal infarction of the brain, spinal cord, or retina, in which central nervous system infarction was defined by pathological, imaging, or other objective evidence of ischemic injury in a defined vascular distribution or by symptoms that persisted ≥24 hours or until death with other (non-stroke) causes excluded. **Recombinant tissue plasminogen activator (rt-PA):** It is a thrombolytic therapy used for IS. Intravenous rt-PA is used at a dosage of 0.9 mg/kg, maximum dose 90mg. **CT brain imaging time:** It is the time a CT Brain is initiated.
Criteria	:	**Inclusion:** 1. All patients diagnosed with IS indicated for thrombolytic therapy **within office hours (8am to 5pm).** **Exclusion:** 1. Patients of < 18 years of age. 2. Patients who have contraindications for thrombolytic therapy as per the *'AHA/ ASA 2018 guidelines for the Early Management of Patients with Acute Ischaemic Stroke'.* 3. Documented reason for delay in initiating rt-PA e.g.,

		• Unstable patient who needs urgent medical stabilisation, prior to CT brain (e.g., intubation for respiratory failure or airway protection). • Patient who needs treatment of elevated blood pressure. • Patients with fluctuating neurological examination. • Initial refusal by patient or family members for thrombolysis therapy. 4. Patients who come **after office hours** (*as many KKM centres are still single neurologist centres and have yet to open 24-hours' thrombolysis service*).
Type of indicator	:	Rate based process indicator
Numerator	:	Number of patients with IS receiving IV rt-PA therapy within (≤) 35 minutes of CT brain initiation
Denominator	:	Total number of patients diagnosed with IS receiving IV rt-PA therapy
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 65%
Data Collection & Verification	:	1. **Where**: Data will be collected in Acute Stroke Ward/ Neurology Ward/ Acute cubicle of general medical, geriatric ward or ward where the post thrombolytic therapy patients are treated. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ procedure book/ IV rt-PA record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Neurology**
Indicator 2	:	**Percentage of Acute Ischaemic Stroke (AIS) inpatients obtained Neurology consultation within (≤) 24 hours of referral**
Dimension of Quality	:	Customer centeredness
Rationale	:	1. Stroke is the most common causes of physical disability in adults. 2. Strokes can be either ischaemic or haemorrhagic. The ischaemic (75%) is more common than haemorrhagic (25%). 3. Many cases of stroke are admitted to the general medical ward. Early referral to neurology team will ensure initiation of appropriate management and prevention of stroke complications. The management involves multidisciplinary departments/units. The long-term management includes secondary stroke prevention and rehabilitation process. The length of hospital stay (LOS) could reflect the effectiveness of stroke management. 4. Early neurological attention in acute stroke is related to better functional outcome and shorter hospitalization. Reference: Davalos A, Castillo J, and Martinez EV. Delay in Neurological Attention and Stroke Outcome. Stroke. 1995; 26: 2233-2237.
Definition of Terms	:	**Acute Ischaemic Stroke (AIS)**: It occurred when the blood supply to certain part of the brain is blocked usually because of atherosclerosis which usually located at the arterial branches. Other cause is a thromboembolic phenomenon usually from cardiac (cardioembolic stroke). The CT-scan brain shoes hypodense (black) area in the brain. **Neurology consultation:** Time taken from the time patient was referred to Neurology team to the time patient was seen by the team (at least seen by the medical officer from Neurology team and discussed verbally or via phone consultation).
Criteria	:	**Inclusion:** 1. Acute onset Ischaemic Stroke patients admitted for further management and referred for Neurology consultation. **Exclusion:** 1. Transient Ischaemic Attack (TIA). 2. Haemorrhagic Stroke which includes Intracerebral Haemorrhage (ICH) and Subarachnoid Haemorrhage (SAH). 3. Traumatic head injury. 4. Stroke syndrome other than vascular causes such as Cerebral Tumour. 5. Patients who died within (≤) 24 hours after referral.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of Acute Ischaemic Stroke (AIS) inpatients obtained Neurology consultation within (≤) 24 hours of referral
Denominator	:	Total number of Acute Ischaemic Stroke (AIS) inpatients referred to Neurology team
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 85%

Data Collection & Verification	:	1. **Where**: Data will be collected in Acute Stroke Ward/ Neurology Ward/ Acute cubicle of general medical and other wards that cater for the above conditions. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department / unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ referral record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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PALLIATIVE MEDICINE			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	**Percentage of inpatients with severe cancer pain on initial encounter whose pain had been significantly reduced within (≤) 24 hours of therapy**	Effectiveness	**≥ 80%**
2	Percentage of severe opioid toxicity requiring reversal with naloxone due to inappropriate opioid administration or prescription	Safety	0%

Discipline	:	**Palliative Medicine**
Indicator 1	:	**Percentage of inpatients with severe cancer pain on initial encounter whose pain had been significantly reduced within (≤) 24 hours of therapy**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Cancer pain is one of the main symptoms managed in palliative care and it has been documented that about 90% of cancer pain can be relieved with routine pain medications such as opioid analgesia. 2. All palliative care services should be able to achieve good pain relief in over 90% of cancer pain patients.
Definition of Terms	:	**Cancer pain**: Pain directly or indirectly due to cancer. **Severe cancer pain**: Pain score of 7/10 or more. **Significant reduced pain**: Reduction of pain severity of at least (≥) **3 points from baseline pain score.** **Therapy:** Pain medications such as opioid analgesia. **Inpatient:** Patients admitted to a dedicated palliative care bed or referred to palliative care team from other wards.
Criteria	:	**Inclusion**: 1. All in-patients with severe cancer pain reviewed by the palliative care servicethat has been followed up continuously for more than 24 hours. **Exclusion**: 1. All patients who are unable to self-report pain with established unidimensional pain scores. 2. Patients not receiving analgesia as prescribed by the palliative care service due to patient refusal or unauthorized medication adjustment by other clinicians.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of inpatients with severe cancer pain reviewed by the palliative care service whose pain had been significantly reduced within 24 hours
Denominator	:	Total number of inpatients with severe cancer pain reviewed by the palliative care service
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	**≥ 80%**
Data Collection & Verification	:	1. **Where**: Data will be collected in the Palliative wards or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Palliative Medicine**
Indicator 2	:	**Percentage of severe opioid toxicity requiring reversal with naloxone due to inappropriate opioid administration or prescription**
Dimension of Quality	:	Safety
Rationale	:	1. Opioid analgesia is an essential medication that is commonly used in the management of cancer pain. Although opioids are considered dangerous drugs, WHO and international pain and palliative care organisations worldwide advocate its use and promote safe and appropriate techniques to manage cancer pain effectively. 2. MOH has developed a CPG Management of Cancer Pain (July 2010) and in this document detail of safe and effective use of opioid analgesia has been specified. 3. Clinicians should adhere to these safe practices to avoid incidences of opioid toxicity which can result in pre-mature death of a patient receiving palliative care. 4. This indicator is to measure the safe practice of opioid prescription and administration in patients under the care of a Palliative Medicine specialist.
Definition of Terms	:	**Opioid**: morphine, oxycodone, fentanyl, methadone. **Severe opioid toxicity**: Toxicity due to excessive administration of opioid analgesia resulting in respiratory depression requiring the use of naloxone. **Inappropriate administration**: Incorrect delivery of opioid analgesia to a patient in terms of dose or route of administration. **Inappropriate prescription**: Prescription of opioid analgesics not justified according to the guidance of the MOH CPG on cancer pain management.
Criteria	:	**Inclusion**: 1. All new patients under the care of the Palliative Care team. **Exclusion**: 1. Patients with opioid prescription not under supervision of Palliative Care team. 2. Patients developing severe opioid toxicity due to metabolic changes as a consequence of primary illness or comorbidities. 3. Patients prescribe naloxone inappropriately.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients developed severe opioid toxicity requiring reversal with naloxone due to inappropriate opioid administration or prescription
Denominator	:	Total number of new patients referred to Palliative Care team
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	0%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Palliative wards or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ incident reporting forms/ pharmacy Daily Define Dose (DDA) record book.

		4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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GENERAL PAEDIATRIC			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	**Percentage of survival of all livebirths with birthweight between 1000-1499g**	Effectiveness	≥ 85%
2	**Community-acquired pneumonia death rate**	Effectiveness	≤ 0.5%
3	**Percentage of paediatric patients with unplanned readmission to Paediatric Ward within (≤) 48 hours of discharge**	Effectiveness	≤ 0.5%

Discipline	:	**General Paediatric**
Indicator 1	:	**Percentage of survival of all livebirths with birthweight between 1000-1499g**
Dimension of Quality	:	Effectiveness
Rationale	:	1. This group of infants comprises a significant proportion of patients who utilize NICU and special care nursery resources. 2. Their survival impacts significantly on the under 5 survival target.
Definition of Terms	:	**Livebirth**: Born alive. **Survival:** alive at discharge **Discharge:** alive/ dead/ transferred out **BBA (Born Before Arrival):** babies who are born alive outside the hospital
Criteria	:	**Inclusion:** 1. **All livebirth infants** born in the hospital/ referred to the hospital with birthweight between 1000-1499 g. **Exclusion:** 1. Babies born with major/ lethal congenital anomalies (LCM). 2. Born before arrival (BBA)
Type of indicator	:	Rate based outcome indicator
Numerator	:	**Number of livebirth with birthweight between 1000-1499g who are alive at discharge**
Denominator	:	Total number of livebirths with birthweight between 1000-1499g who are discharge
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 85%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Paediatric Neonatology Unit/ PICU/ PHDW/ GICU/ other related area. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ daily census. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as Outcome Based Budgeting(OBB) and National Indicator Approach (NIA) indicator.

Discipline	:	**General Paediatric**
Indicator 2	:	**Community-acquired pneumonia death rate**
Dimension of Quality	:	Effectiveness
Rationale	:	Pneumonia is a common childhood infection where mortality can be reduced by careful management.
Definition of Terms	:	**Community Acquired Pneumonia (CAP):** Pneumonia acquired from normal social contact as opposed to being acquired during hospitalization and confirmed by radiological or laboratory investigations. It is the final main diagnosis written during discharge which is the cause of admission. It is not the admission diagnosis as it may change. Discharge diagnosis of just Pneumonia is also taken as CAP. **Death due to CAP:** Underlying cause of death is CAP/ pneumonia and its complication
Criteria	:	**Inclusion**: 1. All children aged between 1 month and 5 years with CAP or Pneumonia as main diagnosis. **Exclusion:** 1. Hospital-acquired pneumonia (Pneumonia that develops after 72 hours of admission). 2. Children with severe chronic condition and who are under palliative management of Advance Care Plan
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of deaths due to community-acquired pneumonia in children aged between 1 month and 5 years
Denominator	:	Total number of cases admitted for community-acquired pneumonia in children aged between 1 month and 5 years
Formula	:	Numerator x 100 % Denominator
Standard	:	≤ 0.5%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Paediatric Ward/ PICU/ PHDW/ GICU/ other related area. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ admission & discharge record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored Outcome Based Budgeting(OBB) indicator. Cases where pneumonia is part of sepsis at presentation are not included.

Discipline	**:**	**General Paediatric**
Indicator 3	:	**Percentage of paediatric patients with unplanned readmission to Paediatric Ward within (≤) 48 hours of discharge**
Dimension of Quality	:	Effectiveness
Rationale	:	Unplanned readmission is often considered to be the result of suboptimal care in the previous admission leading to readmission.
Definition of Terms	:	**Unplanned readmission**: It includes the following criteria: • Patient being readmitted for the management of the same clinical condition (main diagnosis) he or she was discharged. • Readmission was not scheduled. • Readmission to the same hospital. • This does not include readmission requested by next-of-kin or other department. • This does not include patients were readmitted for different reason but have the same underlying conditions ('other diagnosis'). **Same clinical condition**: Same diagnosis as refer to the ICD 11.
Criteria	:	**Inclusion**: 1. All paediatric inpatient discharges from Paediatric Ward. **Exclusion**: 1. Neonates of < 28 days of life.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with unplanned readmissions to Paediatric Ward within (≤) 48 hours of discharge
Denominator	:	Total number of paediatric patients discharged during the same period of time the numerator data was collected
Formula	:	Numerator x 100 % Denominator
Standard	:	≤ 0.5%
Data Collection & Verification	:	1. **Where**: Data will be collected in Paediatric Ward. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: For numerator, data is suggested to be collected on the day of readmission. For denominator, data is from admission & discharge record book/ Hospital Information System (HIS). 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as a part of HPIA indicator and Outcome Based Budgeting (OBB)indicator.

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PAEDIATRIC CARDIOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1a	Major complication associated with elective Patent Ductus Arteriosus (PDA) occlusion **(Facilities with total number of cases ≥ 50 per year)**	Safety	≤ 2.5%
1b	**Major complication associated with elective Patent Ductus Arteriosus (PDA) occlusion (Facilities with total number of cases < 50 per year)**	Safety	≤ 1 case

Discipline	:	**Paediatric Cardiology**
Indicator 1a	:	**Major complication associated with elective Patent Ductus Arteriosus (PDA) occlusion (Facility with total number of cases ≥ 50 per year)**
Dimension of Quality	:	Safety
Rationale	:	1. With the recent advancement in Paediatric Cardiology, the major complication associated with PDA occlusion is becoming less common and preventable. 2. The rate of major complication associated with PDA occlusion is quoted to be around 2.3%. 3. To ensure the quality and safety of the procedure, the indicator is to measure rate of major complications associated with PDA occlusion within MOH hospitals that provides the services. Reference: Pass RH et al, Multicenter USA Amplatzer patent ductus arteriosus occlusion device trial, J Am Coll Cardiol 2004.
Definition of Terms	:	**Major complication associated with PDA occlusion**: • Death directly related to procedure. • Device embolization requiring catheter retrieval or surgical intervention. • Confirmed vascular thrombosis requiring thrombolytic therapy (alteplase/ streptokinase) or surgical intervention. • Pericardial effusion requiring pericardiocentesis. • Significant blood loss from the procedure requiring blood transfusion
Criteria	:	**Inclusion:** 1. Isolated PDA. **Exclusion:** 1. All emergency cases. 2. Complex PDA. 3. PDA in a premature infant of gestation less than 37 weeks. 4. Infants with weight less than 6kg.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of major complications associated with PDA occlusion
Denominator	:	Total number of PDA occlusion
Formula	:	Numerator x 100 % Denominator
Standard	:	≤ 2.5%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Paediatric Cardiology Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ PDA occlusion record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Paediatric Cardiology**
Indicator 1b	:	**Major complication associated with elective Patent Ductus Arteriosus (PDA) occlusion (Facility with total number of cases < 50 per year)**
Dimension of Quality	:	Safety
Rationale	:	1. With the recent advancement in Paediatric Cardiology, the major complication associated with PDA occlusion is becoming less common and preventable. 2. The rate of major complication associated with PDA occlusion is quoted to be around 2.3%. 3. To ensure the quality and safety of the procedure, the indicator is to measure rate of major complications associated with PDA occlusion within MOH hospitals that provides the services. Reference: Pass RH et al, Multicenter USA Amplatzer patent ductus arteriosus occlusion device trial, J Am Coll Cardiol 2004.
Definition of Terms	:	**Major complication associated with PDA occlusion**: • Death directly related to procedure. • Device embolization requiring catheter retrieval or surgical intervention. • Confirmed vascular thrombosis requiring thrombolytic therapy (alteplase/ streptokinase) or surgical intervention. • Pericardial effusion requiring pericardiocentesis. • Significant blood loss from the procedure requiring blood transfusion
Criteria	:	**Inclusion:** 1. Isolated PDA. **Exclusion:** 1. All emergency cases. 2. Complex PDA. 3. PDA in a premature infant of gestation less than 37 weeks. 4. Infants with weight less than 6kg.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of major complications associated with PDA occlusion
Denominator	:	**NA**
Formula	:	**NA**
Standard	:	≤ 1 case
Data Collection & Verification	:	1. **Where**: Data will be collected in the Paediatric Cardiology Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ PDA occlusion record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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PSYCHIATRY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Defaulter rate among Psychiatric outpatients	Effectiveness	≤ 10%
2	Percentage of new patients reviewed by psychiatrist within (≤) 30 days at Psychiatry Outpatient Clinic	Customer centeredness	≥ 90%
3	**Percentage of Non-Urgent Cases Patients Given Appointment of 6 Weeks or Less (≤ 6 Weeks) for 1st Consultation**	Customer centeredness	≥ 70%

Discipline	:	**Psychiatry**
Indicator 1	:	**Defaulter rate among Psychiatric outpatients**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Clinically effective management results in low defaulter rate, as patient develop compliance and adherence to treatment. 2. Studies have shown that high defaulter rate in psychiatric patients resulted in high morbidity and high mortality.
Definition of Terms	:	**Defaulter**: Patient who failed to attend outpatient clinic within (≤) one month (30 days irrespective of working or non-working days) of the appointment date.
Criteria	:	**Inclusion:** 1. All outpatients under follow up of Psychiatry Outpatient Clinic. **Exclusion:** 1. All new cases/ referrals. 2. Appointment to counsellor.
Type of indicator	:	Rate-based output indicator
Numerator	:	Number of patients defaulting Psychiatric Outpatient Clinic follow-up
Denominator	:	Total number of patients attending Psychiatric Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 10%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Psychiatry Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from appointment record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 1 month retrospective cohort of data. E.g., for April 2024, it will be patients who had appointment in March 2024, to allow one month period for them before they are considered as defaulters. *This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Psychiatry**
Indicator 2	:	**Percentage of new patients reviewed by psychiatrist within (≤) 30 days at Psychiatry Outpatient Clinic**
Dimension of Quality	:	Customer centeredness
Rationale	:	Management of patients comprises proper diagnoses including exclusion of other medical problems, and effective, holistic treatment. This is best achieved through review by psychiatrists, resulting in improved safety and quality of patient care.
Definition of Terms	:	**New Outpatient cases**: First appointment in Psychiatric Clinic. **Reviewed**: Seen by or discussed with psychiatrist as documented evidence by endorsement/ signature or appropriate entry in patients' medical records. **30 days**: 30 days (irrespective working or non-working days).
Criteria	:	**Inclusion:** 1. All new outpatients at Psychiatry Outpatient Clinic. **Exclusion:** NA
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of new patients reviewed by psychiatrist within (≤) 30 days at Psychiatry Outpatient Clinic
Denominator	:	Total number of new patients at Psychiatry Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Psychiatry Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 1 month retrospective cohort of data. E.g., for April 2024, it will be new outpatients of March 2024; to allow one month period for these patients to be reviewed by specialist.

Discipline	:	**Psychiatry**
Indicator 3	:	**Percentage of Non-Urgent Cases Patients Given Appointment of 6 Weeks or Less (≤6 Weeks) for 1st Consultation**
Dimension of Quality	:	Customer centeredness
Rationale	:	Patient-centered services must give priority to prompt attention to patient needs by reducing waiting times for consultation. It is the aim of the MOH to reduce the waiting times to get treatment /consultation
Definition of Terms	:	**Non-urgent cases**: Cases of Green Code according to Psychiatric Triaging Assessment Form (P-TAF) This indicator measures the time taken for the patient (a "new case") to be given the first appointment at the specialist clinic from the time he calls the department for an appointment.
Criteria	:	**Inclusion:** All new non-urgent cases **Exclusion:** NA
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of non-urgent cases patients given appointment of 6 weeks or less (≤6 weeks) for first consultation
Denominator	:	Total number of non-urgent cases given appointment for first consultation
Formula	:	Numerator x 100% Denominator
Standard	:	≥ 70%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Psychiatry Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	All psychiatric specialist clinics should have a system for recording the time of call for an appointment for every new case.

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RESPIRATORY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of major complications during elective flexible diagnostic bronchoscopy	Safety	≤ 0.8%
2	Percentage of complicated Tuberculosis (TB) cases seen within (≤) 2 weeks in Pulmonology/ TB clinic	Efficiency	**≥ 92%**

Discipline	:	**Respiratory**
Indicator 1	:	**Percentage of major complications during elective flexible diagnostic bronchoscopy**
Dimension of Quality	:	Safety
Rationale	:	1. To ensure safety of patients undergoing elective diagnostic flexible bronchoscopy. 2. With the recent advancement in pulmonology, the major complication associated with bronchoscopy is becoming less common and preventable. 3. Based on European Respiratory Society, the rate of major complication (such as bleeding, respiratory depression and pneumothorax) associated with elective flexible diagnostic bronchoscopy is 1%. Mortality is rare with a reported death rate of 0 - 0.04% in a large number of procedures. 4. To ensure the quality and safety of the procedure, the indicator is to measure rate of major complications associated with elective flexible diagnostic bronchoscopy within MOH hospitals that provides the services.
Definition of Terms	:	**Major complications** are defined as patients that had at least one of these outcomes: • Resuscitative or surgical measures. • Unscheduled admission. • Termination of procedure (due to bleeding, respiratory depression or pneumothorax). • Death. *Termination of procedure due to factors such as patient cannot tolerate or agitated is NOT considered here as it is not a complication.
Criteria	:	**Inclusion**: 1. All patients undergoing elective diagnostic flexible bronchoscopy. **Exclusion**: 1. Emergency/ semi-emergency flexible bronchoscopy. 2. Flexible bronchoscopy as part of advanced bronchoscopy such as rigid bronchoscopy/ cryobiopsy/ EBUS/ debulking.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with major complications following elective diagnostic flexible bronchoscopy
Denominator	:	Total number of patients underwent elective diagnostic flexible bronchoscopy
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 0.8%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Thoracic Endoscopic Suite. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ procedure book/ bronchoscopy suite registry. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.

Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Respiratory**
Indicator 2	:	**Percentage of complicated Tuberculosis (TB) cases seen within (≤) 2 weeks in Pulmonology/ TB clinic**
Dimension of Quality	:	Efficiency
Rationale	:	1. Complex TB cases need input from specialist with experience in TB management to prevent further complications/ transmission. 2. All complicated TB cases need to be seen by or discussed with specialist in Pulmonology/ TB Clinic.
Definition of Terms	:	**Complicated TB:** It is defined as TB with complications such as adverse drug reactions, airway complication, persistent positive smear and drug resistance. **2 weeks**: 14 days (irrespective of working or non-working days).
Criteria	:	**Inclusion:** 1. All complicated TB cases that are referred to Pulmonology/ TB clinic. **Exclusion:** 1. Patients who defaulted appointment.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of complicated TB cases seen in the Pulmonology/ TB clinic within (≤) 2 weeks
Denominator	:	Total number of complicated TB cases referred to Pulmonology/ TB clinic
Formula	:	Numerator x 100% Denominator
Standard	:	**≥ 92%**
Data Collection & Verification	:	1. **Where**: Data will be collected in the Pulmonology/ TB Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 1 month retrospective cohort of data. E.g., for April 2024, it will be new complicated TB patients of March 2024; to allow 2 weeks for these patients to be seen at Pulmonology/ TB Clinic.

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RHEUMATOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of newly presented SLE patients prescribed hydroxychloroquine (HCQ) in Rheumatology Outpatient Clinic	Effectiveness	≥ 95%
2	Percentage of Inflammatory Arthritis patients screened for Viral Hepatitis prior to starting methotrexate	Safety	≥ 95%

Discipline	:	**Rheumatology**
Indicator 1	:	**Percentage of newly presented SLE patients prescribed hydroxychloroquine (HCQ) in Rheumatology Outpatient Clinic**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Systemic Lupus Erythematosus (SLE) is one the commonest rheumatic disease with significant morbidity and mortality among young women. 2. Hydroxychloroquine has been shown to: • reduce flares, • reduce organ damage, • reduce lipid, • reduce thrombosis, • triples MMF response in lupus membranous nephritis and • improve survival.
Definition of Terms	:	**Hydroxychloroquine (HCQ):** Essential drug in management of SLE patients.
Criteria	:	**Inclusion:** 1. All new SLE patients presented to Rheumatology Outpatient Clinic. 2. All SLE patients newly referred from other health centres already on HCQ. **Exclusion:** 1. Patients who have intolerance or contraindication to HCQ. 2. Patients who refuse HCQ.
Type of indicator	:	Rate-based output indicator
Numerator	:	Number of newly presented SLE patients prescribed HCQ in Rheumatology Outpatient Clinic
Denominator	:	Total number of newly presented SLE patients in Rheumatology Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 95%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Rheumatology Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book/ SLE registry. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Rheumatology**
Indicator 2	:	**Percentage of Inflammatory Arthritis patients screened for Viral Hepatitis prior to starting methotrexate**
Dimension of Quality	:	Safety
Rationale	:	1. Methotrexate (MTX) is a commonly used disease modifying anti-inflammatory drugs (DMARDs) in Inflammatory Arthritis. 2. It is contraindicated in acute Hepatitis B and C infections and needs to be used with caution in chronic carriers. 3. Hep B and Hep C infections need to be screened prior to commencement of MTX to avoid viral reactivation and flare of hepatitis.
Definition of Terms	:	**Viral Hepatitis screening**: It is done by serology screening test for Hepatitis B and C. **Inflammatory Arthritis:** Refers to Rheumatoid Arthritis, Psoriatic Arthritis & Spondyloarthritis
Criteria	:	**Inclusion:** 1. All Inflammatory Arthritis patients started with methotrexate. 2. All Inflammatory Arthritis patients newly referred from other health centres already on methotrexate. **Exclusion**: 1. Patients who have contraindication to methotrexate. 2. Patients who refuse methotrexate.
Type of indicator	:	Rate-based output indicator
Numerator	:	Number of Inflammatory Arthritis patients screened for Hepatitis B and C prior to starting methotrexate
Denominator	:	Total number of Inflammatory Arthritis patients that were newly started on methotrexate in Rheumatology Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 95%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Rheumatology Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book/ National Inflammatory Arthritis registry. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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BREAST & ENDOCRINE SURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of patients with clear surgical margins in Breast Conserving Surgery (BCS)	Effectiveness	≥ 85%
2	Percentage of recurrent laryngeal nerve (RLN) injury in primary benign thyroid operation	Safety	≤ 3%

Discipline	:	**Breast and Endocrine Surgery**
Indicator 1	:	**Percentage of patients with clear surgical margins in Breast Conserving Surgery (BCS)**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Breast Cancer is the commonest cancer affecting female patients. 2. A number of Breast Cancer patients with early Breast Cancer will only require Breast Conserving Surgery (BCS) as the definitive procedure. 3. BCS is cosmetically more acceptable and less traumatic to Breast Cancer patients. However, some technical expertise with good pathology service back-up is required for this type of treatment to be successful. 4. Clear surgical margins are paramount in BCS treatment of Breast Cancers.
Definition of Terms	:	**Clear surgical margins:** Complete excision of the tumour with clear margins (no tumour on ink). HPE of tissue needs to be reviewed within 1 month by the operating team to confirm on clear surgical margins. **Margin:** Referred to Superior, Inferior, Medial and Lateral Margins. Anterior (Superficial) margin is excluded if the skin overlying tumour is removed together with tumour **Deep margin clearance** is when there is no tumour at margin. * Based on Clinical Practice Guidelines for Management of Breast Cancer Third Edition (Page 21) **Breast Conserving Surgery (BCS)**: Any procedure that preserve a part of the breast tissue. This can be performed with other Oncoplastic/ Reconstructive procedures.
Criteria	:	**Inclusion:** 1. All patients undergoing BCS as the definitive surgical procedure for Breast Cancer. 2. Post neo-adjuvant BCS. **Exclusion:** 1. Procedures performed as part of diagnostic work-up. 2. Suspicious lesion. 3. Ductal Carcinoma In-Situ (DCIS) or other in-situ cancers/ tumours. 4. Breast Sarcomas and Malignant Phylloides.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with clear surgical margin following BCS for Breast Cancer
Denominator	:	Total number of patients underwent BCS as definitive treatment for Breast Cancer
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 85%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Department of Surgery/ Unit that has Breast & Endocrine Surgery Service by Breast & Endocrine Surgeon(s). 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit.

		3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book. Histopathological reports of all patients are collected and reviewed by respective surgeons to verify the margins clearance. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 1 month retrospective cohort of data. E.g., for April 2024, it will be patients operated in March 2024; to allow time for reviewing HPE results to verify margin clearance.

Discipline	:	**Breast and Endocrine Surgery**
Indicator 2	:	**Percentage of recurrent laryngeal nerve (RLN) injury in primary benign thyroid operation**
Dimension of Quality	:	Safety
Rationale	:	1. Benign thyroid surgery is a common procedure. 2. Injury to recurrent laryngeal nerve (RLN) can cause significant morbidity to patients and in some cases, it may result in life-threatening complications e.g., airway obstruction. 3. In good hands and trained surgeon, the RLN injury is very low.
Definition of Terms	:	**Primary**: First time thyroid operation. **Injury to RLN**; i) RLN cut off during surgery. ii) Post op hoarseness of voice confirmed RLN injury via indirect laryngoscopy (IDL) assessment (by ENT) before discharged. iii) Both temporary and permanent injuries included. **RLN at risk of injury:** In a total thyroidectomy, 2 RLN are at risk of injury. In a hemi-thyroidectomy, 1 RLN is at risk. **Thyroid operation**: It includes hemi-thyroidectomy, total thyroidectomy and subtotal thyroidectomy. Isthmectomy is NOT included.
Criteria	:	**Inclusion:** 1. All patients undergoing primary thyroid operations for benign thyroid diseases. **Exclusion:** 1. Re-do, secondary and completion procedures. 2. All malignant cases. Histologically confirmed malignancy that is diagnosed after the procedures should also be excluded from final calculations. 3. Isthmectomy.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of RLN palsy/ injury after thyroid operation
Denominator	:	Total number of RLN at risk for injury following thyroid operation for benign thyroid disease in similar period (In Total Thyroidectomy, 2 RLN are at risk)
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 3%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Department of Surgery/ Unit that has Breast & Endocrine Surgery Service by Breast & Endocrine Surgeon(s). 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.

Remarks	:	Data collection to be done by 3 months retrospective cohort of data. E.g., for April 2024, it will be patients operated in January 2024; as the patient needs to be followed up and assessed on RLN injury.

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TRAUMA SURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Turnaround time from booking OT for crash laparotomy to surgery within (≤) 60 minutes	Efficiency	≥ 90%
2	Survival rate of trauma patients with Injury Severity Score (ISS) less than (<) 16	Effectiveness	100%
3	Percentage of trauma laparotomy cases performed without complication	Safety	≥ 95%

Discipline	:	**Trauma Surgery**
Indicator 1	:	**Turnaround time from booking OT for crash laparotomy to surgery within (≤) 60 minutes**
Dimension of Quality	:	Efficiency
Rationale	:	1. In a hypotensive patient due to exsanguinating intra-abdominal bleeding, urgent surgical intervention for haemostasis is required. Crash laparotomy to arrest the bleeding is part of the resuscitative process for these patients. 2. This indicator needs to be monitored as a delay from making a call to OT and time of surgical intervention can affect patient's survival.
Definition of Terms	:	**Crash laparotomy**: An urgent laparotomy that needs to be carried out for surgical haemostasis in a hypotensive patient due to exsanguinating intra-abdominal bleed.
Criteria	:	**Inclusion:** 1. All haemodynamically unstable patients due to intra-abdominal bleed seen in Emergency Department indicated for urgent laparotomy. 2. All haemodynamically unstable patient due to intra-abdominal bleed seen in ICU or ward indicated for urgent laparotomy after failed non-operative management. **Exclusion:** 1. All patients who require laparotomy for peritonitis and are hemodynamically stable. 2. All patient referred on table for trauma laparotomy.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of crash laparotomies started within (≤) 60 minutes of making a call to OT
Denominator	:	Total number of crash laparotomies
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in ICU/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Trauma Surgery**
Indicator 2	:	**Survival rate of trauma patients with Injury Severity Score (ISS) less than (<) 16**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Injury Severity Score (ISS) is widely used severity scoring system for trauma and is practised internationally. 2. Patient with an ISS score of less than 16 are classified as minor trauma. 3. Patients with minor trauma injuries have a very good prognosis. 4. This indicator needs to be monitored as a drop in survival rate is suggestive of suboptimal care received by the patients.
Definition of Terms	:	**Injury Severity Score (ISS):** An anatomical scoring system that provides an overall severity score for patients with multiple injuries. ISS (from Susan Baker) is also synonymously used with NISS (New ISS- from Osler).
Criteria	:	**Inclusion:** 1. Inpatients mortality in all trauma patients admitted with an ISS score less than 16 (ISS <16). 2. All patients with an ISS score < 16 who were discharged and brought in dead due to trauma related causes. **Exclusion:** 1. Death of patients with minor trauma who presented late (after 24 hours) to the hospital or were transferred in after a period of hospitalization in another facility. 2. Patients with minor trauma and died due to other cause not directly related to trauma (e.g., patient who had humerus fracture, but died due to myocardial infarction).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of trauma patients with ISS <16 who survived
Denominator	:	Total number of trauma patients with ISS <16
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	100%
Data Collection & Verification	:	1. **Where**: Data will be collected in ICU/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ admission & discharge record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Trauma Surgery**
Indicator 3	:	**Percentage of trauma laparotomy cases performed without complication**
Dimension of Quality	:	Safety
Rationale	:	Any complications arising from trauma laparotomy will lead to more morbidity and mortality to the patient. Reference: National and international policies of the 'Safe Surgery Safe Life'.
Definition of Terms	:	**Trauma laparotomy:** Any laparotomy done for intra-abdominal injury. **Complications of laparotomy**: • Iatrogenic bowel injury. • Iatrogenic solid organ injury. • Iatrogenic abdominal vascular injury. • Anastomotic leak post bowel anastomosis. • Miss obvious major injuries – solid organ or bowel injuries. • Bleeding post splenectomy.
Criteria	:	**Inclusion:** 1. All trauma laparotomies done within the facility. **Exclusion:** 1. All trauma laparotomies done by other facilities and transferred in for further management. 2. Non trauma related/ medical complications (e.g., Myocardial Infarction, respiratory failure, Acute Kidney Injury).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of trauma laparotomy cases performed without complication
Denominator	:	Total number of trauma laparotomy cases performed
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 95%
Data Collection & Verification	:	1. **Where**: Data will be collected in ICU or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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CARDIOTHORACIC SURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1a	Elective isolated Coronary Artery Bypass Grafting (CABG) surgery mortality rate **(High volume centres)**	Effectiveness	≤ 3%
1b	Elective isolated Coronary Artery Bypass Grafting (CABG) surgery mortality rate **(Low volume centres)**	Effectiveness	≤ 7%
2	Incidence rate of pneumothorax following removal of chest drains	Safety	≤ 5 %
3	Percentage of patients who underwent Coronary Artery Bypass Grafting (CABG) surgery within (≤) 9 months from the time decision made	Efficiency	≥ 90%

Discipline	:	**Cardiothoracic Surgery**
Indicator 1a	:	**Elective isolated Coronary Artery Bypass Grafting (CABG) surgery mortality rate (High volume centres)**
Dimension of Quality	:	Effectiveness
Rationale	:	1. CABG is the most common open heart surgical procedure currently being performed. However, there are various co-morbid factors which influence the outcome of cardiac surgery – age, co morbid illness e.g., diabetes, renal impairment and impaired left ventricular function. Risk stratification is necessary to enable common standardisation. There are various predictive scoring methods e.g., Parsonnet, STS score and Euroscore, which allows for comparison with international standards. 2. It has also been shown that high volume centres consistently perform better than low volume centres. Thus, such data will be important for human resource management and financial allocation. Reference: Krisstin Thorsteinsonn et al. (2016, 1 February). Age-dependant trends in postoperative mortality and preoperative comorbidity in isolated coronary artery bypass surgery: a nationwide study. European Journal of Cardio-Thoracic Surgery (Volume 49, Issue 2, pp391-397).
Definition of Terms	:	**Emergency surgery:** Surgery performed immediately following referral from the cath lab (e.g., coronary artery dissection). **Urgent surgery:** Patient with high risk anatomy (e.g., tight left main stem disease) that require surgery within the same admission. **Elective surgery**: Surgery for patients with stable coronary artery disease or disease controlled on medication and is usually discharged and readmitted later for elective surgery. **High volume centre:** Centres which performs > 150 open heart procedures/ year.
Criteria	:	**Inclusion**: 1. All elective isolated coronary artery disease patients requiring CABG. 2. Good Left Ventricular (LV) function – Euro Score II (EF ≥ 30%). 3. Good kidney function – Euro Score II (CC ≥ 85ml/min). **Exclusion**: 1. Patients with previous cardiac surgery (e.g., redo surgery). 2. Patients requiring concomitant procedure (e.g., valve procedures). 3. All inter and intra hospital referral (inpatient) cardiac surgeries. 4. Poor Left Ventricular (LV) function - Euro Score II (EF < 30%). 5. Reduced kidney function - Euro Score II (CC < 85ml/min).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of deaths from elective isolated CABG
Denominator	:	Total number of elective isolated CABG done
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 3%
Data Collection & Verification	:	1. **Where**: Data will be collected in Cardiothoracic Ward/ OT/ ICU/ CCU/ CRW/ NICU/ wards that cater for the above condition.

		2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Cardiothoracic Surgery**
Indicator 1b	:	**Elective isolated Coronary Artery Bypass Grafting (CABG) surgery mortality rate (Low volume centres)**
Dimension of Quality	:	Effectiveness
Rationale	:	1. CABG is the most common open heart surgical procedure currently being performed. However, there are various co-morbid factors which influence the outcome of cardiac surgery – age, co morbid illness e.g., diabetes, renal impairment and impaired left ventricular function. Risk stratification is necessary to enable common standardisation. There are various predictive scoring methods e.g., Parsonnet, STS score and Euroscore, which allows for comparison with international standards. 2. It has also been shown that high volume centres consistently perform better than low volume centres. Thus, such data will be important for human resource management and financial allocation. Reference: Krisstin Thorsteinsonn et al. (2016, 1 February). Age-dependant trends in postoperative mortality and preoperative comorbidity in isolated coronary artery bypass surgery: a nationwide study. European Journal of Cardio-Thoracic Surgery (Volume 49, Issue 2, pp391-397).
Definition of Terms	:	**Emergency surgery:** Surgery performed immediately following referral from the cath lab (e.g., coronary artery dissection). **Urgent surgery:** Patient with high risk anatomy (e.g., tight left main stem disease) that require surgery within the same admission. **Elective surgery**: Surgery for patients with stable coronary artery disease or disease controlled on medication and is usually discharged and readmitted later for elective surgery. **Low volume centre:** Centres which performs < 150 open heart procedures/ year.
Criteria	:	**Inclusion**: 1. All elective isolated coronary artery disease patients requiring CABG. 2. Good Left Ventricular (LV) function – Euro Score II (EF ≥ 30%). 3. Good kidney function – Euro Score II (CC ≥ 85ml/min). **Exclusion**: 1. Patients with previous cardiac surgery (e.g., redo surgery). 2. Patients requiring concomitant procedure (e.g., valve procedures). 3. All inter and intra hospital referral (inpatient) cardiac surgeries. 4. Poor Left Ventricular (LV) function - Euro Score II (EF < 30%). 5. Reduced kidney function - Euro Score II (CC < 85ml/min).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of deaths from elective isolated CABG
Denominator	:	Total number of elective isolated CABG done
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 7%
Data Collection & Verification	:	1. **Where**: Data will be collected in Cardiothoracic Ward/ OT/ ICU/ CCU/ CRW/ NICU/ wards that cater for the above condition.

		2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Cardiothoracic Surgery**
Indicator 2	:	**Incidence rate of pneumothorax following removal of chest drains**
Dimension of Quality	:	Safety
Rationale	:	1. Chest drains are routinely inserted following Cardiothoracic Surgery to remove any postoperative pleural fluids, blood or air leaks. Once its function is served and no further accumulation of fluid or air is expected, it is removed under a controlled situation. If performed correctly, the risk of developing pneumothorax is very small. 2. Studies indicate an incidence of < 10% and from that less than 10% may require reinsertion of chest drain. Reinsertion of chest drain may cause morbidity including increase risk of pleural space infection, anxiety and sometime may cause serious consequences if air leaks still present and not noticed. A recurrent pneumothorax of more than 15% or a symptomatic patient may necessitate reinsertion of chest drain. Reference: Ronald L Eisenberg (2011, July). Are chest radiographs routinely indicated after chest tube removal following cardiac surgery/ AJR: 197.
Definition of Terms	:	NA
Criteria	:	**Inclusion**: 1. All post cardiac surgery patients. **Exclusion**: 1. Patients who had undergone thoracic surgery.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of incidences of pneumothorax following chest drain removal
Denominator	:	Total number of chest drains removed
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 5%
Data Collection & Verification	:	1. **Where**: Data will be collected in Cardiothoracic Ward/ Operation Theatre/ ICU/ CCU/ CRW/ NICU/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ procedure book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Cardiothoracic Surgery**
Indicator 3	:	**Percentage of patients who underwent Coronary Artery Bypass Grafting (CABG) surgery within (≤) 9 months from the time decision made**
Dimension of Quality	:	Efficiency
Rationale	:	1. Coronary Artery Bypass Grafting (CABG) is a common cardiac surgical procedure being performed worldwide. Despite the advances in catheter-based therapies, there are still a large group of patients who requires CABG. As new patients are being referred for surgery, some may require emergency or even urgent surgical intervention it has necessitated a need for prioritization. It is also a reflection of shortage of surgical, intensive care and financial resources necessitating the creation of a waiting list. 2. A waiting list for CABG candidate indicates prioritization according to clinical condition and is generally categorised as emergency, urgent and elective. Along waiting list may result in mortality, increased morbidity as the heart weakens following a long period of ischemia. It is generally regarded that a waiting list more than 6 months would indicate a need to review the provision, utilisation and funding of resources. Reference: Rexius H et al. (2005, February). Waiting and mortality after elective Coronary Bypass Grafting, Ann Thoracic Surg. (79(2): pp 538-543).
Definition of Terms	:	**Emergency:** Surgery performed immediately following referral from the cath lab (e.g., coronary artery dissection). **Urgent:** Patient with high risk anatomy (e.g., tight left main stem disease) that require surgery within the same admission. **Elective surgery**: Surgery for patients with stable coronary artery disease or disease controlled on medication and is usually discharged and readmitted later for elective surgery. **Time decision made**: It is the time patient was seen in Cardiothoracic Clinic/ Ward and decision was made for operation by the Cardiothoracic team.
Criteria	:	**Inclusion**: 1. All patients electively admitted for isolated CABG (outpatients). 2. Stable angina with good left ventricular function and normal kidney function. 3. Good Left Ventricular (LV) function – Euro Score II (EF ≥ 30%). 4. Good kidney function – Euro Score II (CC ≥ 85ml/min). **Exclusion**: 1. Inter and intra hospital referrals (inpatient) requiring surgery. 2. Patients requiring concomitant procedure (e.g., valve procedures).

		3. Patients who were postponed after given operation date/ after admission to ward for operation because their comorbid conditions were not optimised (e.g., smoking, uncontrolled diabetes). 4. Patients who refused surgery. 5. Poor Left Ventricular (LV) function - Euro Score II (EF < 30%). 6. Reduced kidney function - Euro Score II (CC < 85ml/min).
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of patients underwent CABG within (≤) 9 months from the time decision made
Denominator	:	Total number of patients who were decided for CABG for the same period
Formula	:	Numerator x 100 % Denominator
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in Cardiothoracic Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ CABG record book/ OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 9 months retrospective cohort of data. E.g., for January 2024, it will be patients who were decided for CABG in April 2023. Both numerator and denominator will be patients of April 2023 who were decided for CABG.

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COLORECTAL SURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of patients with waiting time of ≤ 6 weeks for Colorectal Cancer surgery	Customer centeredness	≥ 90%
2	Percentage of patients with unclear surgical margins in Rectal Cancer surgery	Effectiveness	≤ 10%
3	Post-operative mortality rate for all major elective colorectal surgery	Safety	≤ 10%

Discipline	:	**Colorectal Surgery**
Indicator 1	:	**Percentage of patients with waiting time of ≤ 6 weeks for Colorectal Cancer surgery**
Dimension of Quality	:	Customer centeredness
Rationale	:	1. To ensure no delay in Colorectal Cancer operation. 2. Early surgery prevents progression of disease.
Definition of Terms	:	**Waiting time:** From the time decision is made for surgery till the date given for surgery. **6 weeks**: 42 days (irrespective working or non-working days).
Criteria	:	**Inclusion:** 1. All Colorectal Carcinoma decided for surgery; irrespective of location, type and staging of carcinoma. **Exclusion:** 1. Patients who refused the proposed date that was within 6 weeks. 2. Patients' condition is not permissible for surgery.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of patients with waiting time of ≤ 6 weeks for Colorectal Cancer surgery
Denominator	:	Total number of patients planned for Colorectal Cancer surgery
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be from Surgical Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from OT booking slot record book/ OT list/ appointment book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Colorectal Surgery**
Indicator 2	:	**Percentage of patients with unclear surgical margins in Rectal Cancer surgery**
Dimension of Quality	:	Effectiveness
Rationale	:	1. To ensure complete resection of Rectal Cancer. 2. Unclear surgical margins is a precursor to cancer recurrence.
Definition of Terms	:	**Margins**: Include proximal, distal and circumferential margins.
Criteria	:	**Inclusion:** 1. All Rectal Carcinoma; irrespective of location, type and staging of carcinoma. **Exclusion:** 1. Other colon carcinomas.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with unclear surgical margins in Rectal Cancer surgery
Denominator	:	Total number of patients underwent Rectal Cancer surgery
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 10%
Data Collection & Verification	:	1. **Where**: Data will be from Surgical Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ record book. Histopathological reports of all patients are collected and reviewed by respective surgeons to verify the margins clearance. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 1 month retrospective cohort of data. E.g., for April 2024, it will be patients operated in March 2024; to allow time for reviewing HPE results to verify margin clearance.

Discipline	:	**Colorectal Surgery**
Indicator 3	:	**Post-operative mortality rate for all major elective colorectal surgery**
Dimension of Quality	:	Safety
Rationale	:	Monitoring of post-operative mortality rate is important to ensure quality of care provided by colorectal team of MOH is in par with other countries.
Definition of Terms	:	**Post-operative mortality**: Mortality following colorectal surgeries within the same admission or within (≤) 30 days after surgery. Patients need to be seen in clinic around one month post-operative or followed up on the outcome via phone call with patient/ family member (if patient defaulted appointment). **Colorectal surgeries**: Surgeries that are done for colorectal diseases such as Colorectal Carcinoma, Diverticular Disease, Ulcerative Colitis and others.
Criteria	:	**Inclusion**: 1. All major elective colorectal surgeries. **Exclusion**: 1. Emergency colorectal surgeries. 2. Death after 30 days of operation. 3. Patients who defaulted post-operative appointments and family members were not contactable.
Type of indicator	:	Rate based outcome indicator
Numerator	:	Number of surgical related deaths within (≤) 30 days from major elective colorectal surgeries
Denominator	:	Total number of major elective colorectal surgeries performed
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 10%
Data Collection & Verification	:	1. **Where**: Data will be from Surgical Outpatient Department/ surgical wards/ ICU/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 2 months retrospective cohort of data. E.g., for April 2024, it will be patients operated in February 2024; to allow time for patients to be followed up during TCA to review outcome.

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GENERAL SURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of patients with postponement of surgery for urgent cases	Customer centeredness	**≤10%**
2	Percentage of Peri-operative Mortality Review (POMR) cases reported using vPOMR form	Efficiency	≥ 90%
3	Incidence rate of colonic perforation following colonoscopy	Safety	≤ 0.5%
4	**Percentage of surgical patients with unplanned readmission to surgical ward within (≤) 48 hours of discharge**	Effectiveness	≤ 2%
5	**Percentage of patients with waiting time ≤4 weeks to have endoscopy done from the date the patients presented with suspected GI malignancy**	Safety	≥ 80%

Discipline	**:**	**General Surgery**
Indicator 1	:	**Percentage of patients with postponement of surgery for urgent cases**
Dimension of Quality	:	Customer centeredness
Rationale	:	1. Appendicectomy and soft tissue infections are cases commonly postponed in some hospitals. Postponement of cases scheduled for surgery will require re-fasting and this leads to discomfort for patients especially if they are diabetics. 2. Postponement infers the accessibility of Operation Theatre (OT) within a hospital. 3. The objective of monitoring this indicator is to identify opportunity for improvement within the facilities with regards to accessibility of OT.
Definition of Terms	:	**Urgent Cases**: These are cases that need to be done within 24 hours from the time cases are posted. Reference: Garis Panduan POMR. Prioritisation of cases for emergency and elective surgery. 2018. **Waiting time**: Time from when a patient is posted till time start of surgery. **Postponed cases**: Number of patients that have been scheduled for urgent surgery but postponed (allowed orally and re-fasted) and rescheduled to be done on the following day.
Criteria	:	**Inclusion:** 1. All patients undergoing urgent surgery for appendicectomy, incision & drainage (I&D) and saucerization. **Exclusion:** 1. Other emergency surgeries. 2. All elective surgeries.
Type of indicator	:	Rate-based output indicator
Numerator	:	Number of patients with postponement of surgery for urgent cases
Denominator	:	Total number of patients posted for urgent surgery
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	**≤ 10%**
Data Collection & Verification	:	1. **Where**: Data will be collected in the OT. 2. **Who**: Data will be collected by OT Sister. 3. **How to collect**: Data is suggested to be collected from OT record book for postponed cases. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**General Surgery**
Indicator 2	:	**Percentage of Peri-operative Mortality Review (POMR) cases reported using vPOMR form**
Dimension of Quality	:	Efficiency
Rationale	:	1. POMR has become an international indicator under the Global Surgery 2030 by Lancet and World bank which is supported by WHO. 2. It is a form of clinical audit and proven to be an important tool used to improve outcome in the clinical practice, particularly in Surgery. Hence, improving surgical quality of care as a whole. It is also has become one of the important criteria for surgeon in MOH Surgery Policy 2018. Reference: • Guideline Implementation of Perioperative Mortality Review (POMR) in Ministry of Health (MOH) (3rd edition) 2022 • Garis Panduan Pengisian Borang VPOMR 2022 (2nd edition), KKM
Definition of Terms	:	**Perioperative Mortality:** Perioperative Mortality is defined as any death occurring within the total length of hospital stay within the same admission or readmission of a surgical or gynaecological procedure done under general or regional anaesthesia including death in operation theatre (OT) before induction of anesthesia. **Perioperative Mortality Review (POMR):** Is a form of clinical audit and a confidential enquiry into perioperative deaths at the Ministry of Health (MOH) Hospital.
Criteria	:	**Inclusion** 1. All perioperative deaths (pre-, intra- and post-operative). 2. Patient had surgery performed elsewhere or during the previous admission and was readmitted (related to previous procedure) within 30 days of surgery and died. 3. Referred case whereby patient had surgery elsewhere (at the referral centre) and died at the primary hospital (the referring hospital), i.e., operated on and sent back to the referring hospital. **Exclusion** 1. Diagnostic or therapeutic procedures carried out by physician and other non-surgeons 2. Radiological procedures performed solely by the Radiologist without a surgeon's involvement 3. Endoscopy (e.g., OGDS/ Colonoscopy/ ERCP) performed under sedation or local anaesthesia (LA) 4. Surgery performed outside OT complex, e.g., Procedure Room
Type of indicator	:	Rate-based output indicator
Numerator	:	Number of POMR cases reported using vPOMR form
Denominator	:	Total number of POMR death based on QAPOM2-2018
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 90%

Data Collection & Verification	:	1. **Where**: Data will be collected from POMR coordinator. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from POMR report. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	**:**	**General Surgery**
Indicator 3	:	**Incidence rate of colonic perforation following colonoscopy**
Dimension of Quality	:	Safety
Rationale	:	1. Colonoscopy is a common procedure done for diagnostic or therapeutic purposes. 2. Complication rate following colonoscopy indicates safety of this procedure.
Definition of Terms	:	NA
Criteria	:	**Inclusion:** 1. All colonoscopy performed inclusive of both therapeutic and diagnostic colonoscopy. **Exclusion:** NA
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of colonic perforations following colonoscopy
Denominator	:	Total number of colonoscopies performed
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	$\leq 0.5\%$
Data Collection & Verification	:	1. **Where**: Data will be collected in the Scope Room and ward that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ procedure book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**General Surgery**
Indicator 4	:	**Percentage of surgical patients with unplanned readmission to surgical ward within (≤) 48 hours of discharge**
Dimension of Quality	:	Effectiveness
Rationale	:	Unplanned readmission is often considered to be the result of suboptimal care in the previous admission leading to readmission.
Definition of Terms	:	**Unplanned readmission**: Patient being readmitted for the management of the same clinical condition (main diagnosis) and its complication, he or she was discharged, the admission was not scheduled and it is readmission to the same hospital. This does not include readmission requested by next-of-kin or other department. **Same clinical condition:** Same diagnosis as refer to the ICD 11.
Criteria	:	**Inclusion:** 1. All surgical inpatient discharges from surgical wards. **Exclusion:** 1. Patients of < 12 years of age. 2. AOR (at own risk) discharged patients during the first admission. 3. Patients that were discharged from wards under different department
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of surgical patients with unplanned readmissions to surgical department within (≤) 48 hours of discharge
Denominator	:	Total number of surgical patients discharged during the same period of time the numerator data was collected
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 2%
Data Collection & Verification	:	1. **Where**: Data will be collected in in pre-determined specified surgical wards that cater for the above condition/ record office. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: For numerator, data is suggested to be collected on the day of readmission. For denominator, data is from admission & discharge record book/ Hospital Information System (HIS) 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**General Surgery**
Indicator 5	:	**Percentage of patients with waiting time ≤4 weeks to have endoscopy done from the date the patients presented with suspected GI malignancy**
Dimension of Quality	:	Safety
Rationale	:	• Colorectal and Upper GI malignancies are common cancers encountered in KKM Hospitals. A delay in investigation would result in late diagnosis and subsequent management. • Delay infers the capability of Endoscopy unit within a hospital. • The objective of monitoring this indicator is to identify opportunities for improvement within the facilities regarding accessibility of Endoscopy.
Definition of Terms	:	**Suspected GI malignancy**: These are the cases that need to be investigated as soon as possible to obtain a diagnosis. They are patients with abdominal symptoms suspicious of malignancy OR Immunochemical Faecal Occult Blood Test (IFOBT) positive. **Waiting time**: Time from when a patient presents with suspected GI malignancy until the time Endoscopy is performed.
Criteria	:	**Inclusion:** 1. All patients with abdominal symptoms suspicious of malignancy **OR** Immunochemical Faecal Occult Blood Test (IFOBT) positive. **Exclusion:** 1. Patients who defaulted follow up
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients who had Endoscopy done within 4 weeks from the date the patients presented with suspected GI malignancy
Denominator	:	Total number of patients with suspected GI malignancy.
Formula	:	Numerator / Denominator x 100%
Standard	:	≥ 80%
Data Collection &Verification	:	1. **Where**: Data will be collected in the Clinic & Endoscopy unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ procedure book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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HEPATOBILIARY SURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of non-life-threatening referral that are given appointment for first consultation within (≤) 1 month	Efficiency	≥ 75%
2	Percentage of new Endoscopic Retrograde Cholangiopancreatography (ERCP) case from index referral that are given appointment within (≤) 14 days	Efficiency	≥ 90%
3	Post-operative mortality rate for all major elective Hepatobiliary Surgery	Safety	≤ 15%

Discipline	:	**Hepatobiliary Surgery**
Indicator 1	:	**Percentage of non-life-threatening referral that are given appointment for first consultation within (≤) 1 month**
Dimension of Quality	:	Efficiency
Rationale	:	1. A patient with a hepatobiliary illness should be able to gain access to our public health system without delay. 2. The time interval (from the date a new patient requested for an appointment till the date of the first appointment given) reflects on one aspect of accessibility. Delay is a failure to provide service according to needs and may lead to deterioration of the patient's illness.
Definition of Terms	:	**Waiting time:** From the date of requested appointment to the date of given appointment. **1 month**: 30 days (irrespective working or non-working days).
Criteria	:	**Inclusion**: 1. Total number of new non-life-threatening hepatobiliary cases referred for outpatient appointments. **Exclusion**: 1. Patients who defaulted the first appointment given. 2. Patients who request to see a specific doctor. 3. Patients who request to delay the appointment date given within 1 month.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of patients given appointment for first consultation within (≤) 1 month
Denominator	:	Total number of patients given appointment for first consultation
Formula	:	Numerator x 100% Denominator
Standard	:	≥ 75%
Data Collection & Verification	:	1. **Where**: Data will be from Hepatobiliary Surgery Unit/ Department. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from appointment record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Hepatobiliary Surgery**
Indicator 2	:	**Percentage of new Endoscopic Retrograde Cholangiopancreatography (ERCP) case from index referral that are given appointment within (≤) 14 days**
Dimension of Quality	:	Efficiency
Rationale	:	1. ERCP is a common procedure done by Hepatobiliary surgeons. ERCP is a procedure done to diagnose and treat problems in the liver, gall bladder, bile ducts and pancreas. It combines X-ray and the use of an endoscope. 2. It is important to have patients given early appointment as it affects the management and outcome of a patient.
Definition of Terms	:	**Index referral**: New cases/ patients referred to Hepatobiliary team for Endoscopic Retrograde Cholangiopancreatography (ERCP) from the date requested to the given appointment. **14 days**: 14 days (irrespective working or non-working days).
Criteria	:	**Inclusion**: 1. Total number of index referrals undergoing ERCP. **Exclusion**: 1. Patients who default the first appointment given. 2. Patients who request to delay the appointment date given within 14 days.
Type of indicator	:	Rate based process indicator
Numerator	:	Number of index referrals undergoing ERCP within (≤) 14 days
Denominator	:	Total number of index referrals undergoing ERCP
Formula	:	Numerator x 100% Denominator
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be from Hepatobiliary Surgery Ward/ Endoscopy Suite. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from appointment book/ procedure book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Hepatobiliary Surgery**
Indicator 3	:	**Post-operative mortality rate for all major elective Hepatobiliary surgery**
Dimension of Quality	:	Safety
Rationale	:	1. Internationally, it is found that post-operative mortality rate of major Hepatobiliary surgery is quoted to be around 10%. 2. Monitoring of post-operative mortality rate is important to ensure quality of care provided by MOH is in par with other countries.
Definition of Terms	:	**Post-operative mortality**: Mortality following all major elective Hepatobiliary surgery within the same admission or within (≤) 30 days after surgery. Patients need to be seen in clinic around one month post-operative or followed up on the outcome via phone call with patient/ family member (if patient defaulted appointment).
Criteria	:	**Inclusion**: 1. All major elective hepato-pancreatico-biliary surgeries e.g.,Whipples, Distal Pancreatectomy, Total Pancreatectomy, Major Liver Surgery, Roux-en-Y Hepaticojejunostomy, Puestow Surgery, Cholecytectomy, etc. **Exclusion**: 1. All emergency Hepatobiliary surgery.
Type of indicator	:	Rate based outcome indicator
Numerator	:	Number of patients who died following major elective Hepatobiliary surgery
Denominator	:	Total number of major elective Hepatobiliary surgeries performed
Formula	:	Numerator x 100% Denominator
Standard	:	**≤ 15%**
Data Collection & Verification	:	1. **Where**: Data will be from Hepatobiliary Surgery Unit/ Department. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 2 months retrospective cohort of data. E.g., for April 2024, it will be patients operated in February 2024; to allow time for patients to be followed up during TCA to review outcome.

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NEUROSURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Mild Traumatic Brain Injury (TBI) Case Fatality Rate	Effectiveness	≤ 2%
2	Percentage of patients with surgical site infection following clean elective neurosurgical surgery	Safety	≤ 5%

Discipline	:	**Neurosurgery**
Indicator 1	:	**Mild Traumatic Brain Injury (TBI) Case Fatality Rate**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Mild Traumatic Brain Injury (TBI) is common and while, typically benign; has a very low risk of death sequelae, < 1%. 2. Management for mild TBI is provided by many primary and secondary centres. 3. Important considerations in the management is to provide care in accordance with the national guidelines to avoid this preventable mortality.
Definition of Terms	:	**Fatality:** Death of patients with isolated mild TBI within the same hospitalisation. **Mild TBI:** Patient with a Glasgow Coma Scale (GCS) of 13 to 15; measured at approximately 30 minutes after the injury.
Criteria	:	**Inclusion:** 1. Acute isolated brain injury caused by blunt external force. 2. Direct admission with GCS 13-15. 3. Patients of ≥ 18 years of age. 4. Death occurring during the same hospitalisation. **Exclusion:** 1. Acute brain injury caused by penetrating force or non-trauma such as stroke. 2. Polytrauma where two or more serious injuries in at least (≥) two area of the body. 3. Patients of < 18 years of age. 4. Death from causes other than mild TBI (e.g., Myocardial Infarction).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with mild TBI who dies within the same hospitalisation
Denominator	:	Total number of patients admitted for mild TBI
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 2%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Neurosurgical wards/ ICU/ CCU/ CRW/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ admission & discharge record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Neurosurgery**
Indicator 2	:	**Percentage of patients with surgical site infection following clean elective neurosurgical surgery**
Dimension of Quality	:	Safety
Rationale	:	1. Surgical site infections are a common cause of health care-associated infection. The reported rate ranges from 0.5-7.2% for cranial surgery and about 3.1% for spine surgery. 2. The most important factors for prevention of surgical site infection are timely administration of effective preoperative antibiotics and careful attention to other preoperative control measures. Careful infection control is essential; interventions include hand hygiene and use of gloves and other barrier devices (masks, caps, gowns, drapes, and shoe covers) by all operating room personnel. 3. Application of antiseptics to the skin is warranted to reduce the burden of skin flora. Patient with evidence of active infection prior to elective surgical procedure should complete treatment for the infection prior to surgery, particularly in circumstance when placement of prosthetic material is anticipated. The professional commitments in implementing these control measures for prevention of surgical site infection cannot be over-emphasized.
Definition of Terms	:	**Surgical site infection (SSI):** It is defined as infection related to an operative procedure that occurs at or near the surgical incision within (≤) 30 days of the procedure. Clinical criteria for SSI include one or more of the following: • A purulent exudate draining from a surgical site. • A positive fluid culture obtained from a surgical site that was closed primarily. • A surgical site that is treated or reopened in the setting of at one clinical sign of infection (pain, swelling, erythema, warmth).
Criteria	:	**Inclusion:** 1. All elective cranial and spinal surgery. 2. Adult and paediatric patients. **Exclusion:** 1. Elective cranial and spinal surgery for infective conditions (e.g., abscess). 2. Re-surgery cases. 3. Cancer therapy patients (chemotherapy and radiation therapy). 4. Patients with active infection at a remote site. 5. Surgery done for external CSF diversion procedures (e.g., EVD, lumbar drain). 6. Patients who defaulted TCA.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with wound infection following clean elective neurosurgical surgery
Denominator	:	Total number of patients underwent clean elective neurosurgical surgery
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 5%

Data Collection & Verification	:	1. **Where**: Data will be collected in the Neurosurgery Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book/ wound slip. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 3 months retrospective cohort of data. E.g., for April 2024, it will be patients who had operation done in January 2024; as patient needs to be reviewed during the next TCA to obtain information on surgical site infection.

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OBSTETRICS & GYNAECOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of patients with Eclampsia administered magnesium sulphate ($MgSO_4$)	Effectiveness	≥ 90%
2	Percentage of massive primary Postpartum Haemorrhage (PPH) incidence in cases delivered in the hospital	Safety	≤ 0.75%
3	Percentage of patients with unrecognised intraoperative ureteric injury during benign gynaecological surgery	Safety	≤ 1.5%

Discipline	:	**Obstetrics and Gynaecology**
Indicator 1	:	**Percentage of patients with Eclampsia administered magnesium sulphate ($MgSO_4$)**
Dimension of Quality	:	Effectiveness
Rationale	:	1. This indicator is selected to ensure all mothers with Eclampsia are given magnesium sulphate. 2. Eclampsia occurs in about 1.6 - 10 cases/ 10000 deliveries. The diagnosis of Eclampsia is unambiguous and data is currently collected in an established manner. The incidence of Eclampsia is reflective of the effectiveness of management of hypertensive disorder in pregnancy. The use of this indicator would reflect conformance to current evidence based management strategies by the O&G discipline. 3. Current evidence suggests that magnesium sulphate is the drug of choice in the treatment of women with Eclampsia. It reduces the number of maternal deaths as well as respiratory and neurological complications. It also reduces recurrent fits. 4. It also reduces neonatal admissions to and length of stay in NICU. Reference: Collaborative Eclampsia Trial. Lancet 1995.
Definition of Terms	:	**Eclampsia**: Occurrence of one or more generalized tonic clonic convulsions with underlying hypertensive disorder in pregnancy, in the absence of other neurological conditions. **Administered magnesium sulphate ($MgSO_4$)**: At least administration of loading dose of $MgSO_4$.
Criteria	:	**Inclusion**: 1. All patients with Eclampsia. **Exclusion**: 1. Patients with contraindication for $MgSO_4$.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with Eclampsia administered $MgSO_4$
Denominator	:	Total number of patients with Eclampsia
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Labour Ward/ High Dependency Ward (HDW). 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ $MgSO_4$ record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Obstetrics and Gynaecology**
Indicator 2	:	**Percentage of massive primary Postpartum Haemorrhage (PPH) incidence in cases delivered in the hospital**
Dimension of Quality	:	Safety
Rationale	:	The incidence of massive obstetric haemorrhage is reflective of the effectiveness of the management of haemorrhage at delivery. PPH occurs in 3-5% of pregnant mothers and is still the leading cause of maternal death in Malaysia. The use of this indicator would be reflective of prompt diagnosis and speed of instituting multidisciplinary care. Reference: • Green-top Guideline No. 52, May 2009. • CEMD Training Module for PPH. • Hazra S et al. J Obstet Gynaecol 2004 Aug: 24 (5) 519-20.
Definition of Terms	:	**Massive Postpartum Haemorrhage (PPH)**: Total amount of blood loss of more than (>) 1.5 litres within (≤) 24 hours of delivery. Delivery includes both the vaginal and abdominal routes.
Criteria	:	**Inclusion**: 1. All deliveries within the facility - Both vaginal and abdominal routes. **Exclusion**: 1. Adherent Placenta (e.g., Accreta/ Increta/ Percreta). 2. Placenta Previa. 3. Abruption Placenta. 4. Patients delivered outside of the facility.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with massive primary PPH in the hospital
Denominator	:	Total number of deliveries in the hospital
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 0.75%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Labour Ward/ High Dependency Ward (HDW). 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes / delivery record book/ massive PPH census. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting(OBB) indicator.

Discipline	:	**Obstetrics and Gynaecology**
Indicator 3	:	**Percentage of patients with unrecognised intraoperative ureteric injury during benign gynaecological surgery**
Dimension of Quality	:	Safety
Rationale	:	1. Patient safety is the important emphasis in delivering medical care in MOH hospital. However, complications during surgery do occur but failure to recognise the complication is unacceptable. 2. In gynaecological surgery, ureteric injury is a recognisable complication; it is the responsibility of surgeon to recognise it during surgery whereby primary repair can be arranged. 3. To ensure competency and adherence to safety in performing hysterectomy for benign gynaecological conditions.
Definition of Terms	:	**Ureteric injury**: Any type of ureteric injury. **Benign gynaecological surgery**: Hysterectomy for benign gynaecological condition. **Failure to recognise ureteric injury**: Ureteric injury undiagnosed during surgery.
Criteria	:	**Inclusion**: 1. All patients who underwent hysterectomy for benign gynaecological condition. **Exclusion**: NA
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with unrecognised intraoperative ureteric injury
Denominator	:	Total number of patients with hysterectomy done for benign gynaecological condition
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 1.5%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Obstetrics and Gynaecology wards. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes / OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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OPHTHALMOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1a	**Percentage of patients with waiting time of ≤ 60 minutes to see the healthcare worker at Ophthalmology Outpatient Clinic (Two or more registration areas involved)**	Timeliness	≥ 80%
1b	**Percentage of patients with waiting time of ≤ 90 minutes to see the healthcare worker at Ophthalmology Outpatient Clinic (Only one registration area involved)**	Timeliness	≥ 90%
2	**Percentage of eyes without ocular co-morbidity which achieved Best Corrected Visual Acuity (BCVA) of 6/12 or better within (≤) 3 months following cataract surgery**	Effectiveness	≥ 90%
3	Percentage of patients developed Infectious Endophthalmitis following cataract surgery	Safety	≤ 0.2%

Indicator 1

*Either indicator 1a **OR** 1b is to be reported, based on how many registration counters are involved.

- **Two or more registration areas are involved:** If registration of patient is first done at hospital's main outpatient/ ACC complex registration counter with payment collection, following which the patient needs to re-register at the respective clinical department counter - Refer **Indicator 1a**.
- **Only one registration area is involved:** If registration of patient with payment collection is either done **ONLY** at clinical department counter **OR** it is done **ONLY** at hospital's main outpatient/ ACC complex registration counter with no further re-registration required at the clinical department counter - Refer **Indicator 1b**.

Discipline	:	**Ophthalmology**
Indicator 1a	:	**Percentage of patients with waiting time of ≤ 60 minutes to see the healthcare worker at Ophthalmology Outpatient Clinic (Two or more registration areas involved)**
Dimension of Quality	:	Timeliness
Rationale	:	1. MOH aims for waiting time to see the doctor at outpatient services to be less than 90 minutes in line with patient centred services. Waiting time is time patient first registers in the hospital till the time patient is seen by doctor. (Reference: Director-General of Health Malaysia Circular No. 6/2004) 2. The waiting time is based on patient's experience from the time patient first registers at the first counter in the hospital till seen by doctor. In view of many counters are involved in some hospitals/ departments, some clinical departments have opted for monitoring of registration from department counter as any process prior to that appears out of the clinical department's control. Thus, due to involvement of 2 or more counters within the hospital, for monitoring of clinical services KPI, the target of waiting time is for less than 60 minutes within the department. This is applicable only if patient is being registered at another counter within the same hospital (e.g., at hospital's main outpatient/ ACC complex registration counter) prior to the clinical department counter. 3. For hospital to eliminate or reduce waiting time, it is important to balance between the demand for appointments and the supply of appointments. One needs to identify opportunities for improvement by strengthening policy of outpatient service in hospital, applying Queuing Theory and having contingency plans.
Definition of Terms	:	If registration of patient is first done at hospital's main outpatient/ ACC complex registration counter with payment collection, following that patient needs to re-register at respective clinical department counter (Two or more registration areas involved): **Waiting time**: Time of registration counter at department counter or time of appointment given to patient (whichever is later) **until the time the patient is first seen by the healthcare worker who performs Ophthalmology related assessment (excluding vision taking for patients aged ≥7 years and above) to the patient.** For patients aged **<7 years and below**, vision taking is included as Ophthalmology related assessment. **Healthcare worker**: Any member of the Ophthalmology Team (Paramedic,

		Optometrist, Medical Officer or Ophthalmologist) who are privileged to perform the assessment.
Criteria	:	**Inclusion**: 1. All outpatients of Ophthalmology Outpatient Clinic. **Exclusion**: 1. Patients who come without an appointment ("walk-in" patients). 2. Patients that need to do non-ophthalmological procedures on the same day before seeing the doctors (e.g., blood taking and imaging). **Sampling**: **1 clinic day in a month** need to be selected for data collection. Hospital/ department to ensure randomised sampling of data by ensuring each clinic day of the week is included to ensure proper representation of yearly data.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of sampled patients with waiting time of ≤ 60 minutes to see the healthcare worker at Ophthalmology Outpatient Clinic
Denominator	:	Total sample of patients seen by the healthcare worker at the Ophthalmology Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in Ophthalmology Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book/ waiting time slip. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Ophthalmology**
Indicator 1b	:	**Percentage of patients with waiting time of ≤ 90 minutes to see the healthcare worker at Ophthalmology Outpatient Clinic (Only one registration area involved)**
Dimension of Quality	:	Timeliness
Rationale	:	1. MOH aims for waiting time to see the doctor at outpatient services to be less than 90 minutes in line with patient centred services. Waiting time is time patient first registers in the hospital till the time patient is seen by doctor. (Reference: Director-General of Health Malaysia Circular No. 6/2004) 2. The waiting time is based on patient's experience from the time patient first registers at the first counter in the hospital till seen by doctor. In view of many counters are involved in some hospitals/ departments, some clinical departments have opted for monitoring of registration from department counter as any process prior to that appears out of the clinical department's control. Thus, due to involvement of 2 or more counters within the hospital, for monitoring of clinical services KPI, the target of waiting time is for less than 60 minutes within the department. This is applicable only if patient is being registered at another counter within the same hospital (e.g., at hospital's main outpatient/ ACC complex registration counter) prior to the clinical department counter. 3. For hospital to eliminate or reduce waiting time, it is important to balance between the demand for appointments and the supply of appointments. One needs to identify opportunities for improvement by strengthening policy of outpatient service in hospital, applying Queuing Theory and having contingency plans.
Definition of Terms	:	If registration of patient with payment collection is done only at clinical department counter: **Waiting time**: Time of registration counter at department counter or time of appointment given to patient (whichever is later) till the time the patient is first seen by the healthcare worker who performed Ophthalmology related assessment (excluding vision taking) for the patient. If the registration is done only at hospital's main outpatient/ ACC complex registration counter with no re-registration at clinical department counter: **Waiting time**: Time of registration counter at hospital's main outpatient/ ACC complex registration counter or time of appointment given to patient (whichever is later) until **the time the patient is first seen by the healthcare worker who performs Ophthalmology related assessment (excluding vision taking for patients aged ≥7 years and above) to the patient.** For patients aged **<7 years and below,** vision taking is included as Ophthalmology related assessment. **Healthcare worker**: Any member of the Ophthalmology Team (Paramedic, Optometrist, Medical Officer or Ophthalmologist) who are privileged to perform the assessment.

Criteria	:	**Inclusion**: 1. All outpatients of Ophthalmology Outpatient Clinic. **Exclusion**: 1. Patients who come without an appointment ("walk-in" patients). 2. Patients that need to do non-ophthalmological procedures on the same day before seeing the doctors (e.g., blood taking and imaging). **Sampling**: **1 clinic day in a month** need to be selected for data collection. Hospital/ department to ensure randomised sampling of data by ensuring each clinic day of the week is included to ensure proper representation of yearly data.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of sampled patients with waiting time of ≤ 90 minutes to see the healthcare worker at Ophthalmology Outpatient Clinic
Denominator	:	Total sample of patients seen by the healthcare worker at the Ophthalmology Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in Ophthalmology Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book/ waiting time slip. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Ophthalmology**
Indicator 2	:	**Percentage of eyes without ocular co-morbidity which achieve Best Corrected Visual Acuity (BCVA) of 6/12 or better within (≤) three months following Cataract Surgery**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Cataract is a preventable blindness. 2. Cataract surgery is indicated to improve the quality of life. Therefore, by measuring this indicator, we can monitor the quality of service given. 3. Late presentation during the COVID-19 pandemic has caused an increased in incidence of intra-operative complications and unfavourable visual outcomes. Monitoring this indicator helps evaluate the impact of the pandemic on cataract surgical services.
Definition of Terms	:	**Ocular co-morbidity:** As defined in the Data Definition Document and available as Ocular Co-Morbidity variables in the Pre-Clerking form of Cataract Surgery Registry (CSR). *** Reference:** National Eye Database (NED) (macr.org.my) **Best Corrected Visual Acuity (BCVA):** Visual Acuity obtained from refraction.
Criteria	:	**Inclusion:** 1. All cataract surgeries done in the department **Exclusion:** 1. Surgeries with ocular co-morbidity 2. Patients who defaulted follow-up for refraction 3. Hospital Tunku Azizah, Kuala Lumpur & Hospital Wanita & Kanak-kanak Sabah, Likas
Type of indicator	:	Rate-based outcome indicator
Numerator	:	**Number of eyes** without ocular co-morbidity achieving BCVA of 6/12 or better within (≤) 3 months following cataract surgery
Denominator	:	**Total number of eyes** without ocular co-morbidity operated within the same month
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Ophthalmology Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from National Eye Database. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.

Remarks	:	Data collection to be done by 3 months retrospective cohort of data. E.g., for January 2024, it will be patients who had cataract surgery done in October 2023; as patient needs to be reviewed during the next TCA to follow up on visual acuity. *This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Ophthalmology**
Indicator 3	:	**Percentage of patients developed Infectious Endophthalmitis following cataract surgery**
Dimension of Quality	:	Safety
Rationale	:	1. Infectious Endophthalmitis is a rare but devastating complication after cataract surgery which may lead to permanent blindness. Morbidity associated with post-operative Infectious Endophthalmitis can be substantial and is related not only to acute process but also to late sequelae. 2. The causes can be multifactorial from patient to surgical environmental factors (contamination of sterilized instruments, disposable supplies, theatre environment, etc. 3. Monitoring of this KPI is mandatory to ensure safety of the service. Reference: • NED report (2018). • Royal College of Ophthalmology Guideline: RCOph(2016).
Definition of Terms	:	**Infectious Endophthalmitis**: Infection involving both the anterior and posterior segments of the eye after cataract surgery. A patient post cataract can develop Infectious Endophthalmitis any time after the cataract surgery.
Criteria	:	**Inclusion:** 1. All elective cataract surgeries. **Exclusion:** 1. All emergency and semi-emergency cataract surgeries.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients developed Infectious Endophthalmitis following cataract surgery
Denominator	:	Total number of patients underwent cataract surgery during the specified period
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 0.2%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Ophthalmology Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from National Eye Database. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	This is a yearly data. However, PVF need to be sent 6 monthly for monitoring purposes. Therefore, SIQ will not be issued based on 6 monthly data. The incidence of Infectious Endophthalmitis is monitored by grouping patients in 6 months, based on their date of cataract surgery. E.g., for January-June 2024 (6 monthly data), it will be all patients that underwent cataract surgery in January-June 2024. The outcome of Infectious Endophthalmitis being a sentinel event will be captured as numerator. *This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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ORTHOPAEDIC			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of patients with waiting time of less than (≤) 75 minutes to see doctor in Orthopaedic Outpatient Clinic after completion of pre-planned procedure	Timeliness	≥ 90%
2	Percentage of patients with surgical site infection following clean elective orthopaedic surgery	Safety	**≤ 1%**
3	Percentage of unacceptable internal fixations of fracture requiring revision	Effectiveness	**≤ 1%**
4	Percentage of post primary total knee replacement patient with length of stay in hospital of ≤ 5 working days	Effectiveness	≥ 80%
5	Post-operative sepsis rate in Orthopaedic	Safety	≤2%

Discipline	:	**Orthopaedic**
Indicator 1	:	**Percentage of patients with waiting time of less than (≤) 75 minutes to see doctor in Orthopaedic Outpatient Clinic after completion of pre-planned procedure**
Dimension of Quality	:	Timeliness
Rationale	:	1. Patient-centred services must be given priority to prompt attention to patient's needs by reducing waiting times for consultation. 2. It is the aim of the MOH to reduce the waiting times to a minimum in line with the Circular of the Director-General of Health Malaysia No. 6/2004 – Steps to Reduce the Waiting Time in MOH Facilities. 3. For hospitals to eliminate or reduce waiting time, it is important to balance between the demand for appointments and the supply of appointments. One needs to identify opportunities for improvement by strengthening the policy of outpatient services in hospital, apply Queuing Theory and having contingency plans.
Definition of Terms	:	**Waiting time**: Time of registration counter at department counter/ time of appointment given to patient/ time of completion of required pre-planned procedure (whichever is later) till the time the patient is first seen by the doctor, which is beginning of a consultation. **Pre-planned procedure**: Whereby the following are required prior to consultation: • Imaging procedure. • Cast removal. • Blood investigation. • Other relevant procedures.
Criteria	:	**Inclusion**: 1. All outpatients of Orthopaedic Outpatient Clinic. **Exclusion**: 1. Patients who come without an appointment ("walk-in" patients). **Sampling**: Using an average of total patients seen in a month, 30% of the patients in each month need to be sampled for this indicator. For example, in a case of 22 clinic days per month, 7 clinic days in a month need to be selected for data collection. Hospital/ department to ensure randomised sampling of data by ensuring each clinic day of the week is included to ensure proper representation of data.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of sampled patients with waiting time of ≤ 75 minutes to see the doctor at the Orthopaedic Outpatient Clinic after completion of pre-planned procedure
Denominator	:	Total sample of patients seen by the doctor at the Orthopaedic Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Orthopaedic Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit.

		3. **How to collect**: Data is suggested to be collected from patient's case notes/ appointment record book/ waiting time slip. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Orthopaedic**
Indicator 2	:	**Percentage of patients with surgical site infection following clean elective orthopaedic surgery**
Dimension of Quality	:	Safety
Rationale	:	1. Surgical site infection is multi-factorial. The surgeon has a role in its prevention. Attention to details that includes pre-operative preparation, intra-operative soft tissue handling and post-operative wound care. Surgical site infection would be a reflection of such care. 2. Infection of surgical wounds is a significant nosocomial infection problem in hospitals, which in turn is an important issue in patient safety. Timely investigation of higher than expected rates of infection may identify issues relating to preventative factors for corrective action.
Definition of Terms	:	**Elective surgery**: Planned, scheduled, and well prepared patient. **Clean surgery**: Surgery in patients with no prior laceration wound at the surgical site or presence of wound/ sore/ infection in the body, or presence of acute severe soft tissue injury. **Surgical site infection (SSI):** Includes both the superficial and deep infection (Centres of Disease Control and Prevention guideline). The cut-off point to be considered SSI is 3 months post-surgery. Therefore, all the clean elective operative patients must be seen/ reviewed at around 3 months post-op. **Centres of Disease Control and Prevention (CDC); Definitions of surgical site infection (SSI):** 1. **Superficial infection**: Involves only the skin and subcutaneous tissue of the incision AND the patient has at least one of the following: a. Purulent drainage from the superficial incision. b. Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision. c. At least one of the following signs or symptoms of infection (pain or tenderness, localized swelling, redness or heat). d. Superficial incision is deliberately opened by surgeon, unless incision is culture-negative. e. Diagnosis of superficial incisional SSI by the surgeon or attending physician. 2. **Deep infection:** Infection involved deep soft tissues (e.g., fascia and muscle layers) of the incision AND the patient has at least one of the following: a. Purulent drainage from the deep incision but not from the organ/ space component of the surgical site. b. A deep incision spontaneously dehisces or is deliberately opened by a surgeon when the patient has at least one of the following signs or symptoms (unless incision is culture-negative): i. Fever (>38^{0}C). ii. Localized pain or tenderness. iii. An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathological or radiological examination.

		iv. Diagnosis of deep incisional surgical site infection by a surgeon or attending physician. ****Note:** • Do not count stitch abscesses (minimal inflammation and discharge confined to the points of suture penetration), or a localized stab wound infection as a surgical site infection. • If the incisional site infection involves or extends into the fascia and muscle layers; report as a deep incisional SSI. • An infection that involves both the superficial and deep incision sites should be classified as a deep incisional surgical site infection.
Criteria	:	**Inclusion:** 1. All patients who underwent clean elective orthopaedic surgery. This includes: • Arthroplasty. • Arthroscopic surgery. • Spine surgery. • Deformity correction. • Non-union. • Delayed union. **Exclusion:** 1. All emergency and semi-emergency surgeries. 2. External fixation.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with surgical site infection in clean elective orthopaedic surgery
Denominator	:	Total number of patients underwent clean elective orthopaedic surgery
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	**≤ 1%**
Data Collection & Verification	:	1. **Where**: Data will be collected in the Orthopaedic Outpatient Clinic/ Orthopaedic wards/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book/ wound slip. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 4 months retrospective cohort of data. E.g., for May 2024, it will be patients who had operation done in January 2024; as patient needs to be reviewed during the next TCA to obtain information on surgical site infection.

Discipline	:	**Orthopaedic**
Indicator 3	:	**Percentage of unacceptable internal fixations of fracture requiring revision**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Suboptimal fracture fixations delay/ prevent early recovery of patient. Increases morbidity and mortality, cost, and contribute to resource wastage. 2. Re-surgery also increases risk of nosocomial infection and length of hospital stay.
Definition of Terms	:	**Internal fixation**: Any form of device to hold the bone fragments internally, includes any form of plate, nail, screw or wire buried under the skin. The number used in this indicator is based on number of internal fixations of fracture done and not the number of patients (e.g., if a patient had an internal fixation of radius and ulna on the same forearm and also internal fixation of humerus; it is calculated as 3 fixations and not just 1). **Unacceptable**: Fixations that are considered to result in poor fracture reduction, this may refer to the bone or fixation device. This decision is made by the senior surgeon or Head of Department. **Revision**: Corrective surgery to redo the fracture alignment or device configuration in areas as stated in the inclusion criteria. This decision is made by the senior surgeon or Head of Department.
Criteria	:	**Inclusion:** 1. All long bone fractures; as in femur, tibia, fibula, humerus, radius and ulna. 2. All peri-articular fractures around shoulder, elbow, wrist, hip (neck of femur), knee and ankle. 3. All small bone fractures (including carpal, metacarpal, metatarsal and tarsal bone) in the hand or foot. **Exclusion:** 1. Pelvic and acetabulum fractures; scapula and glenoid fractures; and also spine injury. 2. All external fixations.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of unacceptable internal fixations of fracture requiring revision
Denominator	:	Total number of internal fixations of fracture performed
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	**≤ 1%**
Data Collection & Verification	:	1. **Where**: Data will be collected in the Orthopaedic wards/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ OT record book/ Internal Fixation record list. 4. **How frequent:** PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Orthopaedic**
Indicator 4	:	**Percentage of post primary total knee replacement patient with length of stay in hospital of ≤ 5 working days**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Knee replacement surgery (arthroplasty) involves replacing a damaged, worn or diseased knee with an artificial joint. 2. It's a routine operation for knee pain most commonly caused by arthritis.
Definition of Terms	:	**Primary total knee replacement:** A surgical procedure to replace both sides of the knee joint with artificial material. **Length of stay:** Time taken from Day 1 post operation to the time when the patient discharged home.
Criteria	:	**Inclusion**: 1. All non-complicated primary total knee replacement. **Exclusion**: 1. Bilateral total knee replacement. 2. Revision surgery. 3. Patients with length of stay more than 5 working days due to their co-morbidities not due to the knee replacement surgery.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of post primary total knee replacement patients with length of stay in hospital of ≤ 5 working days
Denominator	:	Total number of patients who underwent primary total knee replacement
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Orthopaedic wards/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ OT record book/ admission & discharge record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	This indicator is only applicable in facilities that perform total knee replacement surgeries. *This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Orthopaedic**
Indicator 5	:	**Post-operative sepsis rate in Orthopaedic**
Dimension of Quality	:	Safety
Rationale	:	Treating and caring for patient in a safe environment and protecting them from avoidable harm.
Definition of Terms	:	**Definition of Sepsis** (Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3) Guidelines: • Defined as life-threatening organ dysfunction caused by a dysregulated host response to an infection. Malaysian Registry of Intensive Care • Sepsis refers to documented infection with 2 out of 4 SIRS criteria • Temperature > 38.3°C or < than 36° • Total white cell count > 12000 or < 4000 • Heart rate > 90/min • Respiration rate > 20 breath/minute or PaCO2 < 32 mmHg Severe sepsis is sepsis with one of the following organ dysfunctions: • Hypotension: Systolic blood pressure < 90 mmHg or mean arterial pressure < 70 mmHg • PaO2/FiO2 ≤ 300 mmHg • Acute decrease in platelet count to < 100,000 u/L • Acute increase in total bilirubin to > 70umol/L • Acute increase serum creatinine to > 170umol/L or urine output < 0.5 mL/kg/hour > 2 hours • Serum lactate > 4 mmol/l **Post-operative period** is within one month post-surgery **Clean Elective Surgery**: Definition of clean elective surgery is pre plan or schedule surgery for orthopaedic cases which do not have any initial or previous wound or sign of infection.
Criteria	:	**Inclusion:** 1. Any (schedule or pre plan) clean elective surgery/ operation done under Orthopaedic Department **Exclusion:** 1. Pre-existing sepsis and pre-existing infection 2. Pre-existing immune compromised state (e.g.: Uncontrolled Diabetes Mellitus, Retroviral positive, Malignancy) 3. Pre-existing organ dysfunction (e.g.: Liver failure, ESRF, Peripheral vascular disease) 4. Patient 18 years old and below

		5. Poly-trauma patient 6. Revision fixation surgery 7. External fixation or K -Wire
Type of indicator		Rate - based outcome indicator
Numerator		Number of patients with post-operative sepsis after operation
Denominator		Total number of clean elective surgery
Formula		Numerator x 100% Denominator
Standard		≤ 2%
Data Collection & Verification		1. **Where:** Data will be collected from Orthopaedic Ward or ward that caterfor the problem. 2. **Who:** Data will be collected by the staff in-charge of the ward and submit to the Quality Unit of the hospital for compilation. 3. **How to collect:** Data will be collected from the patient's records or admission book. 4. **How frequent:** PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify:** PVF must be verified by the Head of Department,Head of Quality Unit and Hospital Director.
Remarks		This indicator is also being monitored under SDG

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OTORHINOLARYNGOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of ears with hearing improvement 3 months post myringoplasty	Effectiveness	≥ 70%
2	Incidence rate of primary post-tonsillectomy haemorrhage	Safety	≤ 3%

Discipline	:	**Otorhinolaryngology**
Indicator 1	:	**Percentage of ears with hearing improvement 3 months post myringoplasty**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Myringoplasty is not a complicated surgery, can be done by general ORL surgeons. It is a procedure that is performed in all ORL centres which allows comparison of services between different centres. 2. Outcome which is hearing improvement post-myringoplasty can be measured objectively by pure tone audiometry.
Definition of Terms	:	**Improvement of hearing:** It is the improvement 3 months post myringoplasty by a minimum of 5 dB at least one frequency by pure tone audiometry. Patient should be seen in ORL clinic within 3 to 6 months post myringoplasty to assess on hearing improvement. The number used in this indicator is based on number of ears with myringoplasty done and not the number of patients.
Criteria	:	**Inclusion**: 1. Patients of ≥ 18 years of age. **Exclusion**: 1. Revision surgery. 2. Total perforation. 3. Combine procedure (e.g., combined with mastoidectomy).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of ears with hearing improvement 3 months post myringoplasty
Denominator	:	Total number of ears with myringoplasty done
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 70%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Otorhinolaryngology Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book/ myringoplasty record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 6 months retrospective cohort of data. E.g., for July 2024, it will be patients who had myringoplasty in January 2024.

Discipline	:	**Otorhinolaryngology**
Indicator 2	:	**Incidence rate of primary post-tonsillectomy haemorrhage**
Dimension of Quality	:	Safety
Rationale	:	1. Tonsillectomy is one of the commonest otorhinolaryngology surgical procedures and can be conducted by the specialist as well as trained medical officers. It can potentially cause significant morbidity and mortality. 2. Internationally, the standard for primary post-tonsillectomy haemorrhage is less than 3%.
Definition of Terms	:	**Primary haemorrhage**: 1. Haemorrhage which occurs within 24 hours of surgery. 2. The haemorrhage shall be objectively identified clinically (e.g., active bleeding on the tonsillar bed).
Criteria	:	**Inclusion**: 1. All tonsillectomies performed. **Exclusion**: 1. Tonsillectomy done as part of other procedures (e.g., sleep apnoea surgery). 2. Bleeding due to patient's premorbid (e.g., bleeding disorder). 3. Secondary haemorrhage: bleeding after 24 hours of surgery.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of primary post-tonsillectomy haemorrhages
Denominator	:	Total number of tonsillectomies performed
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 3%
Data Collection & Verification	:	1. **Where**: Data will be collected in the ICU/ ENT Ward/ Multidisciplinary Ward/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book. 4. **How frequent**: Monthly data collection within department. PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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PAEDIATRIC SURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Incidence rate of anastomotic leak requiring surgical intervention	Safety	≤ 15%
2	Incidence rate of white/ normal appendix during appendicectomy	Safety	**≤ 3%**

Discipline	:	**Paediatric Surgery**
Indicator 2	:	**Incidence rate of anastomotic leak requiring surgical intervention**
Dimension of Quality	:	Safety
Rationale	:	1. Measures clinical competency and judgement of the respective surgeon. 2. The aim is for reduction in anastomotic leak which in return minimizes morbidity and mortality.
Definition of Terms	:	**Anastomosis**: All anastomosis of gastrointestinal tract and biliary tract operations. **Leak**: It is a leak that requires surgical intervention/ reoperation within 30 days.
Criteria	:	**Inclusion**: 1. All patients who underwent anastomosis and suture of gastrointestinal and biliary tract operations inclusive of neonate. 2. Both elective and emergency operations. **Exclusion**: 1. Anastomosis done in babies' weight less than 2 kg. 2. Genitourinary tract anastomosis.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with anastomotic leak requiring surgical intervention after undergoing anastomosis of gastrointestinal and biliary tract operations
Denominator	:	Total number of patients underwent anastomosis of gastrointestinal and biliary tract operations
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 15%
Data Collection & Verification	:	1. **Where**: Data will be collected in OT/ ICU/ CCU/ CRW/ NICU or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 1 month retrospective cohort of data. E.g., for April 2024, it will be patients that underwent anastomosis of gastrointestinal and biliary tract operations in March 2024; in view of one month period where these patients can present with anastomotic leak.

Discipline	:	**Paediatric Surgery**
Indicator 3	:	**Incidence rate of white/ normal appendix during appendicectomy**
Dimension of Quality	:	Safety
Rationale	:	1. To prevent unnecessary appendicectomy in children. 2. To avoid wastages of consumables and human resources. 3. Incidence of white/ normal appendix is quoted to be 5-10% internationally.
Definition of Terms	:	**White or normal appendix**: It is appendix that looked normal at surgery. It must also be supported by histological (HPE) findings.
Criteria	:	**Inclusion**: 1. All appendicectomies done by Paediatric Surgery Department/ Unit. **Exclusion**: 1. Incidental appendicectomy. 2. Detection of other pathologies that required surgery (e.g., torsion of ovary, perforated Meckel diverticulum).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of white/ normal appendix during appendicectomy
Denominator	:	Total number of appendicectomy performed
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	**≤ 3%**
Data Collection & Verification	:	1. **Where**: Data will be collected in OT/ ICU/ CCU/ CRW/ NICU/ Paediatric Surgery Outpatient Clinic or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book. Histopathological reports of all patients are collected and reviewed to verify the results. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 3 months retrospective cohort of data. E.g., for April 2024, it will be patients operated in January 2024; to allow time for reviewing HPE results.

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PLASTIC & RECONSTRUCTIVE SURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	The rate of cleft lip and/or palate patientwho completed primary repair by 24 months of age.	Customer centeredness & Timeliness	≥ 80%
2	The rate of complete excision of cutaneous Basal Cell carcinoma (BCC) and Squamous Cell carcinoma (SCC)	Effectiveness	≥ 90%
3	Percentage of post-palatoplasty haemorrhage patients reintubated and/ or returned to operating theatre within (≤) 24 hours of primary palate repair	Safety	≤ 5%
4	Percentage of Full Thickness Skin Graft (FTSG) with ≥ 80% graft take following elective surgery	Effectiveness	≥ 90%

Discipline	:	**Plastic and Reconstructive Surgery**
Indicator 1	:	**The rate of cleft lip and/or palate patient who completed primary repair by 24 months of age.**
Dimension of Quality	:	Customer centeredness & Timeliness
Rationale	:	Primary repair of cleft lip and/or palate is a time-based surgery as it is a protocol driven management by the multidisciplinary team who has to do their part of management following the primary surgery.
Definition of Terms	:	Time taken to complete the primary repair of cleft lip and/or palate by 24 months of age. a) Rate of Primary Lip repair by 24 months of age (for all types of Cleft lip) b) Rate of Primary Palate repair by 24 months of age (for all types of cleft palate) c) Rate of Primary Lip and Palate repair by 24 months of age (for all types of cleft lip and palate)
Criteria	:	**Inclusion criteria:** 1. All cleft lip and/or palate 2. Syndromic with Severity of illness (SOI) 1 **Exclusion criteria:** 1. Parents/caretaker who request to defer surgery. 2. Default follow-up / appointment 3. Surgery cancelled by managing team 3 or more consecutive times due to medical reason. 4. Syndromic with SOI 2 and 3. 5. Non syndromic with associated congenital heart disease or any majororgan involvement. 6. Delay in referral to complete one surgery for patient who presented at more than 18 months of age. 7. Delay in referral to complete 2 surgeries for patient who presented at more than 12 months of age. 8. Lip adhesion procedure done prior to primary repair. 9. Any other reasons that may affect the elective admission and surgical procedures (e.g., recurrent URTI, etc.)
Type of indicator	:	Rate-based process indicator
Numerator	:	Total number of primary repair cleft lip and/or palate done by 24 months of age.
Denominator	:	Total number of patients with cleft registered in the clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Plastic Surgery Outpatient Clinic/ Plastic SOPD. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ clinic registry/OT registry.

		4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify:** PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	For complete cleft lip and palate cases, it will only count as numerator if both lip and palate are repaired by 24 months of age. (i.e., numerator belongs to the later hospital should the primary lip repair was done elsewhere) Data collection to be done by 2 years retrospective cohort of data. E.g., for Jan-June 2024, it will be patient first registered in the outpatient clinic in Jan-June 2022; to allow time from patient registered in the clinic until repair is done.

Discipline	:	**Plastic and Reconstructive Surgery**
Indicator 2	:	**The rate of complete excision of cutaneous Basal Cell carcinoma (BCC) and Squamous Cell carcinoma (SCC)**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Complete surgical excision is important in reducing risk of recurrence. 2. Incomplete excision may necessitate further surgery.
Definition of Terms	:	Complete excision: Excision with clear surgical margins based on histopathological examination (HPE) report.
Criteria	:	**Inclusion**: 1. All cases of BCC and SCC involving skin. **Exclusion**: 1. Locally advanced tumour. 2. Excision involving the edge of an anatomy involved such as eyelid margin, alar margin or lip vermilion that may be reported as margins involved.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of complete excisions of BCC and SCC
Denominator	:	Total number of BCC and SCC excised
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in Plastic Surgery Outpatient Clinic/ Plastic SOPD/ ward/ OT. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from OT registry/ Histopathological examination (HPE) 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Plastic and Reconstructive Surgery**
Indicator 3	:	**Percentage of post-palatoplasty haemorrhage patients reintubated and/ or returned to operating theatre within (≤) 24 hours of primary palate repair**
Dimension of Quality	:	Safety
Rationale	:	1. Primary haemorrhage is a known complication of palate repair and it is a surgical emergency. 2. Post-palatoplasty haemorrhage is a reflection of competency of the surgeon.
Definition of Terms	:	NA
Criteria	:	**Inclusion**: 1. All patients undergoing primary cleft palate repair. **Exclusion**: 1. Patients of > 12 years of age. 2. Patients with blood dyscrasia.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of post-palatoplasty haemorrhage patients reintubated and/ or returned to operating theatre within (≤) 24 hours of primary palate repair
Denominator	:	Total number of patients underwent primary palate repair
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 5%
Data Collection & Verification	:	1. **Where**: Data will be collected in Plastic and Reconstructive Surgery Ward or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Plastic and Reconstructive Surgery**
Indicator 4	:	**Percentage of Full Thickness Skin Graft (FTSG) with ≥ 80% graft take following elective surgery**
Dimension of Quality	:	Effectiveness
Rationale	:	1. It is an essential component of the reconstructive surgeon. 2. Full Thickness Skin Graft (FTSG) is technically a tedious procedure. It requires a well vascularised wound bed to support the grafted skin. 3. A wrongassessment by the surgeon, poor technique and poor postoperative care will lead to failure of the graft take.
Definition of Terms	:	**Graft take**: Refers to a process where the grafted skin adhere to the wound bed, revascularisation and remodelling of the healed skin graft. This process takes place in phases (e.g., adherence and imbibition (in the first 48 hours), revascularisation or neovascularisation (around day 4) and remodelling (12 to 18 months)). The crucial period of the process is the first 2 weeks that risks graft failure. Reasons for skin graft failure include hematoma, infection, seroma, shear, inappropriate wound bed and error in placement. FTSG can be done as inpatient or outpatient procedure depending on the requirement for types of anaesthesia, size of graft and other clinical requirement. Upon discharge patients are required to attend outpatient review. The first inspection of the graft is usually done one week after the procedure. Tie over or compressive dressing is usually applied onto the graft to avoid hematoma or shearing and to allow the revascularisation process to take place. Subsequent outpatient visit will be given from 3 to 7 days interval. A documentation of the percentage of graft take will be documented during these visits. The operating surgeon has to document if the graft has completely healed and does not require any further dressing.
Criteria	:	**Inclusion**: 1. All patients undergoing FTSG following elective surgery. **Exclusion**: 1. Patients with known skin disease. 2. Patients who defaulted appointment.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of FTSG with ≥ 80% graft take following elective surgery
Denominator	:	Total number of FTSG performed by elective surgery
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in Plastic Surgery Outpatient Clinic/ Plastic SOPD/ ward/ OT. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book/ FTSG record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital.

		5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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UPPER GASTROINTESTINAL SURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of patients with clear surgical margin post resection of Gastric Tumour performed with curative intent	Effectiveness	≥ 90%
2	Incidence rate of oesophageal anastomotic leak requiring surgical intervention	Safety	≤ 10%
3	Percentage of patients with Gastric Adenocarcinoma who underwent curative surgical resection (RO) where ≥ 15 lymph nodes are resected and pathologically examined	Effectiveness	≥ 90%
4	Percentage of patients with Oesophageal or Gastric Tumour operated within (≤) 2 weeks after achieving pre-operative optimization	Customer centeredness	≥ 80%

Discipline	:	**Upper Gastrointestinal Surgery**
Indicator 1	:	**Percentage of patients with clear surgical margin post resection of Gastric Tumour performed with curative intent**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Tumour involvement of surgical resection margins is a negative prognostic factor. 2. Curative cancer surgery (RO) should aim to ensure complete excision of the tumour, as this affects the prognosis and long-term patient outcome.
Definition of Terms	:	**Clear surgical margins:** Complete excision of the tumour with clear margins. Margins include proximal and distal margins. HPE of tissue needs to be reviewed within 1 month by the operating team to confirm on clear surgical margins.
Criteria	:	**Inclusion:** 1. All Gastric Tumour surgery performed with curative intent. 2. Inclusive of cases post neo-adjuvant therapy. **Exclusion:** 1. All palliative Gastric Tumour surgery.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with clear surgical margin post resection of Gastric Tumour performed with curative intent
Denominator	:	Total number of patients who underwent resection of Gastric Tumour with curative intent
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in wards that cater for the above condition/ clinic/ OT. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book/ HPE results. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 1 month retrospective cohort of data. E.g., for April 2024, it will be patients operated in March 2024; to allow time for reviewing HPE results to verify margin clearance.

Discipline	:	**Upper Gastrointestinal Surgery**
Indicator 2	:	**Incidence rate of oesophageal anastomotic leak requiring surgical intervention**
Dimension of Quality	:	Safety
Rationale	:	1. Preoperative preparation for any major oesophageal surgery is important for a positive clinical outcome. 2. Improvement in preoperative general condition, stabilization of co-morbidities and proper patient selection are pertinent to improved clinical outcome.
Definition of Terms	:	**Oesophageal anastomosis leak**: It is a leak that requires surgical intervention/ reoperation within 30 days.
Criteria	:	**Inclusion:** 1. All patients who undergo elective oesophago-gastric surgery for benign or malignant disease either conventional or thoracoscopic assisted surgery (inclusive of 2 or 3 stage oesophagectomy and any bowel interposition to the remnant to the oesophagus). **Exclusion:** 1. Emergency oesophago-gastric surgery.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with oesophageal anastomotic leak requiring surgical intervention after undergoing elective oesophago-gastric surgery
Denominator	:	Total number of patients underwent elective oesophago-gastric surgery
Formula	:	Numerator x 100% Denominator
Standard	:	≤ 10%
Data Collection & Verification	:	1. **Where**: Data will be collected in wards that cater for the above condition/ clinic/ OT. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 1 month retrospective cohort of data. E.g., for April 2024, it will be patients who underwent elective oesophago-gastric surgery in March 2024; in view of one month period where patient can present with oesophageal anastomotic leak.

Discipline	:	**Upper Gastrointestinal Surgery**
Indicator 3	:	**Percentage of patients with Gastric Adenocarcinoma who underwent curative surgical resection (RO) where ≥ 15 lymph nodes are resected and pathologically examined**
Dimension of Quality	:	Effectiveness
Rationale	:	Maximizing the number of lymph nodes resected and analysed enables reliable staging, which influences treatment decision making.
Definition of Terms	:	**Curative surgical resection (RO)**: Curative gastrectomy should be done with intention of harvesting both tier one and tier two lymph nodes for adequate clearance and appropriate histological staging of degree of lymph node metastases.
Criteria	:	**Inclusion:** 1. All patients who undergo gastric surgery with curative intent (RO) for Gastric Adenocarcinoma. **Exclusion:** 1. Palliative gastrectomy. 2. Neo-adjuvant chemo/ radiotherapy provided (will affect yield).
Type of indicator	:	Rate-based output indicator
Numerator	:	Number of patients with Gastric Adenocarcinoma who undergo curative surgical resection (RO) where ≥ 15 lymph nodes are resected and pathologically examined
Denominator	:	Total number of patients with Gastric Adenocarcinoma who underwent curative surgical resection (RO)
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in wards that cater for the above condition/ clinic/ OT. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Upper Gastrointestinal Surgery**
Indicator 4	:	**Percentage of patients with Oesophageal or Gastric Tumour operated within (≤) 2 weeks after achieving pre-operative optimization**
Dimension of Quality	:	Customer centeredness
Rationale	:	1. Surgical resection is the only means of cure for patients with Oesophageal and Gastric Cancer. 2. Time to surgery is important to avoid unnecessary delays which would result in tumour progression and poor outcomes.
Definition of Terms	:	**Pre-operative optimization**: It involves a multi-disciplinary approach where patient's comorbidities are optimized, nutritional issues addressed, and pre-operative neo-adjuvant therapy if deemed necessary by the oncologist are completed. The patient is then considered 'optimized' and should be operated within 2 weeks. **2 weeks**: 14 days (irrespective working or non-working days).
Criteria	:	**Inclusion:** 1. All patients who are optimised for curative surgery. **Exclusion:** 1. All patients who are deemed incurable/ palliative. 2. Patients who defaulted. 3. Patients who request to delay the given surgery date that was within 2 weeks.
Type of indicator	:	Rate-based output indicator
Numerator	:	Number of patients with Oesophageal or Gastric Tumour who are operated within (≤) 2 weeks after pre-operative optimization
Denominator	:	Total number of patients with Oesophageal or Gastric Tumour who are operated after pre-operative optimization
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in wards that cater for the above condition/ OT. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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UROLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of ureters that were stone free following ureterorenoscopy (URS) lithotripsy	Effectiveness	≥ 90%
2	Percentage of safe percutaneous nephrolithotripsy (PCNL)	Safety	**≥ 85%**
3	Percentage of safe transurethral resection of the prostate (TURP)	Safety	≥ 90%

Discipline	:	**Urology**
Indicator 1	:	**Percentage of ureters that were stone free following ureterorenoscopy (URS) lithotripsy**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Endo-urological or minimally invasive urological procedures form the bulk of present-day urological practice. 2. Ureterorenoscopy (URS) with ureteric stone lithotripsy is the commonest endourological procedure performed. 3. As Urolithiasis forms 60-70% of urological practice in Malaysia, the stone clearance rate after the performance of this procedure is an accurate reflection of clinical effectiveness of Urology care.
Definition of Terms	:	**Ureteric stone**: Any stone in the proximal, middle or distal ureter. **Lithotripsy**: Fragmentation of stone using intracorporeal device of either Holmium Laser or Swiss Lithoclast. The number used in this indicator is based on number of ureters underwent URS lithotripsy done and not the number of patients. **Stone free**: Complete absence of any visible stone fragments along the ureter or in the ipsilateral kidney (retropulsed stone fragments) as seen in the immediate post op KUB X-ray.
Criteria	:	**Inclusion**: 1. All radiopaque ureteric stone regardless of stone size and location. Radiopaque means the stone can be seen on plain KUB X-ray (90% of all stones are radiopaque). 2. More than 1 stone in the ureter and bilateral ureteric stones are included if decision was made before the operation to treat them at the same setting. **Exclusion**: 1. All radiolucent stone (unable to visualize on a plain KUB X-ray). 2. Cancellation of procedure due to anaesthesia reasons, intraoperative instability due to underlying medical conditions or patients developing urosepsis.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of ureters that were stone free following URS lithotripsy for ureteric stone
Denominator	:	Total number of ureters underwent URS lithotripsy for ureteric stone
Formula	:	Numerator x 100 % Denominator
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Urology Ward/ OT or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book/ procedure book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Urology**
Indicator 2	:	**Percentage of safe percutaneous nephrolithotripsy (PCNL)**
Dimension of Quality	:	Safety
Rationale	:	1. Endo-urological or minimally invasive urological procedures form the bulk of present-day urological practice. 2. Percutaneous nephrolithotripsy (PCNL) is the major urological procedure performed for the treatment of large or complex renal stones. 3. As Urolithiasis forms 60% - 70% of urological practice in Malaysia, the safe performance of this procedure is an accurate reflection of the quality of care in Urology.
Definition of Terms	:	**Safe percutaneous nephrolithotripsy (PCNL)**: Absence of either one or more of the following complications: • Septicaemia. • Bleeding requiring transfusion of more than 2 units of blood intraoperatively. • Injury to adjacent organ (e.g., lung, bowel). • Wound infection. • Unplanned admission to ICU.
Criteria	:	**Inclusion**: 1. All renal stones regardless of size and location. Full staghorn calculi are also included. **Exclusion**: NA
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of safe PCNL cases performed
Denominator	:	Total number of PCNL performed
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	**≥ 85%**
Data Collection & Verification	:	1. **Where**: Data will be collected in the Urology Ward/ OT or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book/ PCNL record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Urology**
Indicator 3	:	**Percentage of safe transurethral resection of the prostate (TURP)**
Dimension of Quality	:	Safety
Rationale	:	1. Transurethral resection of the prostate (TURP) is the gold standard surgical treatment for Benign Prostatic Hyperplasia (BPH). 2. BPH is predominantly treated by medication and surgery is reserved for severe symptomatic BPH, failure of medical management and in situations where there are complications of BPH such as urinary retention. 3. The safe manner in which TURP is performed is a reflection of the standard of Urological training. 4. It also indicates appropriate case selection and supervision.
Definition of Terms	:	**Safe transurethral resection of the prostate (TURP)**: Absence of either one or more of the following complications: • Post op length of stay greater than 5 days. • Bleeding requiring blood transfusion. • Return to OT during the same admission. • Perforation of the bladder. • TUR syndrome. • Septicaemia. • Unplanned admission to ICU.
Criteria	:	**Inclusion**: 1. All TURP performed on ASA I and II patients. **Exclusion**: NA
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of safe TURP cases performed
Denominator	:	Total number of TURP performed
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Urology Ward/ OT or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ OT record book/ TURP record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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VASCULAR SURGERY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Post-operative mortality rate for open repair of Abdominal Aortic Aneurysm (AAA)	Safety	≤ 5%
2	Percentage of access-related hand ischemia (ARHI) following native arterio-venous fistula (AVF) creation	Safety	≤ 0.5%

Discipline	:	**Vascular Surgery**
Indicator 1	:	**Post-operative mortality rate for open repair of Abdominal Aortic Aneurysm (AAA)**
Dimension of Quality	:	Safety
Rationale	:	1. Ruptured AAA carries a high morbidity with mortality rates as high as 80-90% in cases of free rupture. 2. Exclusion of AAA via open repair on the elective schedule lowers the mortality between 5-10% in patients without significant co-morbid medical problems.
Definition of Terms	:	**Abdominal Aortic Aneurysm (AAA)**: Dilatation of the abdominal aorta of more than 3 cm at its widest diameter. **Elective open repair**: Open AAA repair scheduled and performed on an elective operating list. **Semi-emergency open repair**: Open repair of AAA slotted in the next available list within same admission for symptomatic of impending leak of the AAA. **Post-operative mortality**: Mortality following an open repair of AAA within the same admission or within (≤) 30 days after surgery. Patients need to be seen in clinic around one month post-operative or followed up on the outcome via phone call with patient/ family member (if patient defaulted appointment).
Criteria	:	**Inclusion**: 1. All patients undergoing open repair for AAA as an elective or semi-emergency procedure. **Exclusion**: 1. Ruptured aneurysms. 2. Patients undergoing open repair for AAA as an emergency procedure. 3. Death after 30 days of operation.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of deaths following open repair of AAA
Denominator	:	Total number of patients underwent open repair of AAA
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 5%
Data Collection & Verification	:	1. **Where**: Data will be collected in surgical wards or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ OT list/ OT record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 2 months retrospective cohort of data. E.g., for April 2024, it will be patients who had operation done in February 2024; as patient needs to be followed up after the operation.

Discipline	:	**Vascular Surgery**
Indicator 2	:	**Percentage of access-related hand ischemia (ARHI) following native arterio-veous fistula (AVF) creation.**
Dimension of Quality	:	Safety
Rationale	:	1. A huge number of AVF's are performed due to the increasing incidence of Diabetes Mellitus, which is the most common cause of renal failure. 2. Dialysis-access induced limb ischemia is a known complication from AVF creation and this can lead to tissue loss or even limb loss. With careful selection of patients, this can be avoided. 3. Internationally, incidence of Ischaemic Steal Syndrome (ISS) is found to be ranging between 0.5 to 5 %. Monitoring of this indicator is important to ensure quality of care provided by MOH is in par with other countries. Reference: • Strategies for Predicting and Treating Access Induced Ischemic Steal Syndrome; Eur J Vasc Endovasc Surg 32, 309e315 (2006). • Steal in Hemodialysis Patients Depends on Type of Vascular AccessEur J Vasc Endovasc Surg 32, 710e717 (2006).
Definition of Terms	:	**Native AVF:** Arterio-Venous Fistula configuration from one of the following: • Radio-cephalic AVF. • Brachio-cephalic AVF. • Brachio-basilic AVF. **Access-related hand ischemia (ARHI):** Reduced perfusion to the ipsi-lateral upper limb within 30 days following AVF creation with significant signs and symptoms of Ischemia (grade 3). Patients need to be seen in clinic around one-month post-operative to follow up on the post-operative outcome.
Criteria	:	**Inclusion**: 1. All native AVF performed for haemodialysis vascular access. **Exclusion**: 1. Vascular access procedures performed using prosthetic grafts and catheters. 2. Vascular access procedures involving the lower limbs.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of ARHI within (≤) 30 days following native AVF creation.
Denominator	:	Total number of native AVF created
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 0.5%
Data Collection & Verification	:	1. **Where**: Data will be collected in surgical wards or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ OT list/ OT record book/ AVF record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital.

		5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 2 months retrospective cohort of data. E.g., for April 2024, it will be patients who had operation done in February 2024; as patient needs to be followed up after the operation.

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ANAESTHESIOLOGY (GENERAL)			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of patients on Acute Pain Service (APS) with pain score of (≤) 4 at rest within (≤) the first 24 hours after surgery	Effectiveness	**≥ 90%**
2	Ventilator care bundle (VCB) compliance rate	Safety	≥ 95%

Discipline	:	**Anaesthesiology (General)**
Indicator 1	:	**Percentage of patients on Acute Pain Service (APS) with pain score of (≤) 4 at rest within (≤) the first 24 hours after surgery**
Dimension of Quality	:	Effectiveness
Rationale	:	Post-operative patients in the wards sometimes do not have adequate pain relief despite being managed by the acute pain team.
Definition of Terms	:	**Acute Pain Service (APS):** It is a service provided by acute pain team for the post-operative patients. **Pain score**: Measures a patient's pain intensity using the MOH pain scale (zero to ten).
Criteria	:	**Inclusion**: 1. All post-operative patients received APS. **Exclusion**: 1. Day Care and ICU patients.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients on APS with pain score of ≤ 4 at rest within the first 24 hours after surgery
Denominator	:	Total number of patients on APS after surgery
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	**≥ 90%**
Data Collection & Verification	:	1. **Where**: Data will be collected in wards that cater for the above conditions. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ APS record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Anaesthesiology (General)**
Indicator 2	:	**Ventilator care bundle (VCB) compliance rate**
Dimension of Quality	:	Safety
Rationale	:	1. Ventilator care bundle (VCB) is a set of interventions used to reduce the incidence of Ventilator Associated Pneumonia. 2. Ventilator Associated Pneumonia (VAP) is a complication that develops in a patient after 48 hours of mechanical ventilation, which carries morbidity and mortality. 3. The VCB is an on-going quality improvement initiative under the Malaysian Registry of Intensive Care.
Definition of Terms	:	**Ventilator care bundle (VCB):** A set of 4 interventions which are: 1. Head elevation 30 degrees. 2. Target light sedation 3. Daily assessment for readiness to wean 4. Oral hygiene Compliant to VCB is considered when all 4 of these interventions are done.
Criteria	:	**Inclusion**: 1. All patients on invasive mechanical ventilation for >12 hours in General ICU. **Exclusion:** 1. Patients ventilated outside of General ICU. 2. Patients of < 12 years of age. 3. Non-invasive ventilation such as BIPAP and HFNC. 4. Patients on prone ventilation **Sampling:** Using an average of total ICU patients in a month, 25% of the patients in each month need to be sampled for this indicator. Samples will be taken once a week. All patients on invasive mechanical ventilation in ICU at 8 am on one same day/ week (e.g., every Monday) will be the denominator.
Type of indicator	:	Rate-based process indicator
Numerator	:	All patients on invasive mechanical ventilation and compliant to VCB bundle
Denominator	:	Total number of patients on invasive mechanical ventilation
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 95%
Data Collection & Verification	:	1. **Where**: Data will be collected in General ICU. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ ICU admission record book/ VCB record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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CARDIOTHORACIC ANAESTHESIOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	**Percentage of post-elective cardiopulmonary bypass adult patients with blood glucose level ≤ 10 mmol/L on arrival to Cardiac Intensive Care Unit (CICU)**	Effectiveness	≥ 90%
2	Percentage of accidental carotid arterial puncture during central venous cannulation via Internal Jugular Vein (IJV) approach	Safety	**≤ 3%**
3	Percentage of thoracic surgical patients received Acute Pain Service (APS)	Customer centeredness	**≥ 85%**

Discipline	**:**	**Cardiothoracic Anaesthesiology**
Indicator 1	:	**Percentage of post-elective cardiopulmonary bypass adult patients with blood glucose level ≤ 10 mmol/L on arrival to Cardiac Intensive Care Unit (CICU)**
Dimension of Quality	**:**	Effectiveness
Rationale	:	1. Post-operative patient with high blood glucose level is associated with surgical wound infection and prolonged hospital stay. 2. Post-operative sugar is a reflection of sugar control intraoperatively as most patients undergoing cardiopulmonary bypass are usually diabetic and requiring inotrope intraoperatively.
Definition of Terms	:	**Adult**: Age ≥ 18 years.
Criteria	:	**Inclusion**: 1. All adult patients that underwent elective cardiopulmonary bypass. **Exclusion**: NA
Type of indicator	**:**	Rate-based outcome indicator
Numerator	:	Number of post-elective cardiopulmonary bypass adult patients with blood glucose level ≤ 10 mmol/L on arrival to CICU
Denominator	:	Total number of post-elective cardiopulmonary adult patients in CICU
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in CICU. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ CICU admission record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	**:**	**Cardiothoracic Anaesthesiology**
Indicator 2	:	**Percentage of accidental carotid arterial puncture during central venous cannulation via Internal Jugular Vein (IJV) approach**
Dimension of Quality	**:**	Safety
Rationale	:	1. The use of central venous catheter via the IJV approach is frequently required in the management of cardiothoracic patients. 2. Accidental carotid artery puncture has an incidence of 6-25% and is associated with morbidity. 3. A standard of 5% was taken for this indicator as most central venous catheter insertion is done by well trainer personnel.
Definition of Terms	:	**Accidental carotid artery puncture**: Process whereby the cannulating needle accidentally punctures the carotid artery during insertion.
Criteria	:	**Inclusion**: 1. All IJV cannulations done in cardiothoracic cases. **Exclusion**: NA
Type of indicator	**:**	Rate-based process indicator
Numerator	:	Number of accidental carotid arterial punctures during central venous cannulation via IJV approach
Denominator	:	Total number of central venous cannulation via IJV approach performed
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	**≤ 3%**
Data Collection & Verification	:	1. **Where**: Data will be collected OT/ Cardiac ICU/ CRW or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ procedure book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	**:**	**Cardiothoracic Anaesthesiology**
Indicator 3	:	**Percentage of thoracic surgical patients received Acute Pain Service (APS)**
Dimension of Quality	:	Customer centeredness
Rationale	:	Effective postoperative pain relief via APS helps reduce morbidity, aids recovery and decrease hospital length of stay.
Definition of Terms	:	**Thoracic surgery patients:** It includes both elective and emergency cases.
Criteria	:	**Inclusion:** 1. All thoracic surgical cases, both elective and emergency. 2. Closed cardiothoracic surgery with thoracic approach (e.g., PDA ligation). 3. Postoperative admission to Intensive Care Unit, High Dependency Ward and surgical ward. 4. Patients of ≥ 12 years of age. **Exclusion:** 1. All cases requiring cardiopulmonary bypass. 2. Patient who died intra-operatively. 3. Patient who underwent surgery under local anaesthesia or sedation. 4. Patients of < 12 years of age.
Type of indicator	**:**	Rate-based output indicator
Numerator	:	Number of patients on APS following thoracic surgery under general/ regional anaesthesia
Denominator	:	Total number of patients who underwent thoracic surgery under general/ regional anaesthesia
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	**≥ 85%**
Data Collection & Verification	:	1. **Where**: Data will be collected in Cardiac ICU/ CRW/ HDW/ surgical wards or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT list/ APS record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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CLINICAL GENETIC			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of patients with intoxication type IEM with > 3 admissions in a year for metabolic decompensation	Effectiveness	≤ 5%
2	Percentage of patients with Marfan Syndrome, Tuberous Sclerosis and Prader Willi Syndrome who are compliant to the Care Pathway	Effectiveness	≥ 90%

Discipline	:	**Clinical Genetic**
Indicator 1	:	**Percentage of patients with intoxication type IEM with > 3 admission in a year for metabolic decompensation**
Dimension of Quality	:	Effectiveness
Rationale	:	Frequent metabolic decompensation is significantly associated with suboptimal baseline metabolic control which reflects the outcome of outpatient care.
Definition of Terms	:	**Intoxication type inborn error of metabolism (IEM)**: It includes the following disorder: • Urea Cycle Disorder (NAGS, OTC, CPS1, ASS, ASA, Arginase deficiencies). • Organic Acidurias (PA, MMA, IVA). • Maple Syrup Urine Disease.
Criteria	:	**Inclusion:** 1. All patients with intoxication type IEM under follow up of Genetic Outpatient Clinic. **Exclusion:** NA
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with intoxication type IEM with > 3 admissions in a year for metabolic decompensation
Denominator	:	Total number of patients with intoxication type IEM under Genetic follow up
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 5%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Genetic Outpatient Clinic/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from Genetic database/ admission & discharge record book/ patient's case notes. 4. **How frequent**: PVF to be sent **yearly** to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Clinical Genetic**
Indicator 2	:	**Percentage of patients with Marfan Syndrome, Tuberous Sclerosis and Prader Willi Syndrome who are compliant to the Care Pathway**
Dimension of Quality	:	Effectiveness
Rationale	:	For the provision of effective and standardised safe care. Complications from these genetic disorders may not be preventable but adherence to the care pathway ensure early/ pre-symptomatic detection to enable optimal treatment of these complication (e.g., lens dislocation, aortic rupture, tumours in the brain, kidneys, obstructive sleep apnoea etc.).
Definition of Terms	:	**Care Pathway**: It is the evidence-based guidelines for the management of multisystemic genetic disorders. It is assessed by using a standardised form; which was prepared by Clinical Genetic services.
Criteria	:	**Inclusion:** 1. All patients with Marfan Syndrome, Tuberous Sclerosis and Prader Willi Syndrome; and under follow up in the Genetic Outpatient Clinic. **Exclusion:** NA
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of Marfan Syndrome, Tuberous Sclerosis and Prader Willi Syndrome patients who are compliant to the Care Pathway
Denominator	:	Total number of Marfan Syndrome, Tuberous Sclerosis and Prader Willi Syndrome patients who are under follow up in the Genetic Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Genetic Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from Marfan Syndrome, Tuberous Sclerosis and Prader Willi Syndrome Clinical Genetic database/ Care Pathway records/ patient's case notes. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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EMERGENCY MEDICINE			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Complication rate of procedural sedation and analgesia (PSA)	Safety	≤ 5%
2	**Percentage of suspected Acute Coronary Syndrome (ACS) patients administered oral aspirin by Prehospital Care and Ambulance Services (PHCAS) responder**	Effectiveness	≥ 75%
3	Percentage of Intravenous Tranexamic Acid given in trauma patients with severe haemorrhage within 60 minutes of first medical contact	Effectiveness	≥ 70%
4	**Percentage of inappropriate triaging (under-triaging): Category Green patients who should have been triaged as Category Red**	Safety	≤ 0.5%

Discipline	:	**Emergency Medicine**
Indicator 1	:	**Complication rate of procedural sedation and analgesia (PSA)**
Dimension of Quality	:	Safety
Rationale	:	1. Procedural sedation and analgesia is a core competency in Emergency Medicine and a daily part of Emergency Department practice. 2. The complications following PSA is aimed to be lesser than 5%.
Definition of Terms	:	**Procedural sedation and analgesia (PSA)**: Technique of administering sedatives or dissociative agents with or without analgesics; to induce an altered state of consciousness that allows the patient to tolerate unpleasant procedures while preserving cardiorespiratory function (ACEP Recommendations for Physician Credentialing, Privileging and Practice 2011). **Complications of PSA:** • Hypotension. • Respiratory depression. • Desaturation with SpO2 < 90%. • Requiring endotracheal intubation after the procedure.
Criteria	:	**Inclusion:** 1. All patients who received PSA in Emergency Department/ Unit. **Exclusion:** 1. Patients who received PSA from primary team.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients who developed complications following PSA
Denominator	:	Total number of patients received PSA
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 5%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Emergency Department/ Unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from PSA record book/ patient's case notes. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Emergency Medicine**
Indicator 2	:	**Percentage of suspected Acute Coronary Syndrome (ACS) patients administered oral aspirin by Prehospital Care and Ambulance Services (PHCAS) responder**
Dimension of Quality	:	Effectiveness
Rationale	:	1. One of the common causes of death in Malaysia is Ischaemic Heart Disease (IHD). 2. The use of aspirin can reduce deaths from ACS by 23% and should be started as early as possible even before arrival to hospital. 3. MOH has pre-existing guideline on call triaging for no traumatic chest pain focusing on angina chest pain and CPG Acute STEMI (3rd Ed) 2014 recommending aspirin administration (Class 1). This may allow indirect measure of effectiveness of CME program for PHCAS for following a clinical care protocol and support newer clinical care/ therapeutic pathways
Definition of Terms	:	**Acute Coronary Syndrome (ACS):** For the purpose of this indicator, it is diagnosed based on: • Fulfils description of typical ACS presentation using Malaysian CPG on STEMI 2nd Edition 2007 or NICE Guideline 2016 or an accepted national module for Chest Pain in PHCAS. • Identified under Protocol 10 of NAEMD Version 12.2 by MECC dispatcher. • Identified as chief complaint by ambulance responder (hospital or KK based). • Identified as secondary complaint by ambulance provider (hospital or KK based). • Age 35 or more. • If any younger age: o 12L ECG is done at scene and support aspirin administration or o Patient has medical document confirming a known case of coronary vessel disease. **Aspirin:** It is an antiplatelet drug. Standard blue book formulary from MOH 100mg tablet (Category B). For indicated patients, patient is asked to chew 3 tablets, or tablets are crushed/ grinded for patient by ambulance responder; and asked to be swallowed facilitated by sips of water. This is administered to patient at site. **Prehospital Care and Ambulance Services (PHCAS):** 999 ambulance services team of MOH (Hospital or KK) activated via MECC or direct lines to facility.
Criteria	:	**Inclusion:** 1. All patients diagnosed as ACS by the MECC dispatcher, ambulance responder or ambulance provider. **Exclusion:** 1. Patient who already took **300mg** of aspirin prior to arrival of PHCAS responder (pharmacologically effective and not expired packaging). 2. Patients with documented allergy to aspirin.

		3. Patients who are contraindicated to aspirin (gastric/ intestinal ulcers, bleeding tendency such as haemophilia and on anticoagulant such as warfarin). 4. Patient with suspected Dissecting Aneurysm. 5. Traumatic chest pain. 6. Unconscious patient with risk of aspiration.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of suspected ACS patients administered oral aspirin by PHCAS responder
Denominator	:	Total number of patients that were suspected ACS by PHCAS responder
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 75%
Data Collection & Verification	:	1. **Where**: Data will be collected in PHCAS Unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from PHCAS call records/ clinical documentation/ patient's case notes. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Emergency Medicine**
Indicator 3	:	**Percentage of Intravenous Tranexamic Acid given in trauma patients with severe haemorrhage within 60 minutes of first medical contact.**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Polytrauma is one of the major causes of death worldwide, with motor-vehicle accident as the ninth leading cause of death globally and is predicted to become the third leading cause of death and disability by 2020.[1] 2. Haemorrhage is responsible in a third of in hospital trauma death and contribute to death from multi-organ failure.2 3. In CRASH 2 Study, Tranexamic Acid safely reduced the risk of death in bleeding trauma patients down to 2.8% and the need of transfusion by a third.
Definition of Terms	:	**Trauma**: Sudden physical injury caused by external forces for example motor-vehicle accidents, fall from heights, penetrating injuries, gunshot wounds and others. **Severe haemorrhage** is defined by (A and/or B): A. Evidence of bleeding • External bleeding from obvious open wounds • Internal bleeding detected from clinical examination. B. Physiological parameters • SBP < 90 mmHg and/or • HR > 110 bpm **Tranexamic Acid** is a synthetic derivatives of amino acid lysine that inhibit fibrinolysis by blocking the lysine binding side of plasminogen.
Criteria	:	**Inclusion:** 1. All trauma patients with severe haemorrhage who present to Emergency Department. 2. Trauma patients who were given Tranexamic Acid by Pre-Hospital Responder. **Exclusion:** 1. Contraindication to Tranexamic Acid i) Allergic reaction ii) Patients with known pro-coagulation disorder for example Pulmonary Embolism, Anti-phospholipid syndrome, Cavernous Sinus Thrombosis and others. 2. Injuries occurred more than 3 hours. 3. Patient who is less than 18 years old. 4. Cases when Tranexamic Acid is not beneficial.
Type of Indicator	:	Rate-based Process indicator
Numerator	:	Number of trauma patients with severe haemorrhage present in Emergency Department who received intravenous Tranexamic Acid within 60 minutes of arrival including patients who had been given Tranexamic Acid by Pre-Hospital responders.

Denominator	:	Total number of trauma patients with severe haemorrhage presented in Emergency Department
Formula	:	Numerator x 100% Denominator
Standard	:	≥ 70%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Emergency Department/ Unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from Tranexamic Acid record book/ patient's case notes. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify:** PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	References: 1. Gosselin RA, Spiegel DA, Coughlin R, Zirkelt LG.Injuries:the neglected burden in developing countries. Bull World Health Organ 2009;87:246 2. Sauaia A, Moore FA, Moore EE,et al. Epidemiology of trauma deaths:a reassessment. J Trauma 1995; 38: 185-93 3. Lawson JH, Murphy MP. Challenges for providing effective hemostasis in surgery and trauma. See Hematol 2004; 41 : 55-64 4. CRASH 2 Study

Discipline	:	**Emergency Medicine**
Indicator 4	:	**Percentage of inappropriate triaging (under-triaging): Category Green patients who should have been triaged as Category Red**
Dimension of Quality	:	Safety
Rationale	:	1. Triage is an essential function of Emergency Departments (EDs), whereby many patients may present simultaneously. Triage aims to ensure that patients are treated in the order of their clinical urgency and that treatment is appropriate. Triage also allows for the allocation of the patient to the most appropriate assessment and treatment area. 2. It is a scale for rating clinical urgency. The scale directly relates triage category with a range of outcome measures (inpatient length of stay, ICU admission, mortality rate) and resource consumption (staff time, cost). 3. Studies have shown that the "under triaging" of critically ill patients can increase their morbidity and mortality due to delay in their resuscitation and the provision of definitive care. Urgency refers to the need for time-critical intervention. 4. This indicator measures the accuracy and appropriateness of the Triaging system in the Emergency Department (ED) to ensure that critically ill patients are not missed and categorized as "non-critical".
Definition of Terms	:	**Under-triaged:** Critically ill patient (MTC RED) who was triaged as "non-critical" patient (MTC GREEN).
Criteria	:	**Inclusion:** 1. All patients who come to Emergency Department and triaged as 'non-critical' patient (MTC Green) **Exclusion:** 1. Period of time when the hospital unable to function as usual because involved in mass casualty/ disaster/ crisis.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of MTC GREEN patients who should have been triaged as MTC RED
Denominator	:	Total number of MTC GREEN patients
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 0.5%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Emergency Department/ Unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from the record book/ patient's case notes. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	This indicator is also being monitored as Outcome Based Budgeting (OBB) indicator.

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FORENSIC PATHOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Turnaround time of ≤ 3 hours for releasing bodies (non-police cases) to the appropriate claimant after body registration by the Forensic Medicine Department/ Forensic Unit	Efficiency	≥ 80%
2	Turnaround time of ≤ 12 weeks for preparing forensic autopsy reports of police cases from the autopsy performed by the Forensic Medicine Department	Efficiency	**≥ 85%**

Discipline	:	**Forensic Pathology**
Indicator 1	:	**Turnaround time of ≤ 3 hours for releasing bodies (non-police cases) to the appropriate claimant after body registration by the Forensic Medicine Department/ Forensic Unit**
Dimension of Quality	:	Efficiency
Rationale	:	1. To ensure that the process of management of the deceased is handled effectively, efficiently and with due respect for the dead by the Forensic Medicine Department/ Forensic Unit. 2. To expedite the release of bodies to the rightful claimant for burial or cremation in accordance with the respective religious beliefs.
Definition of Terms	:	**Turnaround time:** It is the time measured from the time body was registered at Forensic Medicine Department/ Forensic Unit till the time body was released to appropriate claimant. It is suggested that the CAPTURED IN time (time of the body registered at forensic unit/ Department) and CAPTURED OUT time (time of the release of body or handing of death documents to the appropriate claimant) be recorded at the Forensic Medicine Department/ Forensic Unit. **Body release:** Claiming of body (non-police case) by the appropriate claimant and handing of death documents to the appropriate claimant with the cautionary statement acknowledged as per procedure. Adherence to the Standard operating procedure (SOP) for releasing of body to appropriate claimant: • Claimant to produce relevant documents such as identity card of deceased, birth certificate, marriage certificate, passport and certificate from religious department, if possible. • Claimant's identification document will be copied and documented. • Police report by claimant necessary to ensure correct next of kin if no supporting documents are available. **Appropriate Claimant:** 1. **Next-of-kin**: spouse(s), daughter(s), son(s), parent(s), sibling(s), grandparent(s), first degree relative(s) (e.g., uncle(s), aunt(s), cousin(s), grand-uncle(s), grand-aunt(s)) and the likes. 2. **Authorised representative**: representative of next-of-kin/ relatives, representative of Embassy/ High Commission, religious authorities and employers.
Criteria	:	**Inclusion:** 1. All bodies (non-police cases) with availability of claimant. **Exclusion:** 1. Unidentified bodies (no identification/ decomposed body/ mutilated body/ skeletonised remains). 2. Incomplete bodies (only body parts found/ fragmented human bones). 3. Communicable or infectious disease cases. 4. All foreigners. 5. Mass disaster fatalities.
Type of indicator	:	Rate-based process indicator

Numerator	:	Number of bodies (non-police cases) released to the appropriate claimant within (≤) 3 hours from the time of body registration by the Forensic Medicine Department/ Forensic Unit
Denominator	:	Total number of bodies (non-police cases) released to the appropriate claimant at Forensic Medicine Department/ Forensic Unit
Formula	:	Numerator x 100% Denominator
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Forensic Medicine Department/ Forensic Unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from death registration book/ Form/ Forensic Medicine Information System. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Forensic Pathology**
Indicator 2	:	**Turnaround time of ≤ 12 weeks for preparing forensic autopsy reports of police cases from the autopsy performed by the Forensic Medicine Department**
Dimension of Quality	:	Efficiency
Rationale	:	To ensure that autopsy reports are prepared in a timely manner for medicolegal purposes and assist in the administration of justice.
Definition of Terms	:	**Forensic autopsy**: Autopsy of police/ medico-legal cases with the issuance of Polis 61 order. **Preparing forensic autopsy report**: Report drawn up detailing the autopsy findings but not yet finalised/ signed by the specialist/ medical officer. **Police/ medico-legal case**: A death case under police investigation and the purview of the law.
Criteria	:	**Inclusion:** 1. All forensic autopsy reports of police/ medico-legal cases with ascertained cause of death. 2. All autopsy by Forensic Medicine specialist and medical officers. **Exclusion:** Forensic autopsy reports of: 1. Skeletonised human remains/ human bones. 2. Pending laboratory investigation results. 3. Mass disasters/ infectious disease outbreaks. 4. Second autopsy examination reports.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of forensic autopsy reports of police cases prepared within (≤) 12 weeks by the Forensic Medicine Department
Denominator	:	Total number of forensic autopsy reports of police cases that need to be prepared by Forensic Medicine Department
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	**≥ 85%**
Data Collection & Verification	:	1. **Where**: Data will be collected in the Forensic Medicine Department/ Forensic Units. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from death registration book/ Forensic Medicine Information System/ forensic records of police cases. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 3 months retrospective cohort of data. E.g., for April 2024, it will be the forensic autopsy for police cases done in January 2024; to allow 12 weeks period for preparation of autopsy report.

		*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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NUCLEAR MEDICINE			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	**Turnaround time of five (5) working days for diagnostic nuclear medicine reports**	Efficiency	≥ 75%
2	Percentage of repeat studies in Diagnostic Nuclear Medicine	Safety	≤ 1%

Discipline	:	Nuclear Medicine
Indicator 1	:	**Turnaround time of five (5) working days for diagnostic nuclear medicine reports.**
Dimension of Quality	:	Efficiency
Rationale	:	Early completions of reports are important for patient's management plan and treatment
Definition of Terms	:	**Turnaround time:** Time taken after completion of studies to the availability of reports.
Criteria	:	**Inclusion:** 1. All diagnostic nuclear medicine studies. **Exclusion:** 1. Repeat studies.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of diagnostic nuclear medicine reports available within five (5) working days after completion of studies over a period of time
Denominator	:	Total number of Diagnostic Nuclear Medicine studies performed over the same period of time
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥ 75%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Nuclear Medicine Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Nuclear Medicine Technologist/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from Diagnostic Nuclear Medicine studies record book/ copy of Diagnostic Nuclear Medicine studies reports. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Nuclear Medicine**
Indicator 2	:	**Percentage of repeat studies in Diagnostic Nuclear Medicine**
Dimension of Quality	:	Safety
Rationale	:	It is important to avoid repeat studies in Diagnostic Nuclear Medicine as it causes: • Additional radiation dose. • Delay in patient's management. • Increase cost, time and human resource wastage.
Definition of Terms	:	**Repeat study**: Cases that require reinjection of the same radiopharmaceutical when and where the first injected radiopharmaceutical has not achieved its intended purposes as a result of any technical or non-technical causes.
Criteria	:	**Inclusion:** 1. All studies done in Diagnostic Nuclear Medicine. **Exclusion:** 1. Any diagnostic case that was postponed, delayed, aborted or rejected; but had not resulted in the need to re-inject radiotracer to the patient.
Type of indicator	:	Rate-based output indicator
Numerator	:	Number of repeat studies in Diagnostic Nuclear Medicine
Denominator	:	Total number of studies done in Diagnostic Nuclear Medicine
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≤ 1%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Nuclear Medicine scanning room. 2. **Who**: Data will be collected by Officer/ Nuclear Medicine Technologist/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from Diagnostic Nuclear Medicine studies record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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PATHOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Prothrombin Time (PT) and Activated Partial Prothrombin Time (APTT) External Quality Assurance (EQA) Performances	Effectiveness	≥ 80%
2	Success rate in haematology-oncology cytogenetic testing	Effectiveness	≥ 80%
3.1	Percentage of laboratory turnaround time (LTAT) for cord blood TSH result within (≤) 48hours of specimen receipt.	Effectiveness	≥ 80%
3.2	Percentage of Laboratory Turnaround Time (LTAT) for AFB Smears Examination reported within 24 hours of sample receipt.	Effectiveness	≥ 80%
3.3	**Percentage of laboratory turnaround time (LTAT) for all diagnostic histopathology final reports validated and authorized within 14 calendar days of specimen receipt.**	Timeliness	≥ 70%

Discipline	:	**Pathology**
Indicator 1	:	**Prothrombin Time (PT) and Activated Partial Prothrombin Time (APTT) External Quality Assurance (EQA) Performances**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Hematology laboratory shall provide reliable results for better quality care of patients. 2. PT and APTT are routinely requested coagulation screening tests provided in almost all hospitals. 3. They are used to evaluate coagulation status of patients with bleeding or risk of bleeding. 4. PT and APTT EQA performances are measured to assess the efficiency of laboratory in providing accurate and precise results.
Definition of Terms	:	**PT:** Automated measurement of Prothrombin Time. **APTT:** Automated measurement of Activated Partial Prothrombin Time. **Accuracy:** The proximity of measurement results to the true value. **Precision:** The repeatability or reproducibility of the measurement. **EQA:** External Quality Assurance Program. **Acceptable Performance:** Parameter that falls within 2 Standard Deviation (SD)/ Allowable Limit of Performance (ALP)/ Allowable Limits of Specification (APS).
Criteria	:	**Inclusion**: 1. All PT & APTT EQA results submitted within 6 months. 2. Parameters included are PT (sec) and APTT (sec). 3. PT& APTT EQA program enrolled for at least one main coagulation analyzer (fully or semi-automated) in Pathology Department / Unit **Exclusion**: 1. Suboptimal condition of the EQA sample received. 2. PT & APTT tests performed using point of care testing analyzers.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Total parameters achieved acceptable performance within 6 months
Denominator	:	Total parameters tested within 6 months
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in all laboratories providing the test. 2. **Who**: Data will be collected by Officer/ assigned laboratory personnel of the department/ unit. 3. **How to collect**: Data is suggested to be collected from request form/ record book/ registry system/ LIS. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Pathology**
Indicator 2	:	**Success rate in haematology-oncology cytogenetic testing**
Dimension of Quality	:	Effectiveness
Rationale	:	Haematology-oncology cytogenetic test results are important to assist clinicians in patient management; including diagnosis, risk stratification and prognostication of haematological malignancies. However the success rate of haematology-oncology cytogenetic testing depends on numerous factors including quality of specimen received.
Definition of Terms	:	**Total specimens:** The total number of specimens processed for haematology-oncology cytogenetic testing by the laboratory. **Successful cases:** Specimens that can be successfully analysed and reported. **Unsuccessful cases:** Specimen that does not yield any metaphase spread after culture; or specimens with poor quality metaphases that are not analysable.
Criteria	:	**Inclusion:** 1. Bone marrow specimens 2. Peripheral blood for acute leukaemia/Chronic Lymphocytic Leukaemia (CLL) (cultured using bone marrow protocol) **Exclusion:** 1. Requests that are not indicated. 2. Specimens that fulfil laboratory rejection criteria.
Type of indicator	:	Rate-based process indicator
Numerator	:	Total number of successful cases in 6 months
Denominator	:	Total specimens in 6 months
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in all laboratories providing the test. 2. **Who**: Data will be collected by Officer/ assigned laboratory personnel of the department/ unit. 3. **How to collect**: Data is suggested to be collected from record book/ registry system/ LIS/ request form. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Pathology**
Indicator 3.1	:	**Percentage of laboratory turnaround time (LTAT) for cord blood TSH result within (≤) 48hours of specimen receipt.**
Dimension of Quality	:	Timeliness
Rationale	:	A child's brain needs thyroid hormone for its development and any deficient of thyroid hormone can cause delayed brain developmental and cretinism. Congenital hypothyroidism can be detected and treated early. Thus, neonatal screening is crucial with using cord blood TSH (cTSH) as a universal screening of all neonates in detecting congenital hypothyrodism and help in delivery of fast management[1]. The delivery of test reports in a timely manner is essential for optimum clinical care of patients[2]. **References**: 1. . Azriyanti AnuarZaini, et al. Congenital Hypothyroidism in Children –A Cross-Sectional Study in a Tertiary Centre in Malaysia. Journal of the ASEAN Federation of Endocrine Society. Vol. 35 No. 1 May 2020. 2. Sciacovelli et al.Quality Indicators in Laboratory Medicine: from theory to practice Preliminary data from the IFCC Working Group Project "Laboratory Errors and Patient Safety". Clin Chem Lab Med 2011;49(5):835–844. 3. 2018 National Congenital Hypothyroidism Screening Program by MOH
Definition of Terms	:	**Laboratory turnaround time (LTAT)**: Measuring the time laboratory receives the specimen to the time the test result is validated. **Cord blood TSH (cTSH)**:Cord blood sample for TSH testing.
Criteria	:	**Inclusion:** 1. All cTSH samples suitable for testing. **Exclusion:** 1. Non cord blood sample for TSH testing.
Type of indicator	:	Rate-based process indicator
Numerator	:	Total number of cTSH results verified within (≤) 48hours in a month
Denominator	:	Total number of cTSH samples tested in a month
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in all laboratories providing the test. 2. **Who**: Data will be collected by Officer/ assigned laboratory personnel of the department/ unit. 3. **How to collect**: Data is suggested to be collected from record book/ registry system/ LIS/ request form. 4. **How frequent**: PVF to be sent yearly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Pathology**
Indicator 3.2	:	**Percentage of laboratory turnaround time (LTAT) for AFB smears examination reported within 24 hours of sample receipt.**
Dimension of Quality	:	Timeliness
Rationale	:	1. A timely AFB result is important for a clinician to start the TB treatment and initiate airborne precaution for positive cases. 1. AFB smear is a basic and commonly requested test provided in all hospitals and can be requested at any time.
Definition of Terms	:	**AFB smears examination:** Auramine or Ziehl-Neelsen staining method and using standard grading system. **Laboratory turnaround time (LTAT):** Measuring the time laboratory receives the specimen to the time the test result is validated.
Criteria	:	**Inclusion:** 1. Respiratory samples which include sputum, BAL, trachea aspirate, pleural fluids, gastric lavage (for paediatric patients only) 2. The first respiratory sample requested for AFB smear examination. **Exclusion:** 1. Non respiratory samples e.g Tissue sample, sterile fluids, swabs
Type of indicator	:	Rate-based process indicator
Numerator	:	Total AFB smear examinations validated within 24 hours of sample receipt in a month
Denominator	:	Total number of AFB smear examinations performed in a month
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in all laboratories providing the test. 2. **Who**: Data will be collected by Officer/ assigned laboratory personnel of the department/ unit. 3. **How to collect**: Data is suggested to be collected from record book/ registry system/ LIS/ request form. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	**:**	**Pathology**
Indicator 3.3	:	**Percentage of laboratory turnaround time (LTAT) for all diagnostic histopathology final reports validated and authorized within 14 calendar days of specimen receipt.**
Dimension of Quality	:	Timeliness
Rationale	:	Final reports of anatomic pathology examination are available in a timely manner to ensure patients can receive optimum clinical care and management.
Definition of Terms	:	**Laboratory turnaround time (LTAT):** Time of diagnostic histopathology samples received in the anatomic pathology laboratory until the final results are reported, validated and authorized by histopathologists.
Criteria	:	**Inclusion:** All diagnostic histopathology cases received for examination in the laboratory. **Exclusion:** Nil.
Type of indicator	:	Rate-based process indicator
Numerator	:	Total number of cases reported and validated within 14 calendar days
Denominator	:	Total number of cases received in the laboratory
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 70%
Data Collection & Verification	:	1. **Where**: Data will be collected in all laboratories providing the test. 2. **Who**: Data will be collected by Officer/ assigned laboratory personnel of the department/ unit. 3. **How to collect**: Data is suggested to be collected from record book/ registry system/ LIS/ request form. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	**Data collection is to be done by 1 month retrospective cohort of data.** E.g., for January 2024, it will be all specimens received in December 2023. This is to allow 14 days period for reports to be validated and authorized.

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CLINICAL RADIOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of patients with waiting time of ≤ 60 minutes for commencement of ultrasound examination	Timeliness	≥ 90%
2	Percentage of reject-retake images	Effectiveness	≤ 5%
3	Percentage of patients developed significant contrast media extravasation following CT examination with intravenous (IV) contrast media	Safety	≤ 0.5%

Discipline	:	**Clinical Radiology**
Indicator 1	:	**Percentage of patients with waiting time of ≤ 60 minutes for commencement of ultrasound examination**
Dimension of Quality	:	Timeliness
Rationale	:	1. The aim of this indicator is to improve patient satisfaction. 2. For hospitals to eliminate or reduce waiting time, it is important to balance between the demand for appointments and the supply of appointments. One needs to identify opportunities for improvement by strengthening the policy of outpatient services in hospital, apply Queuing Theory and having contingency plans.
Definition of Terms	:	**Waiting time**: Time of appointment/ registration (whichever is later) to the time the ultrasound examination is commenced.
Criteria	:	**Inclusion**: 1. All patients with scheduled appointments. **Exclusion**: 1. Patients without prior appointments/ unscheduled. 2. Unprepared cases that contributed to waiting time of > 60 minutes. **Sampling**: Using an average of total patients seen in a month, 25% of the patients in each month need to be sampled for this indicator. Data is to be collected for 1 week (5 consecutive working days) in every month.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of sampled patients with waiting time of ≤ 60 minutes for commencement of ultrasound examination
Denominator	:	Total sample of patients who underwent ultrasound examination
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 90%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Radiology Department/ Unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Radiographer in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from appointment record book/ ultrasound procedure book/ RIS/ PACS. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Clinical Radiology**
Indicator 2	:	**Percentage of reject-retake images**
Dimension of Quality	:	Effectiveness
Rationale	:	1. This indicator is a reflection of many of the processes carried out in an imaging department. 2. This indicator has great relevance as it reflects on almost all the processes in the department namely radiographic techniques, performance of X-ray machines, film/ image processing and storage of films. 3. Internationally, the percentage of reject-retake images is quoted to be around 4-11% in average.
Definition of Terms	:	**Radiographs**: Films produced using conventional (non-digital) system. **Radiographic images**: Images acquired using digital (DR/ CR) system. **Rejected images:** Any radiographs or images acquired during radiographic examinations/ radiological procedures that has no diagnostic value and has to be repeated/ retake. This refers to radiographs or images of patients that are assessed by the radiographer or the requesting clinician/ radiologist to be clinically unacceptable. **Image retake**: Repeat exposure to the patient due to earlier non-diagnostic image or rejected by the radiologists and clinicians.
Criteria	:	**Inclusion**: 1. All radiographs/ radiographic images done in the facility including mobile X-rays. 2. Images rejected by radiographers, radiologist and clinicians. **Exclusion**: 1. Images discarded due to testing purposes. 2. Images used for quality assurance procedures.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of rejected radiographs/ radiographic images
Denominator	:	Total number of radiographs/ radiographic images made
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 5%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Radiology Department/ Unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Radiographer in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from radiographs/ radiographic images record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Clinical Radiology**
Indicator 3	:	**Percentage of patients developed significant contrast media extravasation following CT examination with intravenous (IV) contrast media**
Dimension of Quality	:	Safety
Rationale	:	1. CT with intravenous (IV) contrast media is a commonly performed procedure in the Radiology Department. Contrast extravasation is a known complication which occurs more frequently with power injection. It may also occur with hand injections. 2. Large volumes (usually > 50mls) of contrast media are known to induce significant tissue damage. However, smaller volumes may also have adverse outcomes especially in paediatric patients. 3. Contrast media are known to induce significant tissue damage such as: a) Skin ulceration. b) Soft-tissue necrosis. c) Compartment syndrome. 4. Thus, the incidence should be kept to the minimum.
Definition of Terms	:	**Contrast media extravasation**: Contrast leaks into the tissue around the vein where the IV needle is inserted. **Significant contrast media extravasation**: Volume > 50mls which necessitate referral to the primary team or volumes not more than 50mls but requiring referral to the primary team.
Criteria	:	**Inclusion**: 1. All CT examinations performed involving IV contrast media. **Exclusion**: 1. Patients with abnormal circulation in the limb to be injected (e.g., atherosclerotic peripheral vascular disease, diabetic vascular disease, Raynaud's disease, venous thrombosis or insufficiency, or prior chemo/radiation therapy or extensive surgery (e.g., axillary lymph node dissection)).
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients developed significant contrast media extravasation following CT examination with IV contrast media
Denominator	:	Total number of patients undergo CT examination with IV contrast media
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 0.5%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Radiology Department/ Unit. 2. **Who**: Data will be collected by Officer/ Paramedic/ Radiographer in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from CT scan record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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ONCOLOGY			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of Nasopharyngeal Cancer (NPC) patients who were started on radical radiotherapy within (≤) 4 weeks	Customer centeredness	≥ 70%
2	**Chemotherapy Extravasation Rate**	Safety	≤ 0.5%
3	Percentage of patients who were started on chemotherapy within (≤) 2 weeks from the date of decision for chemotherapy	Customer centeredness	**≥ 75%**

Discipline	:	**Oncology**
Indicator 1	:	**Percentage of Nasopharyngeal Cancer (NPC) patients who were started on radical radiotherapy within (≤) 4 weeks**
Dimension of Quality	:	Customer centeredness
Rationale	:	1. Treatment of NPC with radiotherapy is composed of multi-variable processes in the discipline; involving human resource, facilities, equipment and support services. 2. Each of these processes can affect the administration of radiotherapy as a treatment modality for head and neck cancers as well as other cancers.
Definition of Terms	:	**Date started on radiotherapy**: Date of first fraction of radiation treatment. **Date of CT simulation:** Date of CT simulation done. **Date of last cycle of neo-adjuvant chemotherapy**: Day 1 of last cycle neo-adjuvant chemotherapy following initial treatment plan. **4 weeks**: 28 days (irrespective working or non-working days).
Criteria	:	**Inclusion**: 1. All NPC patients who have been decided by the oncologist as to have radical radiotherapy during consultation at the clinic. 2. NPC patients who had started radiotherapy after additional cycle of neo-adjuvant chemotherapy due to non-patients related factors still need to be included. However, the duration still needs to be counted from the last cycleof chemotherapy following initial treatment plan. **Exclusion**: 1. Stage IVc NPC. 2. Patients whose treatment is delayed due to patient related factors such as personal/ medical reasons/ other needed elements in initiating radiotherapy treatment. 3. Patients who were started on radical radiotherapy after 4 weeks due to need for completion of another treatment other than neo-adjuvant chemotherapy.
Type of indicator	:	Rate-based output indicator
Numerator	:	Number of NPC patients who were started on radical radiotherapy within (≤) 4 weeks either from the date of CT simulation or the date of last cycle of neo-adjuvant chemotherapy given; whichever is later.
Denominator	:	Total number of NPC patients who were started on radical radiotherapy
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 70%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Radiotherapy and Oncology Outpatient Clinic/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ radical radiotherapy record book/ database of NPC patients. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.

Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Oncology**
Indicator 2	:	**Chemotherapy Extravasation Rate**
Dimension of Quality	:	Safety
Rationale	:	1. Extravasation is a grave complication of chemotherapy misdelivery and can lead to devastating effects on patient. 2. The aim of this KPI is to ascertain that chemotherapy delivery is being monitored by the specialists through continuing medical education and dissemination of knowledge about chemotherapy delivery to all stakeholders involved with the patient. 3. Indirect measurement of adherence to stipulated chemotherapy delivery guidelines essential to ensure safe practice, provide evidence-based care and increase awareness amongst healthcare givers.
Definition of Terms	:	**Chemotherapy treatment:** All types of intravenous administration of chemotherapeutic agents. **The number used in this indicator is based on the number of uninterrupted chemotherapy administration given to one patient.** e.g. Day 1 to Day 5 chemotherapy is considered as one administration Day 1 and Day 8 chemotherapy is considered for two administrations **Extravasation**: Inadvertent infiltration of chemotherapy preparations and fluids into the subcutaneous or subdermal tissues surrounding the intravenous administration site. In this indicator, only Grade 3 or 4 of extravasation at any point during the chemotherapy treatment is taken as extravasation. Grade 2 and less is not monitored as extravasation in this indicator. For the purpose of this indicator, it is considered as extravasation up to one month (30 days) from the date chemotherapy was given. **All hospitals with chemotherapy services (with direct or indirect monitoring of an oncologist) should monitor this KPI.** Currently there are 41 hospitals (7 hospitals with in-house oncologist, and 34 hospitals with indirect monitoring of an oncologist)
Criteria	:	**Inclusion**: 1. All patients that were given intravenous chemotherapy including patients with chemo port access. 2. Includes bolus and infusion intravenous chemotherapy. **Exclusion**: NA
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of chemotherapy extravasations following chemotherapy treatment
Denominator	:	Total number of administrations of chemotherapy treatment
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 0.5%

Data Collection & Verification	:	1. **Where**: Data will be collected in the Radiotherapy and Oncology Ward/ Outpatient Clinic/ Day Care/ wards that cater for the above conditions. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ chemotherapy record book/ incident reporting forms. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 1 month retrospective cohort of data. E.g., for April 2024, it will be patients who received chemotherapy in March 2024. The numerator will be incidences of extravasation occurred among patients who received chemotherapy in March 2024. This to allow 30 days period for patients to be followed up on presence/ absence of extravasation. *All cases of suspected extravasation should be recorded and the specialist in charge must be informed. *Any incidence of chemotherapy extravasation requires incident reporting for each occurrence.

Discipline	:	**Oncology**
Indicator 3	:	**Percentage of patients who were started on chemotherapy within (≤) 2 weeks from the date of decision for chemotherapy**
Dimension of Quality	:	Customer centeredness
Rationale	:	1. Patient-centred services must give priority to reducing waiting time for initiation of treatment. 2. As chemotherapy is an important component of cancer treatment, it should be given promptly and timely. 3. Efforts to deliver the chemotherapy treatment within its designated time at the clinics will reflect upon the efficiency of the Oncology management.
Definition of Terms	:	**Started on chemotherapy**: Date for the administration of the first chemotherapy schedule. **Date of decision**: It is the time patient was decided for chemotherapy by the treating oncologist and agreed by patient. The date of decision usually can be referred to date of consent. **2 weeks**: 14 days (irrespective working or non-working days).
Criteria	:	**Inclusion**: 1. All patients where chemotherapy has been decided by the oncologist as part of the cancer treatment during consultation. **Exclusion**: 1. Patients whose treatment is delayed due to patient related factors such as personal/ medical reasons (unfit)/ other needed elements in initiating chemotherapy treatment. 2. Patients who were started on chemotherapy after 2 weeks due to need for completion of another treatment or procedure. 3. Patients on concurrent chemo-radiotherapy.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of patients started on chemotherapy within (≤) 2 weeks from the date of decision for chemotherapy
Denominator	:	Total number of patients decided for chemotherapy by the oncologist
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	**≥ 75%**
Data Collection & Verification	:	1. **Where**: Data will be collected in the Radiotherapy and Oncology Outpatient Clinic/ wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ chemotherapy record book/ database of oncology patients. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	Data collection to be done by 1 month retrospective cohort of data. E.g., for April 2024, it will be patients who were decided for chemotherapy in March 2024. This

		to allow 2 weeks period for patients to be followed up; on whether they were started on chemotherapy. *This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

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REHABILITATION MEDICINE			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of patients with established interdisciplinary rehabilitation plan within (≤) 5 working days of admission	Efficiency	≥ 95%
2	Percentage of falls and near-falls in Rehabilitation Medicine Outpatient Clinic	Safety	≤ 2%

Discipline	:	Rehabilitation Medicine
Indicator 1	:	**Percentage of patients with established interdisciplinary rehabilitation plan within (≤) 5 working days of admission**
Dimension of Quality	:	Efficiency
Rationale	:	Inpatient rehabilitation plan requires a documented and agreed plan which specifies goals, interventions and time frame established via interdisciplinary consultation.
Definition of Terms	:	**Interdisciplinary rehabilitation plan**: Documented evidence of consultation and communication amongst the disciplines involved.
Criteria	:	**Inclusion**: 1. All inpatient referrals/ admissions for inpatient rehabilitation care. **Exclusion**: 1. All inpatients for rehabilitation care with length of stay of less than five working days.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of patients with established interdisciplinary rehabilitation plan within (≤) 5 working days of admission
Denominator	:	Total number of patients who are admitted/ referred for inpatient rehabilitation care
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 95%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Rehabilitation Medicine wards or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ referral record book/ interdisciplinary meeting record/ other relevant documents. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Rehabilitation Medicine**
Indicator 2	:	**Percentage of falls and near-falls in Rehabilitation Medicine Outpatient Clinic**
Dimension of Quality	:	Safety
Rationale	:	1. Ministry of Health (MOH) gives great importance to patient safety. It is implemented and monitored through Malaysian Patient Safety Goal (MPSG). MPSG number 9 is pertaining to number of falls within the facility. 2. To ensure patients' safety starting from the registration in clinic until completion of the clinic session as falls/ near-falls are preventable and has multifactorial cause which includes intrinsic and modifiable extrinsic factor.
Definition of Terms	:	**Fall:** An event that resulted in a person coming to rest in advertently on the ground or floor or other lower level, with or without injury. **Near-fall**: A slip, trip, stumble or loss of balance such that the individual starts to fall but either able to recover (witnessed or unwitnessed) and remains upright because their balance recovery mechanisms were activated; and/ or caught by staff/ other persons or they were eased to the ground/ floor/ other lower level by staff/ other persons (e.g., could not stop or prevent falling to the ground/ floor/ lower surface).
Criteria	:	**Inclusion:** 1. All patients who are at Rehabilitation Medicine Outpatient Clinic (from the time of registration at the clinic till completion of the clinic session). **Exclusion:** NA
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of falls and near-falls in the Rehabilitation Medicine Outpatient Clinic area
Denominator	:	Total number of patients attending Rehabilitation Medicine Outpatient Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 2%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Rehabilitation Medicine Outpatient Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from clinic record book/ Incident Reporting forms & records. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	This INDICATOR requires all Rehabilitation Medicine clinic to report all falls or near-fallsincident to relevant unit within the hospital.

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SPORTS MEDICINE			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Percentage of post-operative sports surgery patients seen within (≤) 3 days for initiation of rehabilitation	Efficiency	**≥ 90%**
2	**Percentage of SPADI or M-SPADI improvement among new cases of shoulder problems presented to Sports Medicine Clinic**	Effectiveness	≥ 60%

Discipline	:	**Sports Medicine**
Indicator 1	:	**Percentage of post-operative sports surgery patients seen within (≤) 3 days for initiation of rehabilitation**
Dimension of Quality	:	Efficiency
Rationale	:	This indicator was selected to assist in the planning of post-operative rehabilitation; when they are clinically stable with tolerable pain as well as free from indwelling catheters.
Definition of Terms	:	**Sports surgery:** Sports surgery involving the shoulder and knee.
Criteria	:	**Inclusion**: 1. All post-operative sports surgery patients (shoulder and knee) **Exclusion**: 1. Patients who are not referred to sports medicine team. 2. Patients who refused for sports medicine treatment after referral. 3. Patients who are discharged within 3 days of surgery.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of post-operative sports surgery patients seen within (≤) 3 days for initiation of rehabilitation
Denominator	:	Total number of post-operative sports surgery patients
Formula	:	Numerator x 100 % Denominator
Standard	:	**≥ 90%**
Data Collection & Verification	:	1. **Where**: Data will be collected in the Sports Medicine wards or wards that cater for the above condition. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes/ OT notes/ referral record book. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Sports Medicine**
Indicator 2	:	**Percentage of SPADI or M-SPADI improvement among new cases of shoulder problems presented to Sports Medicine Clinic**
Dimension of Quality	:	Effectiveness
Rationale	:	1. Shoulder Pain and Disability Index (SPADI) represents outcome measures which is used to measure clinical progression in patients over time. 2. It serves as a baseline and progression objective measure of shoulder functions. 3. It allows for assessment of the effectiveness of rehabilitation or any intervention when the shoulder scoring is repeated. 4. It is practical, reliable and can be used in a variety of shoulder conditions.
Definition of Terms	:	**Shoulder Pain and Disability Index (SPADI)** • SPADI is an English, self-administered, shoulder-specific patient reported outcome measures developed by Roach et al in 1991. • SPADI is short, easily understood, applicable in various shoulder pathology, the most responsive, and has established validity and reliability **Malay Shoulder Pain and Disability Index (M-SPADI)** • M-SPADI is a cross-cultural adaption of SPADI to Malay version. It is a published study by Ho C-A et all in 2022. • The M-SPADI has a bi-dimensional structure with good face and content validity, established construct validity, good internal consistency, and good to excellent test-retest reliability. • M-SPADI is a reliable and valid tool to assess pain and disability in Malay-speaking individuals with shoulder pain in clinical and research settings. **New cases** • Patient who first presented to Sports Medicine Clinic with shoulder problem/s. **Shoulder problems** • Shoulder problems include pain, restricted shoulder motion, disturbed sleep, and impaired activities of daily living.
Criteria	:	**Inclusion**: 1. Patient with shoulder problem/s who first presented to Sports Medicine Clinic **Exclusion**: 1. Patients who have undergone shoulder surgery with implant prior to the first encounter at Sports Medicine Clinic. 2. Patients who have undergone shoulder soft-tissue surgery less than one year ago. 3. Patients with cerebral vascular accidents (CVA) 4. Patient with connective tissue diseases (CTD) 5. Patient with malignancy undergoing active treatment 6. Referred pain to shoulder from elsewhere eg. cervical, cardiac etc. 7. Patient who sustained new injury (does not secondary to their rehabilitation exercises and treatment) on the same shoulder prior to their third visit.

		8. Patient undergone surgery after their first visit in Sports Medicine Clinic 9. Patient who has received treatment from outside KKM facilities on their discretion prior to the THIRD visit. 10. Patient who defaulted follow up visit.
Type of indicator	:	Rate-based outcome indicator
Numerator	:	Number of patients with improved SPADI or M-SPADI score at third visit to Sports Medicine Clinic
Denominator	:	Total number of patients who completed SPADI or M-SPADI during **third visit** to Sports Medicine Clinic
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 60%
Data Collection & Verification	:	1. **Where**: Data will be collected in the Sports Medicine Clinic. 2. **Who**: Data will be collected by Officer/ Paramedic/ Nurse in-charge of the department/ unit. 3. **How to collect**: Data is suggested to be collected from patient's case notes or record book at **first and third visit** to the clinic 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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TRANSFUSION MEDICINE			
NO	**INDICATOR**	**DIMENSION**	**STANDARD**
1	Timeliness of performing emergency cross-match within 30 minutes	Timeliness	≥ 95%
2	Red Cell Expiry Rate	Effectiveness	≤ 2%
3	Percentage of febrile transfusion reaction investigation reported within 10 working days	Efficiency	≥ 80%

Discipline	:	**Transfusion Medicine**
Indicator 1	:	**Timeliness of performing emergency cross-match within 30 minutes**
Dimension of Quality	:	Timeliness
Rationale	:	Timely blood supply is crucial for patient care in emergency/ urgent cases and thus help to reduce mortality and morbidity.
Definition of Terms	:	**Emergency/Urgent cases:** Cases that require blood immediately to save a life. Blood supply will either be of group-specific packed red cells after an emergency cross-matched procedure has been performed, uncross-matched group specific packed cells or Safe O. **Emergency cross-match:** Units of blood that are found to be compatible at immediate spin after 5 minutes incubation at room temperature is issued for transfusion. **Safe 0:** Group 0 Rh D positive packed cell that is released in life threatening condition without cross-matching
Criteria	:	**Inclusion Criteria:** 1. Blood requests marked as emergency cross-match by the attending clinician and a) Preceded by a phone call from the clinician (or delegated representative) OR b) Cases where the ward representative is physically present at the blood bank. **Exclusion Criteria:** 1. Safe O 2. Uncross-match group specific packed cells 3. All cases for elective transfusion (surgical, medical etc.). 4. Incomplete request as per rejection criteria. 5. Cases that required complete antibody identification and supply of compatible blood. 6. Group Screen and Hold (GSH) cases that are converted to GXM.
Type of indicator	:	Rate-based process indicator
Numerator	:	Number of emergency cross-match performed within ≤30 minutes
Denominator	:	Total number of emergency cross-match cases where blood was requested
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≥ 95%
Data Collection & Verification	:	1. **Where**: Data will be collected in hospital's blood bank/ Transfusion Medicine Department/ Unit. 2. **Who**: Data will be collected by Officer of the department/ unit. 3. **How to collect**: Data is suggested to be collected from Blood Bank urgent cases record book/ Blood Bank Information System/ related records. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	*This indicator is also being monitored as an Outcome Based Budgeting (OBB) indicator.

Discipline	:	**Transfusion Medicine**
Indicator 2	:	**Red Cell Expiry Rate**
Dimension of Quality	:	Effectiveness
Rationale	:	To monitor the expiry rate of red cell in blood bank inventory in order to prevent wastage of red cells.
Definition of Terms	:	**Expiry**: Red cell that has expired in the blood bank inventory.
Criteria	:	**Inclusion**: 1. All red cell units in stock (collected and/ or received from other blood centre). **Exclusion**: 1. Red cell units that are not suitable for use (e.g., contaminated).
Type of indicator	:	Rate-based output indicator
Numerator	:	Number of expired red cell units for the month
Denominator	:	Total number of red cell units in stock for the month
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\ \%$
Standard	:	≤ 2%
Data Collection & Verification	:	1. **Where**: Data will be collected in hospital's blood bank/ Transfusion Medicine Department/ Unit. 2. **Who**: Data will be collected by Officer of the department/ unit. 3. **How to collect**: Data is suggested to be collected from record book/ Blood Bank Information System/ related records. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

Discipline	:	**Transfusion Medicine**
Indicator 3	:	**Percentage of febrile transfusion reaction investigation reported within 10 working days**
Dimension of Quality	:	Efficiency
Rationale	:	Transfusion of blood and blood components carries a small risk of acute or delayed adverse reaction. Recognition and management of transfusion reactions is vital to minimize the risk of harm to the patient. Therefore, transfusion reaction investigation and completed report by blood bank provided guidance regarding the diagnosis, treatment, and prevention from subsequent adverse events.
Definition of Terms	:	**Transfusion reaction:** Any adverse effect in a patient associated with administration of blood/blood component during or after blood/blood component transfusion. **Febrile transfusion reaction:** Febrile type reactions that occur during or within 24 hours of blood/blood component transfusion. It can be classified into 3 categories: i. **Mild:** A temperature > 38°C and a rise between 1°C and 2°C from pre-transfusion values, but no other symptoms/ signs ii. **Moderate:** A rise in temperature of 2°C or more, or fever 39°C or over and/or rigors, chills, other inflammatory symptoms/signs such as myalgia or nausea which precipitate stopping the transfusion iii. **Severe:** A rise in temperature of 2°C or more, and/or rigors, chills, or fever 39°C or over, or other inflammatory symptoms/signs such as myalgia or nausea which precipitate stopping the transfusion, prompt medical review AND/OR directly results in, or prolongs hospital stay Note: Definition as per ANNUAL SHOT REPORT 2021 **Within 10 working days:** Time taken from the time the transfusion laboratory receives the request for transfusion reaction investigation to the time the transfusion reaction investigation reported by Transfusion Medicine Specialist/ Medical Officer. **Transfusion reaction investigation report:** A report produced by a Transfusion Medicine Specialist/ Medical Officer after reviewing laboratory investigation and patient's signs and symptoms to determine the diagnosis of adverse reaction.
Criteria	:	**Inclusion Criteria:** All requests for febrile transfusion reaction investigation **Exclusion Criteria:** 1. Rejected request/incomplete request according to rejection criteria

		2. Requests for other types of reactions.
Type of indicator	:	Rate-based output indicator
Numerator	:	Total number of febrile transfusion reaction investigation reported within 10 working days
Denominator	:	Total number of requests for febrile transfusion reaction investigations
Formula	:	Numerator x 100 % Denominator
Standard	:	≥ 80%
Data Collection & Verification	:	1. **Where**: Data will be collected in hospital's blood bank/ Transfusion Medicine Department/ Unit. 2. **Who**: Data will be collected by Officer of the department/ unit. 3. **How to collect**: Data is suggested to be collected from record book/ Blood Bank Information System/ related records. 4. **How frequent**: PVF to be sent 6 monthly to Quality Unit of hospital. 5. **Who should verify**: PVF must be verified by Head of Department, Head of Quality Unit and Hospital Director.
Remarks	:	

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