MINISTRY OF HEALTH MALAYSIA

GERIATRIC FRACTURE LIAISON SERVICE

PROGRAM MANUAL

MEDICAL DEVELOPMENT DIVISION

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FOREWORD

Director General of Health

Malaysia is rapidly progressing toward becoming an ageing nation. With this demographic shift comes the rising burden of age-related conditions, among which fragility fractures stand as a significant public health concern. The increasing incidence of osteoporosis and its consequent fractures, particularly among older persons, demands a systematic, proactive, and multidisciplinary response.

The development of the Geriatric Fracture Liaison Service (GFLS) under the Ministry of Health Malaysia is both timely and essential. It aligns with the Ministry's Strategic Framework 2021–2025, which emphasises seamless, patient-centred, and collaborative geriatric care. This manual provides clear guidance for implementing an integrated model of care that not only addresses the acute management of fragility fractures but also outlines long-term strategies for secondary prevention, rehabilitation, and continuity of care.

The GFLS model embodies the principles of patient-centred, multidisciplinary collaboration, ensuring that no elderly person is left behind in receiving quality fracture care. By streamlining services across disciplines and care settings, we aim to reduce the risk of future fractures, minimise disability, and improve the quality of life for our older population.

I commend the dedicated team behind the development of this manual for their commitment and foresight. It is my hope that this document will serve as a valuable resource for healthcare providers and administrators alike, and that it will pave the way toward more resilient and responsive healthcare services for our ageing population.

Let us move forward together in ensuring healthier ageing and a stronger future for Malaysia.

Datuk Dr. Mahathar Abd Wahab
Director General of Health
Ministry of Health Malaysia

FOREWORD

Deputy Director General of Health (Medical)

The rise in fragility fractures among Malaysia's ageing population is an urgent call to action. As the country moves steadily toward aging nation status, the healthcare system must evolve to meet the unique and growing needs of our older citizens. Geriatric fractures, often the result of underlying osteoporosis and compounded by multiple comorbidities, represent a critical point of vulnerability but also an opportunity for meaningful intervention.

The Geriatric Fracture Liaison Service (GFLS) is a strategic initiative that aligns with the Ministry of Health's commitment to providing holistic, coordinated, and patient-centred care. This manual outlines a structured, multidisciplinary approach that bridges the gap between acute fracture care, rehabilitation, and long-term prevention. It brings together orthopaedics, geriatrics, internal medicine, anaesthesiology, emergency & trauma, rehabilitation medicine, primary care, pharmacy, radiology, nursing, and allied health professionals to deliver care that is both evidence-based and practical.

This program manual emphasises timely identification, comprehensive assessment, and continuity of care: components that are essential in reducing refracture risk, minimising disability, and improving outcomes for older Malaysians.

I thank all those involved in the development of this manual. Your efforts reflect our shared mission to raise the standard of care and ensure that the health system remains responsive and inclusive for all age groups. May this manual serve as a foundation for consistent implementation across healthcare facilities nationwide and a catalyst for continued innovation in geriatric fracture care.

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1.

AIM OF DOCUMENT

AIM OF DOCUMENT

1.1 To introduce the concept of Geriatric Fracture Liaison Service (GFLS) as a multidisciplinary care continuum.

1.2 To explain the rationale and purpose of the implementation of GFLS program with special focus on osteoporosis and fragility fracture management.

1.3 To facilitate the implementation of the GFLS program within the Ministry of Health Malaysia, in alignment with evidence-based management outlined in the Clinical Practice Guidelines.

2.

INTRODUCTION

2.1 BACKGROUND

2.1.1 Osteoporosis is a disease classified by the alteration of bone microarchitecture and the loss of its structural integrity, resulting in its predisposition to fractures. Worldwide, 1 in 3 women and 1 in 5 men are expected to be affected by osteoporosis.

2.1.2 A comprehensive analysis from the Global Burden of Disease (GBD) study examine the burden of fractures in 204 countries and territories. In 2021, Asia accounted for approximately 91.3 million incident fracture cases, representing a 38.35% increase as compared to 1990. The study identified older adults experiencing the highest fracture burden, particularly hip fractures among women.

2.1.3 The Asian Federation of Osteoporosis Societies study in 2018 projected that in 2050, Malaysia could have a 3.5 fold increase in the number of hip fractures, amounting to about 21,000 fractures per year. The cost of treatment was estimated to be about RM450 million per year. The anticipated number of hip fractures in Malaysia is also shown to be one of the highest in the Asia Pacific region.

2.1.4 The impact of a fragility fracture can be devastating, leading to dependency, disability and the need for care, including institutionalisation and mortality. It is known that a proportion of those with fractures often encounter fragmented service provision from health care providers. Suboptimal fracture care increases the risk of complications, poor functional outcome, caregiver stress and an incremental financial burden. Multiple medical complications can also occur if the fractures are not managed adequately, leading to readmissions and a burden to the health care system, caregivers and the society.

2.1.5 Fracture liaison services address the low rates of active osteoporosis investigations and management for those who have had a fragility fracture. The fracture liaison services model sought to ensure that patients with clinical signs of osteoporosis receive appropriate evaluation and treatment, as patients are at a two-fold risk of refracture following a fragility fracture.

2.2 CONCEPT

2.2.1 Geriatric Fracture Liaison Service (GFLS) is a multidisciplinary system approach to **manage fragility fracture** to reduce morbidity and mortality and to **prevent subsequent fractures**.

2.2.2 GFLS encompasses a seamless continuum of care for fragility fracture which begins early in the **acute hospital setting** and actively supports the patients as they progress through the trajectory of recovery until the management is transitioned to the **primary care provider**.

2.2.3 **Key components** of GFLS Program:

1. **Identification** of patients with fragility fracture.

2. Prompt **comprehensive assessment and management** by the **multidisciplinary team.**

3. Evaluation to determine suitability for conservative or surgical management by the **multidisciplinary team.**

4. **Individualisation of care** encompassing the considerations below:
   i. Stabilization of the acute medical and comorbid conditions
   ii. Type of operation and prosthesis
   iii. Resource availability (ie. bed, personnel and equipment)
   iv. Accessibility to rehabilitation facilities in the hospital or community

5. Availability of **monitoring, evaluation and re-entry points** (may allow step-down or step-up of patient care according to the patient's condition).

6. Integration of **secondary** prevention in the care process including:
   i. Treatment and monitoring of **bone health**
   ii. **Falls** assessment and prevention

2.2.4 The process in the management of fragility fractures can be divided into 3 phases:

PHASE 1: ACUTE MULTIDISCIPLINARY MANAGEMENT OF FRAGILITY FRACTURE

PHASE	MANAGEMENT	TIER	DESCRIPTION
1	Management in the hospital (inpatient)		Acute management of fragility fracture by the multidisciplinary team
2	Management in the hospital (in/outpatient rehabilitation) **AND/OR** Management in the community (outpatient rehabilitation)	**TIER 1*** **TIER 2*** **TIER 3***	Rehabilitation post-/ non-surgery in the initial hospital Rehabilitation in a transitional hospital Rehabilitation in the primary care setting
3	Management in the hospital or community (outpatient treatment)		Rehabilitation post-/ non-surgery in the initial hospital Rehabilitation in a transitional hospital Rehabilitation in the primary care setting

**depending on clinical/ patient needs*

i. Efficient management in the emergency setting
ii. Prompt admission to orthopaedic care
iii. Rapid comprehensive assessment by the orthopaedic, medical and anaesthetic teams
iv. Minimal delay to surgery - within 48 hours
v. Accurate and well-performed surgery
vi. Prompt mobilisation post-surgery
vii. Comprehensive assessment by the multidisciplinary team

PHASE 2 : REHABILITATION AFTER SURGERY

i. Early multidisciplinary rehabilitation
ii. Timely supported discharge with ongoing hospital or community rehabilitation

PHASE 3: PREVENTION OF FALLS AND FUTURE FRAGILITY FRACTURES

i. Bone health assessment for secondary osteoporosis prevention
ii. Falls risk assessment

2.3 OBJECTIVE OF THE GFLS PROGRAM

2.3.1 To deliver efficient, high-quality care to individuals with fragility fractures, aiming to **improve patient outcomes**.

2.3.2 To enhance the diagnosis and long-term management of osteoporosis with the goal of **reducing associated morbidity and mortality**.

3.

POLICY STATEMENT

POLICY STATEMENT

3.1 **Geriatric hip fractures** will be prioritised for management through the Geriatric Fracture Liaison Service.

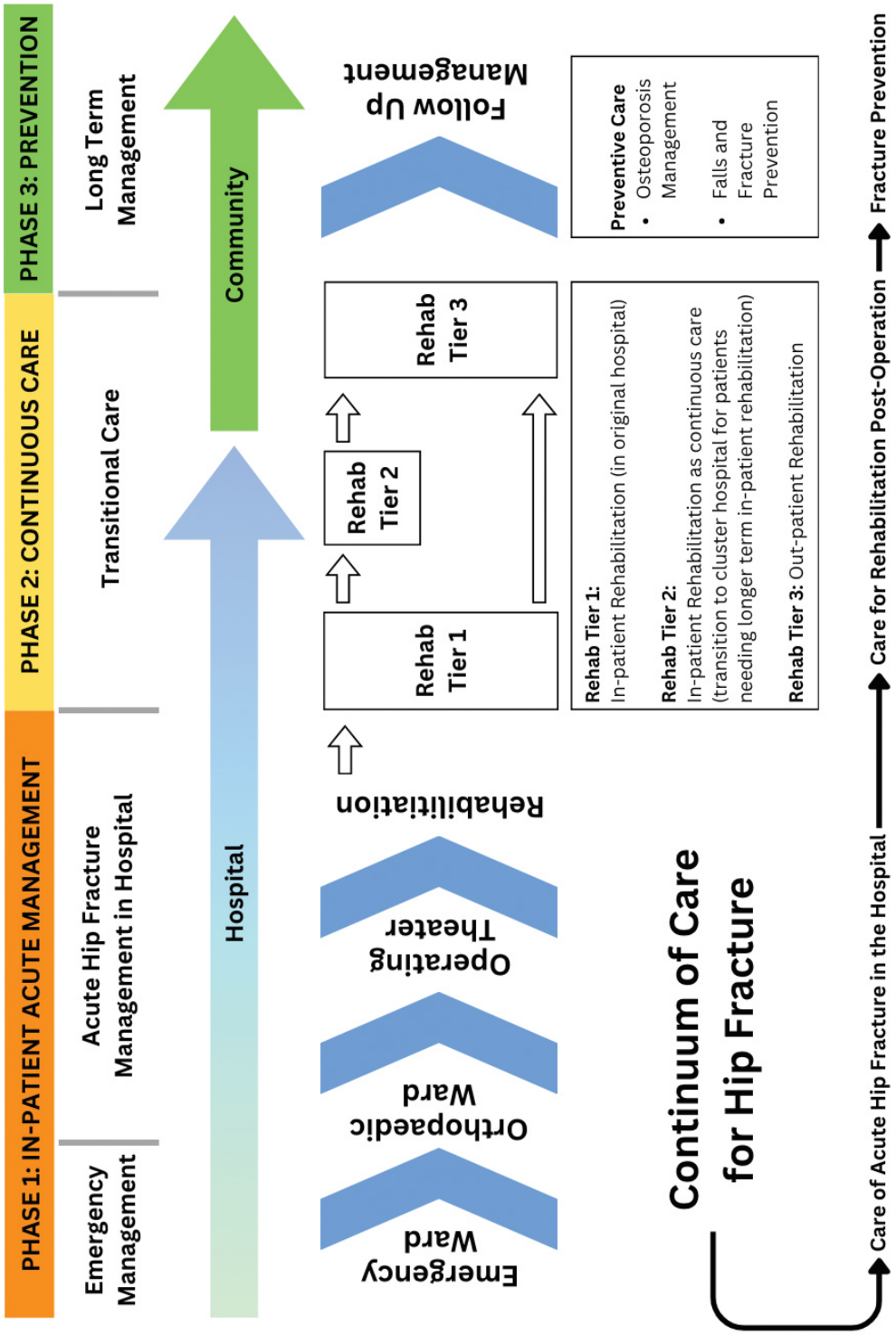
3.2 Patients with hip fracture should have definitive fracture management within 48 hours of admission.

3.3 All patients should receive multidisciplinary management from admission through to discharge and follow-up.

3.4 Fall and secondary fracture prevention is essential to long-term recovery.

4.

MODEL OF CARE


Continuum of Care for Hip Fracture
Care of Acute Hip Fracture in the Hospital
Care for Rehabilitation Post-Operation
Fracture Prevention
Hospital
Community
PHASE 1: IN-PATIENT ACUTE MANAGEMENT
PHASE 2: CONTINUOUS CARE
PHASE 3: PREVENTION
Emergency Management
Acute Hip Fracture Management in Hospital
Transitional Care
Long Term Management
Emergency Ward
Orthopaedic Ward
Operating Theater
Rehabilitation
Follow Up Management
Rehab Tier 1
Rehab Tier 2
Rehab Tier 3
Rehab Tier 1: In-patient Rehabilitation (in original hospital)
Rehab Tier 2: In-patient Rehabilitation as continuous care (transition to cluster hospital for patients needing longer term in-patient rehabilitation)
Rehab Tier 3: Out-patient Rehabilitation
Preventive Care
• Osteoporosis Management
• Falls and Fracture Prevention

5.

PROGRAM IMPLEMENTATION

5.1 CRITERIA

5.1.1 MOH hospitals with the following services available in-house shall be encouraged to start the GFLS Programme:

- Emergency Medicine
- Orthopaedic Surgery
- Internal Medicine
- Anaesthesiology and Critical Care
- Radiology
- Pharmacy
- Physiotherapy

5.1.2 Having fulfilled the above criteria, below are the minimum requirements needed in each facility to start GFLS Programme:

Infrastructure	• Ward • Operating theatre (OT) • Adequate rehabilitation area • Clinic
Equipment	• X-ray • Image intensifier in OT • Ambulation and rehabilitation equipment*
Consumables	• Implants for hip fixation/replacement
Medications	• Osteoporosis medications

**See Appendix 2 (list of recommended equipment)*

5.1.3 Patient selection criteria:

- All patients above the age of 60 with a hip fracture
- The fracture should have occurred within six weeks prior to the first visit to the emergency department

5.1.4 The **ideal acute geriatric hip fracture service** should include the following:

Services	• Emergency Medicine • Orthopaedic Surgery • Geriatric Medicine • Anaesthesiology and Critical Care • Acute Pain Service • Radiology • Rehabilitation Medicine • Dental Surgery • Pharmacy • Physiotherapy • Occupational Therapy • Dietetic • Medical Social Work
Infrastructure	• Orthogeriatric ward • Dedicated OT for geriatric hip fracture • Rehabilitation facilities • High Dependency Ward (HDW)/Post Anaesthesia Care Unit (PACU)/Extended Recovery • GFLS Clinic
Equipment	• Image intensifier in OT • Activities of Daily Living (ADL) aids (eg: wheelchair, commode) • Ambulation aids (eg: walking frame, rollators) • Bone Mineral Density (BMD) machine • Ultrasound machine
Consumables	• Implants for hip fixation/replacement • For regional block • Rehabilitation devices (eg: Theraband)
Drugs	• Osteoporosis medication

5.2 HIP FRACTURE PATHWAY

5.2.1 MOH hospitals with the following services available in-house shall be encouraged to start the GFLS Programme:

- Emergency Medicine
- Orthopaedic Surgery
- Internal Medicine
- Anaesthesiology and Critical Care
- Radiology
- Pharmacy
- Physiotherapy

PHASE	GENERAL PRINCIPLE
Acute Hip Fracture Care: **Emergency management**	Patients with suspected fragility hip fracture should be triaged accordingly in the Emergency and Trauma Department (ETD). Clinical assessment to be conducted include: • History taking • Physical examination • Blood investigations • Electrocardiogram Adequate pain relief is essential. Imaging should include: • Chest X-ray (CXR) Anteroposterior (AP) view • X-ray Pelvis AP • X-ray Hip AP & lateral • Computed Tomography (CT) hip* **If occult hip fracture is suspected* Referral should be made to the orthopaedic surgeon/team upon confirmation of hip fracture diagnosis.

PHASE	GENERAL PRINCIPLE
Acute Hip Fracture Care: **Pre operative management**	A multi-disciplinary team should be activated, including: • Orthopaedic Surgeon • Geriatrician/ Physician • Anaesthesiologist (upon decision for operation) • Rehabilitation Physician (if required) • Physiotherapist • Occupational Therapist • Dietitian • Pharmacist The multi-disciplinary team approach should include: • Comprehensive Geriatric Assessment* • Pre-Operative Medical Optimisation • Prehabilitation • Functional Assessment **CPG Geriatric Hip Fracture: Appendix 4 (Pg 10)* Patients who opt for non-surgical management should be managed as per protocol.
Post Operative Hip Fracture Care	Post-operative patients should be admitted to the respective ward according to clinical needs/availability, e.g. general ward/ PACU/ Intensive Care Unit (ICU)/ HDW. Orthopaedic team should decide on weight bearing status. Mobilization should be started as early as day 1 post-operative if, condition permits. Multi-disciplinary review and management should be performed. Individualised post-operative rehabilitation program should be formulated. Re-evaluation of rehabilitation goals should be conducted regularly according to the individual's ability.

PHASE	GENERAL PRINCIPLE
Secondary fracture prevention	Secondary fracture prevention should be started and consist of the following components: • Osteoporosis treatment* **CPG on the Management of Osteoporosis* • Falls risk factor assessment
Post Discharge Hip Fracture Care	Early supported discharge from hospital should be arranged. **Falls risk assessment** could be conducted by the: • Geriatrician • Internal Medicine Physician • Rehabilitation Physician • Family Medicine Specialist **Bone health optimisation** could be conducted by: • Orthopaedic Surgeon • Geriatrician • Internal Medicine Physician • Family Medicine Specialist The patient should be enrolled to the long term follow-up programme once the rehabilitation and functional goals are achieved.

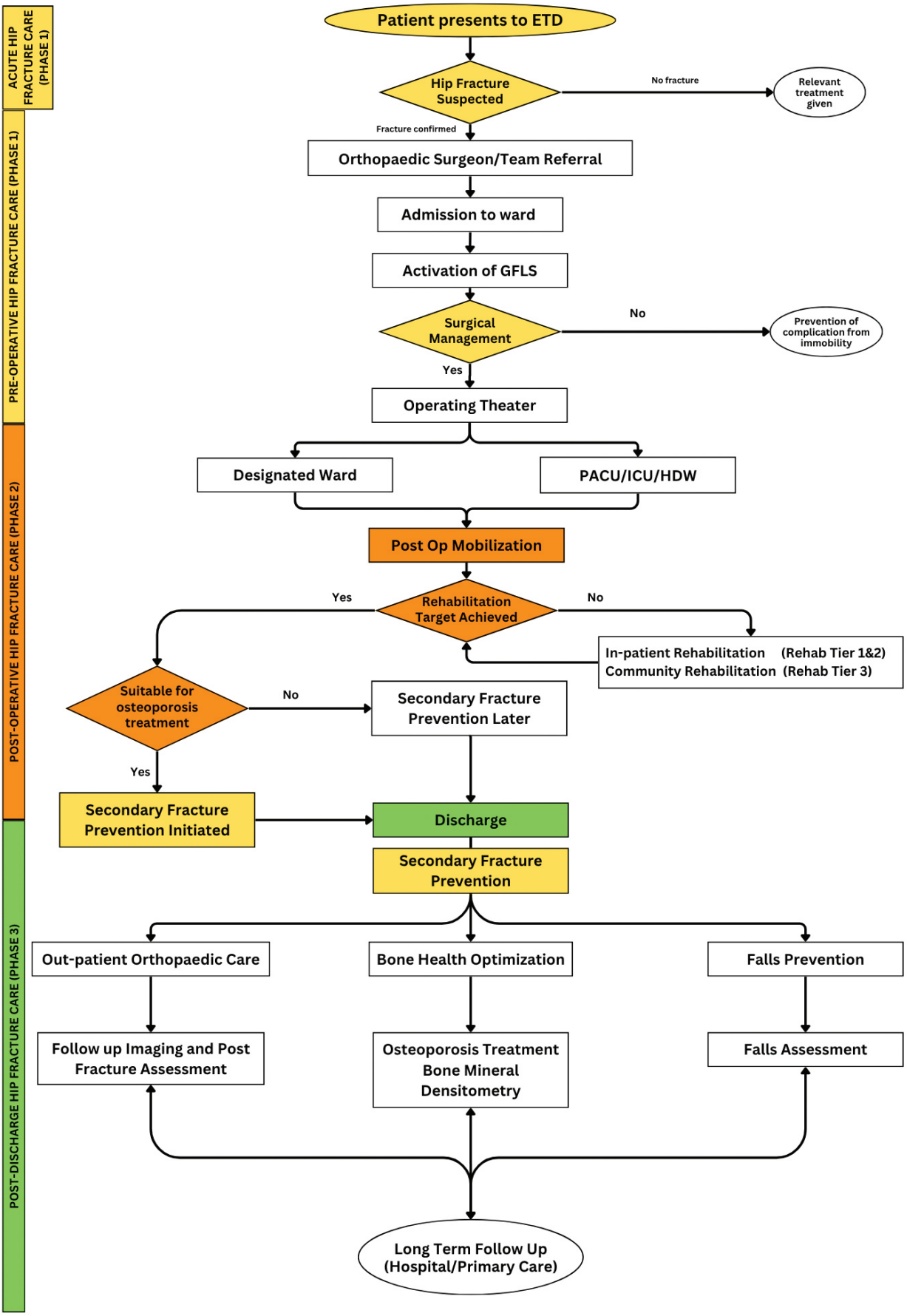


DIAGRAM 1: HIP FRACTURE PATHWAY

6.

ROLE OF THE MULTIDISCIPLINARY TEAM

6.1 Emergency & Trauma

- Diagnose and manage acute fragility fractures
- Provide pain control and immediate fracture stabilization

6.2 Orthopaedic

- Refer to the multidisciplinary team members
- Co-manage the acute care of the patient
- Plan and procure the necessary implant needed
- Perform the hip fracture operation in the earliest available operating theatre time
- Determine the initial type of post-op rehabilitation
- Optimise bone health

6.3 Radiology

- Facilitate imaging
- Report and inform positive findings on plain radiographs/ CT scan in patients with suspected occult hip fractures to Emergency or Orthopaedic Team within 24 hours
- Inform the Emergency or Orthopaedic team in case of missed hip fracture on initial plain radiograph

6.4 Internal Medicine

- Stabilise acute medical conditions
- Manage medical comorbidities
- Screen and manage for delirium
- Optimise bone health

6.5 Geriatric

Comprehensive Geriatric Assessment (CGA) evaluation of the patient to:

- Manage acute condition
- Review and manage medical comorbidities
- Assess cognition and manage delirium
- Assess nutritional status
- Review functional assessment and falls risk
- Review medication
- Prevent complications
- Optimise bone health
- Plan rehabilitation
- Evaluate falls risk

6.6 Anaesthesiology

- Manage perioperative pain
- Ensure patient is optimised pre-operatively
- Facilitate operating theatre time
- Manage postoperative care

6.7 Rehabilitation team

- Assess pre & post-operative rehabilitation
- Initiate pre-op rehabilitation
- Initiate sub-acute inpatient / outpatient rehabilitation
- Coordinate multidisciplinary team for individualised rehabilitation plan
- Coordinate Interdisciplinary Round (IDR)
- Determine rehabilitation goals
- Perform home assessment and prescribe appropriate equipment
- Educate patient and caregiver regarding importance of early mobilization and rehabilitation

6.8 Physiotherapy

- Personalize exercise plans to regain muscle strength and balance
- Educate on fall prevention strategies
- Prescribe and teach patients on suitable assistive devices

6.9 Occupational Therapy

- Perform home visit to assess environmental hazards that contribute to falls and recommend home modification
- Develop simple and effective solutions to prevent falls
- Rebuild confidence after a fall
- Enhance the assimilation of older person back to the communities

6.10 Dietetic

- Screen for malnutrition in older persons
- Prescribe diet requirements and interventions
- Educate on appropriate nutrition requirements

6.11 Pharmacy

- Reconciliate medications
- Ensure patient's adherence to medication by designing personalized individual care plan
- Educate and empower patients and care-givers regarding the medication management
- Enhance patient's safety in medication use and reduce adverse effects and complications
- Collaborate with physicians and other healthcare providers in the provision of optimal patient care

6.12 Family Medicine

- Optimise bone health
- Assess falls risk
- Plan and manage community rehabilitation

6.13 Geriatric Fracture Liaison Service Coordinator

- Identify patients with hip fracture
- Communicate with patients and/ or family members
- Facilitate MDT
- Ensure GFLS form is completed
- Manage appointments and attendances
- Monitor care plan implementation
- Provide essential information and support for managing and preventing fractures
- Follow up with non-adherent patients and provide support to address barriers
- Ensure seamless communication and workflow between patients and healthcare professionals
- Track patient outcomes and ensure the quality of care is maintained

6.14 Bed Management Unit

- Ensure access to beds for patients requiring fracture care
- Coordinate with the FLS coordinator to facilitate smooth transitions across departments
- Implement contingency plans during periods of high demand to ensure no delay in fracture care, including utilizing overflow or alternative units

7.

PROGRAM GOVERNANCE

7.1 NATIONAL LEVEL

7.1.1 The National Steering Committee

i. Determines the **direction** for key policies and strategies for the GFLS service.

ii. Chaired by the **Deputy Director-General of Health (Medical)** and will be composed of:

- Divisions from the Medical Program:
  - Medical Development Division (BPP)
  - Nursing Division
  - Medical Assistant Services Section (CPPPP, BAP)
  - Allied Health Sciences Division (BSKB)
- Divisions from the Public Health Program:
  - Family Health Development Division (BPKK)
- Divisions from the Pharmacy Services Program
- Head of Speciality of Orthopaedic
- Head of Speciality of Internal Medicine
- Head of Subspeciality of Geriatric Medicine
- Other relevant divisions and/or specialty will be involved when necessary

iii. Meetings will be conducted once a year or when necessary.

iv. The Medical Service Development Section (CPPP) is the secretariat.

7.1.2 The National Technical Committee

i. Develops policies and modules for the service according to the planned direction.

ii. Monitors the implementation and progress of the program.

iii. Support continuous improvement of the program using data, feedback, and best practices.

iv. Coordinate with state teams, including State GFLS Champions, to ensure smooth and consistent implementation.

v. The National Technical Committee may establish subcommittees as necessary.

vi. Chaired by the Director of Medical Development Division and will include:

- Divisions from the Medical Program:
  - Medical Development Division (BPP)
  - Nursing Division
  - Medical Assistant Services Section
  - Allied Health Sciences Division (BSKB)
- Divisions from the Public Health Program:
  - Family Health Development Division (BPKK)
- Divisions from the Dental Services Program
- Divisions from the Pharmacy Services Program
- Head and/or representative of Specialty and Subspecialty of:
  - Orthopaedic
  - Internal Medicine
  - Geriatric Medicine
  - Emergency and Trauma
  - Anaesthesiology and Critical Care
  - Radiology
  - Rehabilitation Medicine
  - Family Medicine
- Heads and/or officers from related professions:
  - Physiotherapy
  - Occupational Therapy
  - Dietetics
- Additional representative will be involved when necessary

vii. Meetings will be conducted twice a year.

viii. The Medical Service Development Section (CPPP) is the secretariat.

7.1.3 The Secretariat of the National Committee

i. Coordinates the steering and technical national committee meetings.

ii. Ensures the discussion of issues pertaining GFLS program to be also discussed in each fraternity service meeting.

7.2 STATE LEVEL

7.2.1 A dedicated GFLS State Committee may be established, or GFLS related issues may be discussed on existing platforms.

i. Ensures the effectiveness of the service implementation at the state level
ii. Collects and analyses report for the service
iii. Provides reports to the national committee
iv. Ensures that health care professionals receive training according to the established modules
v. Monitors the effectiveness and conducts audits for the service at the state and district level
vi. Appoint the GFLS state champion
vii. A dedicated GFLS State Committee may be established, or GFLS-related issues may be discussed on existing platforms

7.2.1 The GFLS State Champion

i. Provides technical advice at state level
ii. Should be a clinician, either orthopaedic surgeon, or internal medicine physician/ geriatrician
iii. Ensures the effectiveness of the service implementation at the hospitals within the state
iv. Ensure the collection of data for quality indicators and provide a report/ analysed data to the state
v. Coordinate the training for all the hospitals within the state

7.3 FACILITY LEVEL

A dedicated GFLS Facility Committee may be established, or GFLS related issues may be discussed on existing platforms.

i. Ensure the effective implementation of the service
ii. Ensure involvement of all relevant disciplines in the program
iii. Monitor the implementation of the program
iv. Provide progress reports to the state level

8.

MONITORING AND EVALUATION

8.1 DATA COLLECTION

8.1.1 Relevant data shall be collected and analysed for systematic tracking of patients' progress, risk factors, and outcomes.

8.1.2 Components of the data that needs to be collected are in Appendix 1. It includes demographic, fracture related information, management and data at outpatient review.

8.1.3 This data shall be reported to the national committee (via state and facility committee).

8.2 KEY PERFORMANCE INDICATOR

No.	Indicator	Percentage
1.	Percentage of patients with hip fracture operated within 48 hours of admission.	50%
2.	Percentage of patients with hip fracture discharged with osteoporosis treatment.	75%
3.	Percentage of patients with hip fracture investigated for Bone Mineral Density (BMD) within one year.	75%
4.	Percentage of patients with hip fracture assessed for falls risk factor.	75%
5.	Percentage of patients with hip fracture given adequate perioperative pain management (pain score < 4).	95%
6.	Percentage of postoperative hip fracture patients mobilised with walking aid before hospital discharge.	50%
7.	Percentage of hip fracture patients who received continued osteoporosis treatment.	75%

9.

APPENDICES

APPENDIX 1

Geriatric Fracture Liaison Services Form

DATE: DD MM / 20

GERIATRIC FRACTURE LIAISON SERVICE (GFLS) FORM

Mark '✓' in ☐ *where appropriate* ***Fill in details*** *where appropriate*

INFORMATION ON THE PERSON WHO FILL UP THE FORM

Hospital:
Name:
Designation:
Contact Number:
Email Address:

DEMOGRAPHIC SECTION

Hospital Name:
Identity Card / Passport :
Date of Birth (DD/MM/YYYY): / /
Age: year
Gender: ☐ Male ☐ Female
Ethnicity: ☐ Malay ☐ Chinese ☐ Indian ☐ Others (specify):
Body weight: kg Height: cm BMI: kg/m^2

PREMORBID CONDITIONS SECTION

Prefracture ambulatory status
- ☐ Bedbound
- ☐ House bound
- ☐ Wheelchair
- ☐ Walking frame
- ☐ Walking stick / Quadripod
- ☐ No walking aid

Original placement
- ☐ Home
- ☐ Nursing Home
- ☐ Others (specify):

Falls
- ☐ No previous falls
- ☐ Reccurence falls

History of fracture (sites)
- ☐ Spine
- ☐ Distal radius
- ☐ Femur
- ☐ Hip
- ☐ Others (specify):

Prefracture medications
- ☐ None
- ☐ Vitamin D
- ☐ Calcium

Antiosteoporotic
- ☐ Romosuzumab
- ☐ Teriparatide
- ☐ Denosumab
- ☐ Alendronate
- ☐ Ibandronate
- ☐ Zoledronic acid
- ☐ Raloxifene
- ☐ Others (specify):

Comorbidities
- ☐ None
- ☐ Diabetes
- ☐ Hypertension
- ☐ Ischaemic Heart Disease
- ☐ Chronic Kidney Disease Stage 4 & 5
- ☐ Obesity
- ☐ Previous TIA / Stroke

- [ ] Dementia
- [ ] Thyroid Disease
- [ ] Malignancy
- [ ] Parkinson's Disease
- [ ] Airways Disease
- [ ] Rheumatological Disease
- [ ] Others

ACUTE FRACTURE CARE SECTION

Type of hip fracture
- [ ] Neck of femur (right / left)
- [ ] Intertrochanteric / base of neck fracture (right / left)
- [ ] Subtrochanteric hip fracture (right / left)

Management of fracture (surgical or non-surgical)
- [ ] Surgical
- [ ] Non-surgical

If non-surgical
- [ ] Not fit for surgery
- [ ] Refuse surgery
- [ ] Request transfer to other health facility

First encounter with Orthopaedic Surgeon — Date (DD/MM/YYYY): _____ Time (24-H Format): _____

First encounter with Anaesthetist — Date (DD/MM/YYYY): _____ Time (24-H Format): _____

First encounter with Geriatrician / Physician — Date (DD/MM/YYYY): _____ Time (24-H Format): _____

Date and time of surgery — Date (DD/MM/YYYY): _____ Time (24-H Format): _____

Type of surgery
- [ ] Emergency
- [ ] Elective / Trauma

Choice of implant
- [ ] Screw fixation (right / left)
- [ ] Dynamic Hip / Condylar screw (DHS / DCS) (right / left)
- [ ] Proximal Femoral Nail (PFN) (right / left)
- [ ] Unipolar Hemiarthroplasty (right / left)
- [ ] Bipolar Hemiarthroplasty (right / left)
- [ ] Total Hip Arthroplasty (right / left)

Time to surgery _____ *hours*

If more than 48 hours, reason for delay
- [ ] Medically not optimized
- [ ] No OT time** (Surgery at same facility / Surgery at different facility
- [ ] Awaiting implant
- [ ] Awaiting patient / family decision
- [ ] No ICU / HDW bed
- [ ] Awaiting orthopaedic investigation / diagnosis
- [ ] Unknown

PAIN MANAGEMENT SECTION

Type of pain management
- [ ] Oral analgesia
- [ ] Parenteral analgesia
- [ ] Regional analgesia

Pain score < 4
- [ ] Yes
- [ ] No

Perioperative pain management by APS
- [ ] Yes
- [ ] No

ANAESTHESIOLOGY SECTION

Mode of intraop anaesthesia
- ☐ General anaesthesia
- ☐ Regional anaesthesia
- ☐ Nerve block

Post-op disposition
- ☐ Ward
- ☐ ICU / HDW / PACU

Inpatient complication
- ☐ None
- ☐ Surgical site infection
- ☐ Pneumonia
- ☐ UTI
- ☐ Cardiovascular event
- ☐ Pressure sore
- ☐ DVT/PE
- ☐ Delirium
- ☐ Others (specify):

Falls assessment
- ☐ Yes
- ☐ No

DISCHARGE SECTION

Date and time of discharge — Date (DD/MM/YYYY): ☐ Time (24-H Format): ☐

Discharge status
- ☐ Alive
- ☐ Dead (close question)

Post op mobility upon discharge
- ☐ Bedbound
- ☐ Wheelchair
- ☐ Walking frame
- ☐ Walking Stick / Quadripod
- ☐ No walking aid

Discharge destination
- ☐ Home
- ☐ Nursing home
- ☐ Rehabilitation facility

Treatment of Osteoporosis upon discharge 1
- ☐ None
- ☐ Romosuzumab
- ☐ Teriparatide
- ☐ Denosumab
- ☐ Alendronate
- ☐ Ibandronate
- ☐ Zoledronic acid
- ☐ Raloxifene
- ☐ Others (specify):

BMD scan appointment given
- ☐ Yes
- ☐ No

Date of BMD scan (if available) — Date (DD/MM/YYYY): ☐

OUTPATIENT SECTION

0 to 1 month — Date (DD/MM/YYYY): ☐ Time (24-H Format): ☐

Mobility status
- ☐ Bedbound
- ☐ Wheelchair
- ☐ Walking frame
- ☐ Walking Stick / Quadripod
- ☐ No walking aid

Osteoporosis treatment 1
- ☐ None
- ☐ Vitamin D
- ☐ Calcium

Osteoporosis treatment 2

- ☐ None
- ☐ Romosuzumab
- ☐ Teriparatide
- ☐ Denosumab
- ☐ Alendronate
- ☐ Ibandronate
- ☐ Zoledronic acid
- ☐ Raloxifene
- ☐ Others (specify):

BMD scan done

- ☐ Yes
- ☐ No

1 to 3 month review Date (DD/MM/YYYY): Time (24-H Format):

Mobility status

- ☐ Bedbound
- ☐ Wheelchair
- ☐ Walking frame
- ☐ Walking Stick / Quadripod
- ☐ No walking aid

Osteoporosis treatment 1

- ☐ None
- ☐ Vitamin D
- ☐ Calcium

Osteoporosis treatment 2

- ☐ None
- ☐ Romosuzumab
- ☐ Teriparatide
- ☐ Denosumab
- ☐ Alendronate
- ☐ Ibandronate
- ☐ Zoledronic acid
- ☐ Raloxifene
- ☐ Others (specify):

BMD scan done

- ☐ Yes
- ☐ No

3 to 6 month review Date (DD/MM/YYYY): Time (24-H Format):

Mobility status

- ☐ Bedbound
- ☐ Wheelchair
- ☐ Walking frame
- ☐ Walking Stick / Quadripod
- ☐ No walking aid

Osteoporosis treatment 1

- ☐ None
- ☐ Vitamin D
- ☐ Calcium

Osteoporosis treatment 2

- ☐ None
- ☐ Romosuzumab
- ☐ Teriparatide
- ☐ Denosumab
- ☐ Alendronate
- ☐ Ibandronate
- ☐ Zoledronic acid
- ☐ Raloxifene
- ☐ Others (specify):

BMD scan done

- ☐ Yes
- ☐ No

6 to 12 month review Date (DD/MM/YYYY): Time (24-H Format):

Mobility status

- ☐ Bedbound
- ☐ Wheelchair
- ☐ Walking frame
- ☐ Walking Stick / Quadripod
- ☐ No walking aid

Osteoporosis treatment 1

- ☐ None
- ☐ Vitamin D
- ☐ Calcium

Osteoporosis treatment 2

- ☐ None
- ☐ Romosuzumab
- ☐ Teriparatide
- ☐ Denosumab
- ☐ Alendronate
- ☐ Ibandronate
- ☐ Zoledronic acid
- ☐ Raloxifene
- ☐ Others (specify):

BMD scan done

- ☐ Yes
- ☐ No

APPENDIX 2

Recommended Equipment for Ambulation & Rehabilitation

No.	Item
1.	Mini Finger Pulse Oxymeter (SPO_2)
2.	Stacking Cone
3.	Matching Board
4.	ADL Training Kit
5.	Portable Mirror
6.	Staircase
7.	Pedal Cycling
8.	Motor Med Cycling
9.	2 Wheel Rollator
10.	Walking Frame
11.	Quadripod Small Base of Support
12.	Geriatric Chairs With Adjustable Height and Arm Rest
13.	Commode Chair (Adjustable Height)
14.	Detachable Arm and Foot Rest Wheelchair-light Weight

APPENDIX 3

Related CPGs and Guidelines

No.	Document	Link	QR Code
1	CPG Geriatric Hip Fracture	https://www.moh.gov.my/moh/resources/Penerbitan/CPG/Orthopaedics/e-CPG_GHF-compressed.pdf	
2	CPG Osteoporosis	https://www.moh.gov.my/moh/resources/Penerbitan/CPG/Rheumatology/221115_MOS_CPG-Management_of_Osteoporosis-ed3_PREVIEW.pdf	
3	Guidelines for pain management in elderly	https://www.moh.gov.my/moh/resources/Penerbitan/Program%20Bebas%20Kesakitan/Garis%20Panduan/Geriatric_Pain_Management_2018_(1st_Ed.)_.pdf	

APPENDIX 4

Key Performance Indicator

Indicator 1: Percentage of patients with hip fracture operated within 48 hours of admission

Discipline	:	Geriatric Fracture Liaison Service
Indicator	:	Percentage of patients with hip fracture operated within 48 hours of admission.
Dimension of Quality	:	Timeliness
Rationale	:	High mortality and morbidity
Definition of Terms	:	Hip fracture: a break in the proximal part of the femur bone and/or around the hip joint. 48 hours of admission: Time from admission registration to definitive operative procedure.
Criteria	:	Inclusion criteria: • All patients above the age of 60 with a hip fracture The fracture should have occurred within 6 weeks prior to first visit to the emergency department. Exclusion criteria: • Patient refusal • Medically unfit for surgery - refer to chart • Extraordinary circumstances - fire, flood, natural disasters, power outage, maintenance failure, others • Other bone disorders - Paget's, Tertiary hyperparathyroidism
Type of indicator	:	Rate - based outcome indicator
Numerator	:	Number of patients with hip fracture operated within 48 hours from admission.
Denominator	:	Number of patients with hip fracture
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$

Discipline	:	Geriatric Fracture Liaison Service
Standard	:	≥50%
Data Collection & Verification	:	1. **Where:** Data will be collected from Orthopaedic Ward or ward that cater for the problem. 2. **Who:** Data will be collected by the staff in-charge and submit to GFLS hospital committee. 3. **How to collect:** Data will be collected from the patient's records or admission book. 4. **How frequent:** Data to be sent 3 monthly to GFLS hospital committee. 5. **Who should verify:** Data must be verified by the Hospital Director.

Indicator 2: Percentage of patients with hip fracture discharged with osteoporosis treatment

Discipline	:	Geriatric Fracture Liaison Service
Indicator	:	Percentage of patients with hip fracture discharged with osteoporosis treatment.
Dimension of Quality	:	Effectiveness
Rationale	:	To prevent secondary fracture
Definition of Terms	:	Hip fracture: a break in the proximal part of the femur bone and/or around the hip joint. Osteoporosis treatment: Consist of vitamin D, calcium and any of the medication listed below: • Romosuzumab • Teriparatide • Denosumab • Alendronate • Ibandronate • Zoledronic acid • Raloxifene
Criteria	:	Inclusion criteria: • All patients above the age of 60 with a hip fracture. Exclusion criteria: • Patient refusal • Patient contraindicated for osteoporosis treatment
Type of indicator	:	Rate - based outcome indicator
Numerator	:	Number of patients with hip fracture discharged with osteoporosis treatment.
Denominator	:	Number of patients with hip fracture
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$

Discipline	:	Geriatric Fracture Liaison Service
Standard	:	≥75%
Data Collection & Verification	:	1. **Where:** Data will be collected from Orthopaedic Ward or ward that cater for the problem. 2. **Who:** Data will be collected by the staff in-charge and submit to GFLS hospital committee. 3. **How to collect:** Data will be collected from the patient's records or admission book. 4. **How frequent:** Data to be sent 3 monthly to GFLS hospital committee. 5. **Who should verify:** Data must be verified by the Hospital Director.

Indicator 3: Percentage of patient with hip fracture investigated for Bone Mineral Density (BMD) within one year

Discipline	:	Geriatric Fracture Liaison Service
Indicator	:	Percentage of patient with hip fracture investigated for Bone Mineral Density (BMD) within one year.
Dimension of Quality	:	Effectiveness
Rationale	:	To prevent secondary fracture
Definition of Terms	:	Hip fracture: a break in the proximal part of the femur bone and/or around the hip joint. Investigated for BMD: undergone BMD Scan. Definition of one year: Time from admission until 12 month follow up.
Criteria	:	Inclusion criteria: • All patients above the age of 60 with a hip fracture. Exclusion criteria: • Patient refusal • Patient loss to follow up
Type of indicator	:	Rate - based outcome indicator
Numerator	:	Number of patients with hip fracture investigated with BMD within one year.
Denominator	:	Number of patients with hip fracture
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$

Discipline	:	Geriatric Fracture Liaison Service
Standard	:	≥75%
Data Collection & Verification	:	1. **Where:** Data will be collected from Orthopaedic Ward or ward that cater for the problem. 2. **Who:** Data will be collected by the staff in-charge and submit to GFLS hospital committee. 3. **How to collect:** Data will be collected from the patient's records or admission book. 4. **How frequent:** Data to be sent 3 monthly to GFLS hospital committee. 5. **Who should verify:** Data must be verified by the Hospital Director.

Indicator 4: Percentage of patient with hip fracture assessed for falls risk factor

Discipline	:	Geriatric Fracture Liaison Service
Indicator	:	Percentage of patient with hip fracture assessed for falls risk factor.
Dimension of Quality	:	Effectiveness
Rationale	:	To prevent secondary fracture
Definition of Terms	:	Hip fracture: a break in the proximal part of the femur bone and/or around the hip joint. Fall risk factor: refer to table 4.2 The Risk Factor of Falls in CPG Management of Osteoporosis 2022 (Third Edition)
Criteria	:	Inclusion criteria: • All patients above the age of 60 with a hip fracture. Exclusion criteria: • Patient loss to follow up
Type of indicator	:	Rate - based outcome indicator
Numerator	:	Number of patients with hip fracture assessed for falls risk factor.
Denominator	:	Number of patients with hip fracture.
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥75%
Data Collection & Verification	:	1. **Where:** Data will be collected from Orthopaedic Ward or ward that cater for the problem. 2. **Who:** Data will be collected by the staff in-charge and submit to GFLS hospital committee. 3. **How to collect:** Data will be collected from the patient's records or admission book. 4. **How frequent:** Data to be sent 3 monthly to GFLS hospital committee. 5. **Who should verify:** Data must be verified by the Hospital Director.

Indicator 5: Percentage of patient with hip fracture given adequate perioperative pain management (pain score < 4)

Discipline	:	Geriatric Fracture Liaison Service
Indicator	:	Percentage of patient with hip fracture given adequate perioperative pain management (pain score < 4).
Dimension of Quality	:	Effectiveness
Rationale	:	To prevent secondary fracture
Definition of Terms	:	Hip fracture: a break in the proximal part of the femur bone and/or around the hip joint. Adequate perioperative pain management: Average pain score < 4.
Criteria	:	Inclusion criteria: • All patients above the age of 60 with a hip fracture. Exclusion criteria: • None
Type of indicator	:	Rate - based outcome indicator
Numerator	:	Number of patients with hip fracture given adequate perioperative pain management (pain score < 4).
Denominator	:	Number of patients with hip fracture.
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥95%
Data Collection & Verification	:	1. **Where:** Data will be collected from Orthopaedic Ward or ward that cater for the problem. 2. **Who:** Data will be collected by the staff in-charge and submit to GFLS hospital committee. 3. **How to collect:** Data will be collected from the patient's records or admission book. 4. **How frequent:** Data to be sent 3 monthly to GFLS hospital committee 5. **Who should verify:** Data must be verified by the Hospital Director.

Indicator 6: Percentage of postoperative hip fracture patients mobilised with walking aid before hospital discharge.

Discipline	:	Geriatric Fracture Liaison Service
Indicator	:	Percentage of postoperative hip fracture patients mobilised with walking aid before hospital discharge.
Dimension of Quality	:	Effectiveness
Rationale	:	To prevent morbidity and mortality.
Definition of Terms	:	Postoperative hip fracture: a break in the proximal part of the femur bone and/or around the hip joint that has been stabilised or replaced operatively. Mobilised before hospital discharge: ambulate with or without walking aid before discharge.
Criteria	:	Inclusion criteria: • All patients above the age of 60 with a hip fracture. Exclusion criteria: • Pre-fracture non-ambulatory
Type of indicator	:	Rate - based outcome indicator
Numerator	:	Number of postoperative hip fracture patients mobilised before hospital discharge.
Denominator	:	Number of postoperative hip fracture patients.
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥50%
Data Collection & Verification	:	1. **Where:** Data will be collected from Orthopaedic Ward or ward that cater for the problem. 2. **Who:** Data will be collected by the staff in-charge and submit to GFLS hospital committee. 3. **How to collect:** Data will be collected from the patient's records or admission book. 4. **How frequent:** Data to be sent 3 monthly to GFLS hospital committee. 5. **Who should verify:** Data must be verified by the Hospital Director.

Indicator 7: Percentage of hip fracture patients who received continued osteoporosis treatment

Discipline	:	Geriatric Fracture Liaison Service
Indicator	:	Percentage of hip fracture patients who received continued osteoporosis treatment.
Dimension of Quality	:	Effectiveness
Rationale	:	To prevent secondary fracture
Definition of Terms	:	Hip fracture: a break in the proximal part of the femur bone and/or around the hip joint. Continued osteoporosis treatment: vitamin D, calcium and alendronate prescribed after discharged from hospital follow up.
Criteria	:	Inclusion criteria: • All patients above the age of 60 with a hip fracture. Exclusion criteria: • Patient refusal • Patient contraindicated for osteoporosis treatment
Type of indicator	:	Rate - based outcome indicator
Numerator	:	Number of patients with hip fracture who received continued osteoporosis treatment.
Denominator	:	Number of patients with hip fracture.
Formula	:	$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$
Standard	:	≥75%
Data Collection & Verification	:	1. **Where:** Data will be collected from Health Clinic that cater for the problem. 2. **Who:** Data will be collected by the staff in-charge and submit to GFLS committee. 3. **How to collect:** Data will be collected from the patient's records or admission book. 4. **How frequent:** Data to be sent 3 monthly to GFLS hospital committee. 5. **Who should verify:** Data must be verified by the Family Medicine Specialist.

10.

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REFERENCES

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ABBREVIATION

ABBREVIATION

List of Abbreviation	
ADL	Activities of daily living
AP	Anteroposterior
BKJ	*Bahagian Kejururawatan* (Nursing Division)
BMD	Bone Mineral Density
BPKK	*Bahagian Pembangunan Kesihatan* Keluarga (Family Health Development Division)
BPP	*Bahagian Perkembangan Perubatan* (Medical Development Division)
BSKB	*Bahagian Sains Kesihatan Bersekutu* (Allied Health Sciences Division)
CGA	Comprehensive Geriatric Assessment
CPG	Clinical Practice Guideline
CPPPP, BAP	*Seksyen Perkhidmatan Pembantu Perubatan* (Medical Assistant Services Section)
CT	Computed Tomography
CXR	Chest X-ray
DCS	Dynamic Condylar Screw
DHS	Dynamic Hip Screw
DVT	Deep Vein Thrombosis
ECG	Electrocardiogram
ETD	Emergency and Trauma Department
FMS	Family Medicine Specialist
GBD	Global Burden of Disease
GFLS	Geriatric Fracture Liaison Service

ABBREVIATION

List of Abbreviation	
HDW	High Dependency Ward
ICU	Intensive Care Unit
IDR	Interdisciplinary Round
MDT	Multidisciplinary Team
OT	Operating Theatre
PACU	Post-Anesthesia Care Unit
PCA	Patient Controlled Analgesia
PE	Pulmonary Embolism
PFN	Proximal Femoral Nail
TBP	Tabung Bantuan Perubatan
UTI	Urinary Tract Infection

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