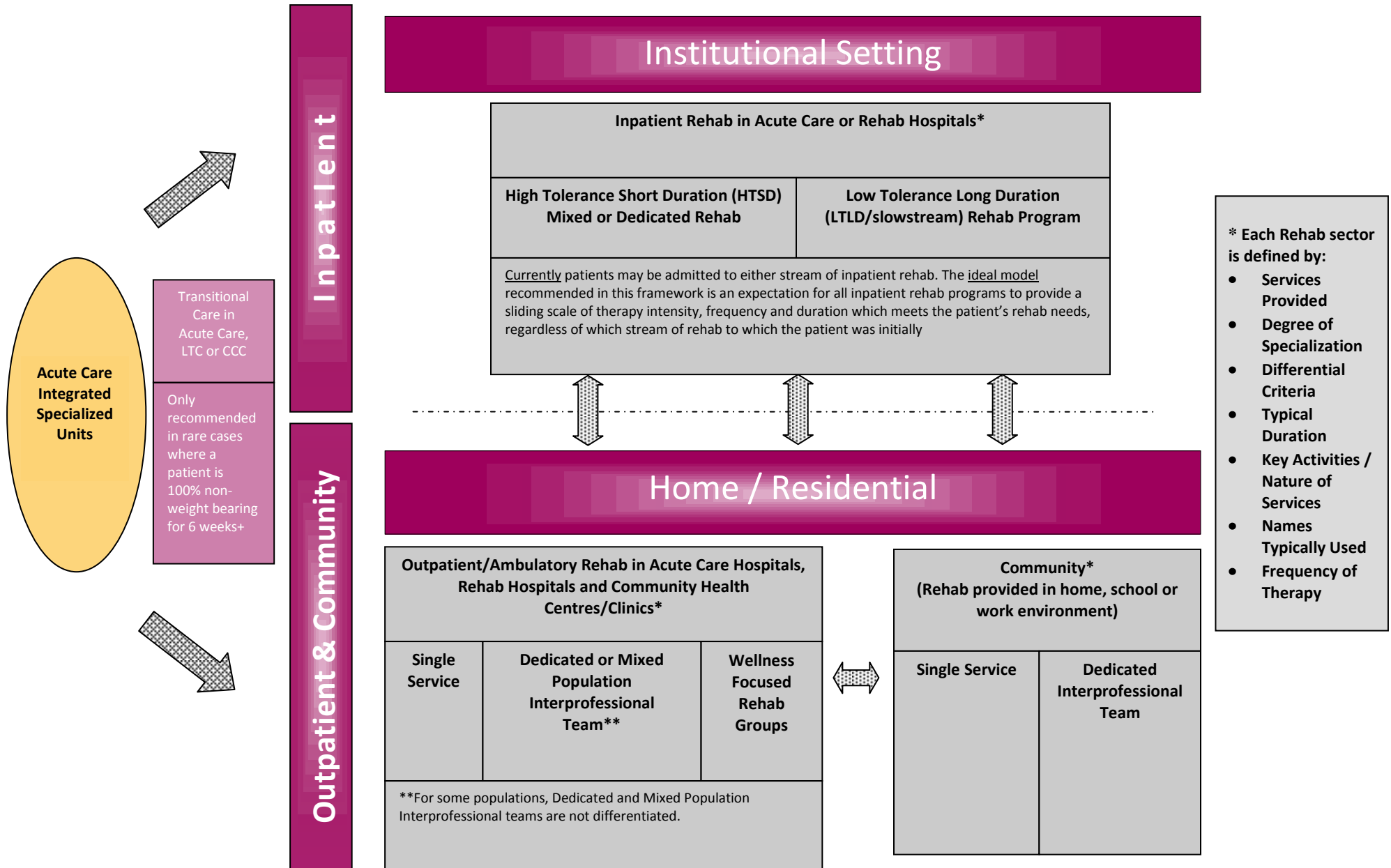


Hip Fracture Rehab Definition Framework



Hip Fracture Rehab Definition Framework

GUIDING PRINCIPLES

Objective:

I. Increase clarity and consistency in the forms of cognitive and physical rehab across the continuum by:

1. Clarifying the distinctions between and across institutional and community-based rehab programs.
2. Classifying programs with consistent terminology.
3. Describing the key features of institutional and community-based rehabilitation programs based on the services provided, the degree of specialization, differential/critical criteria, duration, and the primary focus of the rehab program/service.

II. Inform planning and performance measurement through the development of standards for rehab program components against which rehab programs can be benchmarked.

Guiding Principles:

1. The Rehab Definitions Conceptual Framework presupposes the World Health Organization's definition of "rehabilitation" as "*a progressive, dynamic, goal-oriented and often time-limited process, which enables an individual with an impairment to identify and reach his/her optimal mental, physical, cognitive and/or social functional level. Rehabilitation provides opportunities for the individual, the family and the community to accommodate a limitation or loss of function and aims to facilitate social integration and independence.*"
2. The Rehab Definitions Conceptual Framework refers to cognitive and physical forms of rehabilitation across the continuum of care. The rehab conceptual diagram refers to acute care, inpatient rehab programs within institutional settings and outpatient and community-based rehab for clients residing at home or in a residential setting. The use of bi-directional arrows in the schematic reflects the flow of patients and continuity of care across these settings.
3. The framework identifies key features of rehab programs based on evidence-based practices where available to define the "gold standard" of rehab care (e.g. rehab beds are clustered together). In most instances these key features reflect current practices; however, some organizations may be required to implement changes within their organizations to achieve consistency with the criteria set out in the framework.
4. The term "patient" is used for individuals receiving rehabilitation in a hospital setting. The term "client" is used to refer to individuals receiving community rehab services.
5. The Rehab Definitions Conceptual Framework uses categories that have been defined based on the rehab needs of the patient and the typical services provided. Length of stay or the type of facility in which the rehab is provided is not considered essential to defining rehab sectors.

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6. The Rehab Definitions Conceptual Framework is based on the assumption that clients participating in the programs described have rehab potential and rehab goals. For criteria regarding rehab potential, medical stability and rehab readiness for inpatient rehab, refer to the GTA Rehab Network's Inpatient Rehab Referral Guidelines (www.gtarehabnetwork.ca).
7. The framework uses terminology that is consistent with the MOHTLC guidelines for inpatient rehabilitation beds and can be applied to community and ambulatory service delivery.
8. While it is appreciated that much of rehabilitation occurs in third-party payer assessment centres or private clinics, the framework refers to publicly-funded rehabilitation. However, it is hoped that the framework will promote consistency in standards of care and equitable access across all rehab programs.
9. Input from healthcare providers representing acute care, regional rehab centres and community-based organizations that provide adult (including geriatric) and paediatric rehab has been obtained to validate the Rehab Definitions Conceptual Framework.
10. The MSK – Hip Fracture Rehab Definitions Framework will be reviewed every 3 years to incorporate any newly emerging research in MSK rehab.

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GLOSSARY OF REHAB COMPONENT TERMS

Core Team: Refers to the team members who are essential, actively involved in the assessment and treatment of MSK patients on the unit. In acute care, although team members collaborate closely, they may not participate regularly in team rounds due to the nature of this setting.

Consultation: Consultation would be expected to be available within 24 hours in acute care and 48 hours in rehab.

Dedicated Interprofessional Team (Community): Rehab provided in the home, school or work environment by an interprofessional team using a coordinated, integrated approach for specific rehab populations or to reduce the impact of a particular disability.

Dedicated Interprofessional Team (Outpatient/Ambulatory Rehab): Outpatient rehab provided by an interprofessional team with expertise in the treatment and assessment of a particular patient population. Outpatient/Ambulatory dedicated interprofessional teams are located in acute care hospitals, rehab hospitals and community health centres/clinics. They provide rehab to patients who require more than one rehab service and a coordinated rehab approach.

Dedicated Rehab Unit: An inpatient rehab unit located in acute care and rehab hospitals that serves a single patient population group and provides intensive rehabilitation. Some units may specialize in more than one diagnosis in related populations (e.g. Cardio/Respiratory, Orthopaedic/Amputation, etc.). A dedicated rehab unit is suitable for individuals who require 24-hour hospital care and who are in need of an interprofessional rehab program using a coordinated rehab approach.

Low Tolerance Long Duration (LTLD/slowstream) Rehab Program: Suitable for individuals in need of an interprofessional rehab approach to address specific rehab goals who also have chronic/complex conditions requiring 24-hour hospital care and who are expected to benefit from a slower-paced rehab program for a longer duration than is offered in dedicated or mixed rehab programs. LTLD rehab is most commonly delivered in a complex continuing care bed but may also be provided in a designated rehab bed. LTLD rehab programs may be located in acute care, rehab or complex continuing care hospitals.

Mixed Population Interprofessional Team (Outpatient/Ambulatory Rehab): Outpatient rehab that is provided by an interprofessional team, which typically assesses and treats patients from a variety of patient population groups. Outpatient/Ambulatory mixed population interprofessional teams are located in acute care hospitals, rehab hospitals and community health centres/clinics. They provide rehab to patients who require more than one rehab service and a coordinated rehab approach.

Mixed Rehab Unit: Formerly referred to as a General inpatient rehab unit, this type of unit is located in acute care and rehab hospitals, provides intensive rehabilitation and serves a variety of patient population groups. The mixed rehab unit is suitable for individuals who require 24-hour hospital care and are in need of an interprofessional rehab program using a coordinated approach.

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Single Service (Community): Individual rehab services that are usually provided through Community Care Access Centres. Single rehab services are suitable for individuals who are in need of one or more rehabilitation services in single specialty area(s)/profession(s) provided in the home, school or work environment. Although clients may receive more than one service, a coordinated approach is not used as rehab providers typically work as individual providers. However, some communication with other health providers may occur on an as-needed basis.

Single Service (Outpatient/Ambulatory Rehab): An outpatient rehab service located in acute care hospitals, rehab hospitals and community health centres/clinics that is suitable for individuals who are in need of an outpatient rehabilitation service in a single specialty area/profession. Clients may receive more than one rehab service; however, the services are not provided by way of a coordinated rehab approach. Services may include assessment only or assessment and treatment. Services may be provided during a one-time visit or multiple visits.

Wellness Focused Rehab Groups: These groups are provided in an outpatient/ambulatory setting and led by an individual rehab provider or team or rehab specialists to enhance an individual's ability to cope with a particular disability or impairment. These time-limited groups are publicly-funded although a small fee may be charged for materials

Hip Fracture Rehab Definition Framework

ACUTE CARE	
Integrated Specialized Unit	
Names Typically Used	<ul style="list-style-type: none"> • Orthopaedic unit, MSK unit¹
Services Provided	<ul style="list-style-type: none"> • A coordinated, interprofessional team² provides rehab^{3,4} • The core team⁵ includes all of the following professionals: <ul style="list-style-type: none"> ▶ Clinical Dietitian ▶ Discharge planning role (as filled by: social worker, discharge planner/coordinator, patient flow coordinator, etc.) ▶ Nurse ▶ Occupational therapist ▶ Orthopaedic surgeon ▶ Pharmacist ▶ Physiotherapist ▶ Social worker • Consultation⁶ is available from all of the following professionals: <ul style="list-style-type: none"> ▶ Anaesthetist ▶ Chaplain/pastoral care provider ▶ Pain service ▶ Psychiatrist ▶ Physician specialized in internal medicine ▶ Psychiatrist and/or psychologist ▶ Specialist in gerontology (as filled by: advance practice nurse, nurse practitioner specialized in gerontology, etc.)⁷ ▶ Urologist • Interdisciplinary assessments and short-term rehabilitation is provided. • All patients have access to some type of rehab post acute care, unless they are able to be safely discharged home. Referrals are based on guidelines set in the Triage Tool (See Appendix B) • Determination of rehab need is patient-centred rather than driven by perceived length of stay in rehab or level of tolerance (see Appendix A: Guiding Principles of Hip Fracture Rehab). • All patients with mild to moderate cognitive impairment are referred to inpatient rehab. • Patients with severe cognitive impairment are considered for inpatient rehab referral with consideration for weight bearing status and pre-morbid function. Patients from all types of pre-morbid living situations (e.g. home, long term care facility) are considered equally in decision-making regarding inpatient rehab referral.
Specialized Services	<ul style="list-style-type: none"> • All core and consult team members understand and are able to apply principles of senior focused care⁸, which includes all of the following: <ul style="list-style-type: none"> ▶ Appropriate communication with cognitively impaired persons ▶ A team approach to assess and implement a safe environment ▶ Ability to assess and support patients' informed decision making ▶ Use of interventions which may include: daily orientation, early mobilization, maintenance of vision and hearing, management of sleep, maintenance of adequate fluids and nutrition, minimal use of restraints and catheters in order to maintain physical and cognitive functioning, maximize independence at discharge, and prevent readmission to hospital. • All core team members have expertise in the management of pre-morbid conditions (e.g. cardiac, dementia)

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ACUTE CARE	
Integrated Specialized Unit	
	<ul style="list-style-type: none"> • The core team as a whole has established competency in treating patients with hip fractures and has competency in each of the following areas: <ul style="list-style-type: none"> ▶ Pain management ▶ Non pharmacological and pharmacological sleep management ▶ Ability to identify each of the following and understand the difference between them: delirium (e.g. with CAM), dementia (e.g. with MMSE), and depression (e.g. with GDS) ▶ Ability to appropriately manage delirium, dementia, and depression ▶ Assessment and incorporation of the individual’s unique needs and interests (i.e. personhood). • There is no evidence to support a recommendation for a minimum critical mass of patients to maintain level of clinical expertise. Any hospital should be able to manage a hip fracture surgery and subsequent acute care level rehab. • Staffing ratios are sufficient to support the level of services recommended.^{9, 10}
Differentiating Criteria	<ul style="list-style-type: none"> • Suitable for all patients with hip fracture who require medical and rehabilitative care until medically stable and ready for discharge home or to rehab. • Appropriate goals to be attained include having the patient back to pre-fracture level of continence¹¹, pain-free¹² and delirium-free¹³ (if this is not possible, at a minimum an appropriate goal is to help the family cope with the delirium).
Typical Duration	<ul style="list-style-type: none"> • The current system goal is for a 5 day maximum between surgery and referral to inpatient rehab; however, evidence supporting this length of stay does not currently exist. Ideally, the length of stay is not constrained by a maximum duration, but is linked to the patient’s needs and goals. Based on available evidence, the timeframe between surgery and admission to inpatient rehab should be no more than 15 days¹⁴; however, ideally this time frame would be as soon as possible. • Patients are appropriate for discharge home from acute care based on their ability to function safely at home with appropriate supports and based on their ability to accept risk. • Patients are only referred to transitional care as a temporary destination in rare circumstances when they are not able to participate in rehab due to an expected period of 100% non weight bearing for a period of 6 weeks or more. • Early referrals to rehab are encouraged to minimize any service gap between the patient becoming ‘rehab ready’ and the patient being admitted to rehab. Rehab referrals should be submitted once patients meet the following 3 criteria as per the GTA Rehab Network guidelines¹⁵: (1) the patient meets the criteria of a rehab candidate*; (2) the patient meets the criteria of medical stability* OR the patient’s date of medical stability can be identified within the next 1-2 days of submission of application; (3) the patient meets the criteria for rehab readiness* or the date for rehab readiness can be identified. Note that planning for discharge should begin prior to ALC designation. <i>*See Appendix C for summary of GTA Rehab Network Inpatient Rehab Referral Guidelines</i> • Prior to transfer to rehab, the following are met: (1) the etiology of the fall has been determined or is under investigation (e.g. neurological, cardiovascular, mechanical, environmental) and all neurological and cardiac reasons for falls have been ruled out or are under investigation; AND (2) the patient is medically stable as defined in GTA Rehab Network guidelines.* • <i>*See Appendix C for summary of GTA Rehab Network Inpatient Rehab Referral Guidelines</i>
Key Activities / Nature of Service	<ul style="list-style-type: none"> • Throughout the acute care stay (pre and post surgery), care is provided to minimize the risk of deconditioning and maximize rehab readiness. In particular, all of the following activities occur for all patients: (1) Promotion of abilities, such as maximizing self care¹⁶; (2) Pain management^{17,18}; (3) Maintenance of proper hydration¹⁹ and nutrition^{20,21,22,23,24}; (4) Early mobilization^{25,26,27,28}; (5) Bladder and bowel care and re-training such that issues have been addressed even if not fully resolved^{29,30} (e.g. urology consult has been arranged, catheter has been attempted to be removed)^{31,32}; (6) Maintenance of skin integrity / prevention of pressure sores^{33,34,35}; (7) Positioning. • The team provides consistent messaging and education to the patient and/or family regarding anticipated timeframes, next steps and discharge options throughout

Hip Fracture Rehab Definition Framework

ACUTE CARE	
Integrated Specialized Unit	
Key Activities / Nature of Service	<p>the acute care stay (pre and post surgery).</p> <ul style="list-style-type: none"> • A delirium management program is provided on admission and throughout the hospital stay^{36,37,38} which includes all of the following components: (1) Use of a standardized screening tool for delirium³⁹ (e.g. with CAM); (2) Identification of possible causes of/contributors to delirium⁴⁰; (3) Education provided to the family on delirium; (4) Intervention/strategies to minimize delirium and maximize functional and cognitive gains⁴¹. • Surgery is completed within 48 hours of admission^{42,43,44} • The following activities occur in the 48 hours before surgery for all hip fracture patients, unless otherwise noted: <ul style="list-style-type: none"> ▶ Identification of type and number of comorbidities⁴⁵ ▶ Pre⁴⁶ and post-fracture reconciliation of functioning level⁴⁷ ▶ Pre⁴⁸ and post-fracture reconciliation of cognitive level⁴⁹ (from the patient or by proxy from the family) ▶ Pre⁵⁰ and post-fracture reconciliation of medications ▶ Pre⁵¹ and post-fracture reconciliation of social supports ▶ Pre⁵² and post-fracture reconciliation of continence ▶ For those with surgical interventions, the orthopaedic surgeon clearly communicates the type fracture and expected weight bearing status ▶ Wherever possible, discussions and decisions are completed in the pre-surgical phase when the patient is able to participate. If there is no surgical intervention, the patient is involved in all discussions and decisions throughout their hospital stay wherever possible. ▶ Discharge destination is discussed and decided upon in conjunction with the patient and/or family. • The following activities occur post-surgery for all hip fracture patients, unless otherwise noted: <ul style="list-style-type: none"> ▶ For those with surgical intervention, the orthopaedic surgeon clearly communicates a) the type of fracture and b) weight bearing status on day 1 post-op. Unless otherwise indicated, all patient are fully weight bearing on day 1 post-op^{53,54,55} ▶ Urological issues are addressed; at a minimum, catheter removal is attempted in order to minimize UTI risk and service disruption in rehab^{56,57} ▶ Transfer assessment and training ▶ Other therapy as appropriate ▶ Discharge planning is discussed and begun in conjunction with the patient and/or family. • Thorough cognitive assessment is, at minimum initiated and preferably completed^{58,59}, to rule out neurological sequelae from the fall, as needed. • All patients being discharged home have a plan in place for ongoing rehab and care management (e.g. outpatient rehab, CCAC rehab, private therapy). • Patients being discharged directly home are screened for falls risk based on personal and environmental risk factors^{60,61} as needed. Those at increased risk are offered multiple interventions OR are referred to a falls prevention or lifestyle management program (e.g. Arthritis society, YMCA) with their caregiver, if needed⁶². These interventions or programs address all of the following areas: osteoporosis management⁶³, exercise and balance re-training^{64,65}, modification of falls risk factors/hazards and education re: falls prevention⁶⁶. • Communication with the patient's family physician is established around the time of discharge to support continuity of care and the patient's long term osteoporosis management, falls prevention and rehabilitation plans.^{67,68,69} • A mechanism is in place to assess the patient/family's learning needs. Education is available⁷⁰ on all of the following topics and is reviewed with the patient/family as appropriate: medication, mobility, expected progress, pain management and sources of help.⁷¹ • Appropriate outcome measures are used to document patient progress and guide treatment selection, including performance measures, self report measures, clinical measures. •

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TRANSITIONAL CARE

- Transitional care may be provided in multiple service settings, including acute care, rehab, complex continuing care, or long term care. These beds are typically provided in long term cares as convalescent care
- Transitional care is only recommended in rare circumstances when a patient is not able to participate in rehab due to an expected period of 100% non weight bearing for 6 weeks or more.
- As soon as the patient is partially weight bearing, he or she should be transferred to an inpatient rehab program.

Hip Fracture Rehab Definition Framework

INPATIENT REHAB	
Dedicated MSK/Ortho Rehab Team in a Mixed Population OR Dedicated Population Inpatient Rehab Unit in Rehab and Community Hospitals	
<ul style="list-style-type: none"> • Suitable for individuals in need of an interprofessional rehab program who also require 24-hour hospital care. • Within the <u>current</u> system, patients are often referred to either HTSD or LTLD rehab. For patients admitted to LTLD rehab whose tolerance level improves, patients are either limited in the maximum amount of rehab that can be provided within this program, or are transferred to an HTSD program. Based on evidence in the literature and given the characteristics of this population, multiple transfers extend hospital length of stay and may contribute to increased confusion, with more time needed to adjust to new surroundings and care team.⁷² As such, the <u>ideal model</u> recommended in this framework is an expectation for all inpatient rehab programs to provide a sliding scale of therapy intensity, frequency and duration which meets the patient's rehab needs, regardless of which stream of rehab to which the patient was initially accepted. The therapy levels indicated in this framework are <u>not</u> to be interpreted as admission criteria, but rather as an indication of the minimum amount of therapy the program should be able to provide. Determination of rehab need should be patient-centred rather than driven by perceived length of stay or level of tolerance. • Patients from all types of pre-morbid living situations (e.g. home, long term care facility) are considered equally with regards to decision making for inpatient rehab admission.^{73,74} • All patients with mild to moderate cognitive impairment are considered equally with those who are unimpaired with regards to decision making for inpatient rehab admission^{75,76,77,78,79,80} • Patients with severe cognitive impairment may be considered for inpatient rehab with consideration for weight bearing status and pre-morbid function.^{81,82,83,84} • See Appendix A and B for details. 	
Typical Names	<ul style="list-style-type: none"> • General rehabilitation or medical rehabilitation; specialized MSK/Ortho rehabilitation program, low tolerance long duration (LTLD) rehab, slow stream rehab
Services Provided	<ul style="list-style-type: none"> • Care is provided by a coordinated, interprofessional team⁸⁵ specialized in geriatrics⁸⁶ • The core team⁸⁷ includes all of the following professionals: <ul style="list-style-type: none"> ▶ Clinical dietitian ▶ Discharge planning role (as filled by: social worker, discharge planner/coordinator, patient flow coordinator, etc.) ▶ Nurse ▶ Occupational therapist ▶ Pharmacist ▶ Physiotherapist ▶ Psychiatrist and/or geriatrician ▶ Social worker • Where a physician or a geriatrician is not available on the core team, a mechanism is in place to access the expertise of these professionals through consultation (e.g. RGP). • Consultation⁸⁸ is available from all of the following professionals: <ul style="list-style-type: none"> ▶ Chaplain/pastoral care provider ▶ Chiropodist ▶ Geriatric psychiatrist ▶ Physician specialized in internal medicine ▶ Specialist in gerontology (may be filled by an advance practice nurse, nurse practitioner specialized in gerontology, etc.) ▶ Speech language pathologist ▶ Urologist ▶ Wound care specialist

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INPATIENT REHAB	
Dedicated MSK/Ortho Rehab Team in a Mixed Population OR Dedicated Population Inpatient Rehab Unit in Rehab and Community Hospitals	
Services Provided (cont.)	<ul style="list-style-type: none"> ● Some patients may not tolerate the full recommended amount of therapy upon admission, but should work up to that level of therapy prior to discharge. ● HTSD provides an intensive rehab program which provides a) a minimum of 2 hours per day AND b) 7 days a week of individualized therapeutic activities (which can be provided between OT, PT, Nursing, OTA/PTA, etc.).⁸⁹ Note that individualized therapeutic activity refers to patient-centred, goal-specific therapy which does not necessarily need to be delivered in a one to one setting. If the patient is not able to tolerate this amount of therapy, the program scales down to meet the patient's needs without requiring the patient to transfer rooms, units, or programs.⁹⁰ The therapy levels indicated in this framework are <u>not</u> to be interpreted as admission criteria, but rather as an indication of the minimum amount of therapy the program should be able to provide. ● LTLT provides a slower paced rehab program of a) a minimum of 30 minutes per day AND b) 5-7 days a week of individualized therapeutic activities (which can be provided between OT, PT, Nursing, OTA/PTA, etc.)⁹¹, as tolerated by the patient. Note that individualized therapeutic activity refers to patient-centred, goal-specific therapy which does not necessarily need to be delivered in a one to one setting. If the patient is able to tolerate more therapy, the program scales up to meet the patient's needs without requiring the patient to transfer rooms, units or programs.⁹² The therapy levels indicated in this framework are <u>not</u> to be interpreted as admission criteria, but rather as an indication of the minimum amount of therapy the program should be able to provide. ● For both HTSD and LTLT programs, the staffing ratio should be sufficient to support a minimum of 2 hours of individualized therapeutic activity between the OT and PT professions (including OTA/PTA/other support staff), 7 days a week.⁹³ Note that individualized therapeutic activity refers to patient-centred, goal-specific therapy which does not necessarily need to be delivered in a one to one setting. ● Services may be supplemented by OTA/PTA/CDA/PSW/RA under the direct supervision of respective health care professionals (e.g. OT directing OTA, PT directing PTA, etc.) as legislated by their respective colleges. Assistants can provide support to the therapists, but the overall care is directed by the regulated health professional and the OTA/PTA/CDA/PSW/RA usually does not exceed 60% of therapy time ● Where a client has more than one rehab need (e.g. ABI & MSK) there is a mechanism in place to cross consult to another rehab service to acquire expertise in other rehab areas.
Specialization (cont.)	<ul style="list-style-type: none"> ● <i>For mixed and dedicated population programs:</i> There is a dedicated MSK/Ortho interprofessional team with access to skills/training to develop and maintain the necessary skills and knowledge base. ● There is a critical mass of 50 cases/year to support the development and maintenance of clinical expertise of all staff. ● If on a mixed population unit, beds are geographically clustered with other MSK-related diagnoses ● All core and consult team members have expertise in senior focused care^{94,95}, which includes all of the following: <ul style="list-style-type: none"> ▶ Appropriate communication with cognitively impaired persons ▶ A team approach to assess and implement a safe environment ▶ Ability to assess and support patients' informed decision making ▶ Use of interventions which may include: daily orientation, early mobilization, maintenance of vision and hearing, management of sleep, maintenance of adequate fluids and nutrition, minimal use of restraints and catheters in order to maintain physical and cognitive functioning, maximize independence at discharge, and prevent readmission to hospital. ● All core team members have expertise in the management of pre-morbid conditions (e.g. cardiac, dementia) ● The core team has established competency in treating patients with hip fractures; specifically they have competency in: <ul style="list-style-type: none"> ▶ Pain management⁹⁶ ▶ Non pharmacological and pharmacological sleep management ▶ Bladder and bowel care and re-training ▶ Falls prevention

Hip Fracture Rehab Definition Framework

INPATIENT REHAB	
Dedicated MSK/Ortho Rehab Team in a Mixed Population OR Dedicated Population Inpatient Rehab Unit in Rehab and Community Hospitals	
	<ul style="list-style-type: none"> ▶ Ability to identify each of the following and understand the difference between them: delirium (e.g. with CAM), dementia (e.g. with MMSE), and depression (e.g. with GDS) ▶ Assessment and incorporation of the individual’s unique needs and interests (i.e. personhood) ▶ Preventative daily care (e.g. mobility, positioning, nutrition, hydration)
Differential Criteria	<ul style="list-style-type: none"> ● The therapy levels indicated in this framework are <u>not</u> to be interpreted as admission criteria, but rather as an indication of the minimum amount of therapy the program should be able to provide. ● Determination of rehab need is patient-centred rather than driven by perceived length of stay or level of tolerance. ● Patients from all types of pre-morbid living situations (e.g. home, long term care facility) are considered equally with regards to decision making for inpatient rehab admission^{97,98}. ● All patients with mild to moderate cognitive impairment are considered equally with those who are unimpaired with regards to decision making for inpatient rehab admission^{99,100,101,102}. ● Patients with severe cognitive impairment may be considered for inpatient rehab with consideration for weight bearing status and pre-morbid function^{103,104,105}. ● Patients are only referred to transitional care as a temporary destination in rare circumstances when they are not able to participate in rehab due to an expected period of 100% non weight bearing for a period of 6 weeks or more. ● Based on available evidence, the timeframe between surgery and admission to inpatient rehab should be no more than 15 days¹⁰⁶; however, ideally this time frame would be as soon as possible. ● Once admitted for rehab, every effort is made to ensure consistency of the clinical team. If a patient’s rehab needs change during the course of their stay, those needs will be met by the current clinical team without requiring the patient to move (e.g. bed, units, programs, buildings)¹⁰⁷.
Typical Duration	<ul style="list-style-type: none"> ● As strong evidence regarding length of stay does not currently exist, benchmarks for duration are not being included in this framework. Ideally, the length of stay is not constrained by a maximum duration, but is linked to the patient’s needs and goals.
Key Activities/ Nature of Service	<ul style="list-style-type: none"> ● Regular team meetings/conferences are held. ● Patients and families are encouraged to participate in interprofessional family meetings. ● A mechanism is in place for communication of goals between patient/family and the rehab team ● There are established mechanisms for communication, collaboration and transfer of information between professions to maximize patient outcomes (e.g. between therapists and nursing) ● Profession-specific activities are completed according to college standards, however, as an interprofessional team, all of the following activities are provided: <ul style="list-style-type: none"> ▶ Promotion of abilities with care focused on maximizing self care¹⁰⁸ ▶ Preventative daily care (e.g. mobility, positioning, nutrition^{109,110,111,112,113}, hydration¹¹⁴, reduction of risk for pressure ulcers^{115,116,117}) ▶ Early mobility¹¹⁸, including integration of mobility, strength, and balance ▶ Maximizing of functional potential (e.g. ADL) ▶ Home safety ▶ Thorough cognitive assessment to rule out neurological sequelae from the fall ● A delirium management program is provided^{119,120,121} which includes all of the following components: <ul style="list-style-type: none"> ▶ Use of a standardized screening tool for delirium¹²² (e.g. CAM) ▶ Identification of possible causes of/contributors to delirium¹²³ ▶ Education provided to the family on delirium

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INPATIENT REHAB	
Dedicated MSK/Ortho Rehab Team in a Mixed Population OR Dedicated Population Inpatient Rehab Unit in Rehab and Community Hospitals	
Key Activities/ Nature of Service	<ul style="list-style-type: none"> <li style="margin-left: 20px;">▶ Intervention/strategies to minimize delirium and maximize functional and cognitive gains¹²⁴ ● Discharge planning occurs early on in the inpatient rehab process.¹²⁵ ● Expectation is that patients will either be discharged home or to their preferred accommodation in the community. ● All patients discharged from inpatient rehab have a plan in place for ongoing rehab and care management (e.g. outpatient rehab, CCAC rehab, private therapy). <ul style="list-style-type: none"> ▶ Patients with cognitive impairments: these patients may require interprofessional outpatient services ▶ Patients whose pre-morbid residence was LTC: these patients are expected to receive single service rehab within the LTC facility unless interprofessional outpatient services are required due to the presence of cognitive impairments. ● Patients are screened for falls risk based on personal and environmental risk factors^{126,127}. Those at increased risk are offered multiple interventions OR are referred to a falls prevention or lifestyle management program (e.g. Arthritis society, YMCA) with their caregiver, if needed¹²⁸. These interventions or programs address all of the following areas: osteoporosis management¹²⁹, exercise and balance re-training^{130,131}, modification of falls risk factors/hazards and education re: falls prevention¹³². ● Communication with both the patient's surgeon AND family physician is established around the time of discharge to support continuity of care and the patient's long term osteoporosis management, falls prevention and rehabilitation plans.^{133,134,135} ● A mechanism is in place to assess the patient/family's learning needs. Education is available¹³⁶ on all of the following topics and reviewed with the patient/family¹³⁷ as appropriate : (1) caregiver training; (2) safe activity resumption; (3) delirium management; (4) medications; (5) mobility; (6) expected progress; (7) pain management; (8) sources of help; (9) falls prevention/management; (10) osteoporosis management; (11) anti-coagulation. ● Appropriate outcome measures are used to document patient progress and guide treatment selection, including performance measures, self report measures, and clinical measures.

Hip Fracture Rehab Definition Framework

OUTPATIENT REHAB	
Single Service in Acute Care, Rehab and Community Health Centres/Clinics/Family Health Teams	Mixed or Dedicated Population Interprofessional Team in Acute Care, Rehab and Community Health Centres/Clinics/Family Health Teams
<p>Suitable for all hip fracture patients who are cognitively intact and who are discharged from acute care or inpatient rehab, or patients residing in the community. Services may include assessment only or assessment and treatment. Services may be provided during a one-time visit or multiple visits. Treatment could be in group or individual format.</p>	<p>Suitable for all hip fracture patients, but in particular, those with cognitive impairments are recommended to receive an interprofessional rehab program and a coordinated approach.</p>
<p>Names Typically Used</p>	
<p>Services Provided</p>	
<p>Specialization</p>	

Hip Fracture Rehab Definition Framework

OUTPATIENT REHAB		
Single Service in Acute Care, Rehab and Community Health Centres/Clinics/Family Health Teams		Mixed or Dedicated Population Interprofessional Team in Acute Care, Rehab and Community Health Centres/Clinics/Family Health Teams
Specialization (cont.)	<ul style="list-style-type: none"> ▶ Ability to assess and support patients' informed decision making ▶ Use interventions which may include: maintenance of vision and hearing, management of sleep, maintenance of adequate fluids and nutrition, minimal use of catheters in order to maintain physical and cognitive functioning, maximize independence, and prevent readmission to hospital.¹⁴⁰ ● In addition, all rehab providers have expertise in the management of pre-morbid conditions (e.g. cardiac, dementia) . 	<p style="text-align: right;">independence, and prevent readmission to hospital.¹⁴¹</p> <ul style="list-style-type: none"> ● In addition, all core team members have expertise in the maintenance and management of pre-morbid conditions (e.g. cardiac, dementia) ● The core team has established competency in treating patients with hip fractures; specifically, they have competency in each of the following areas: <ul style="list-style-type: none"> ▶ Pain management¹⁴² ▶ Osteoporosis management ▶ Recognizing and managing multiple sequelae and comorbidities ▶ Falls prevention ▶ Competence in assessment, treatment and management of cognitive impairments as a team with respect to functional goals in the home and community ▶ A team approach to focusing on the individual's personhood (i.e. their unique needs and interests)
Differential Criteria	<ul style="list-style-type: none"> ● Given basic principles of muscle strengthening, <i>at a minimum</i> all patients discharged from inpatient rehab should receive single service outpatient rehab unless interprofessional outpatient services are required due to the presence of cognitive impairments or unless other circumstances (e.g. geography, transportation) necessitate other levels of rehab (e.g. interprofessional outpatient rehab or community rehab). ● Patients whose pre-morbid residence was LTC are expected to receive single service outpatient rehab within the LTC facility unless the presence of cognitive impairments requires an interprofessional outpatient program. ● Patients are residing in the community with a specific rehab need which may be an impairment, activity or participation issue that requires assessment and/or treatment by a health professional. ● Referrals are accepted from all sources including community (e.g. family physicians, CCAC), acute care, inpatient rehab, other health professionals. ● Some patients may be discharged from acute care and require ongoing rehab to achieve higher functional goals. ● Patients may be referred from acute care, rehabilitation, or family physicians, surgeons, or other health professionals working in the community. ● In some hospitals, the service is only available for patients of that 	<ul style="list-style-type: none"> ● Given basic principles of muscle strengthening and complexities of cognitive rehabilitation, all hip fracture patients discharged from inpatient rehab with a cognitive impairment should receive interprofessional outpatient services. ● Patients whose pre-morbid residence was LTC and who have a cognitive impairment should receive interprofessional outpatient services ● Suitable for patients with a hip fracture and a cognitive impairment residing in the community with a specific rehab need which may be an impairment, activity or participation issue that requires assessment and/or treatment by an interprofessional team. ● Patients may not have required an inpatient rehab program or other outpatient rehab program. ● Some patients may be discharged from acute care and require ongoing rehab to achieve higher functional goals. ● Referrals are accepted from all sources including community (e.g. family physicians, CCAC), acute care, inpatient rehab, other health professionals. ● Typically, patients are community patients who are responsible for arranging their own transportation to and from their outpatient appointments. ● Co-ordinated services are provided with regular team meetings/conferences.

Hip Fracture Rehab Definition Framework

OUTPATIENT REHAB		
	Single Service in Acute Care, Rehab and Community Health Centres/Clinics/Family Health Teams	Mixed or Dedicated Population Interprofessional Team in Acute Care, Rehab and Community Health Centres/Clinics/Family Health Teams
	<p>institution and their physicians.</p> <ul style="list-style-type: none"> Typically, these are community patients who are responsible for arranging their own transportation to and from their outpatient appointments. 	
Typical Duration	<ul style="list-style-type: none"> Varies depending on client need and type of service/program. Specialty clinics may provide one or a few visits until the target goals are achieved. Patient care, as defined by delivery of direct services by OT and/or PT) should be started: (1) within 48 hours of discharge from acute care; (2) within 48 hours of discharge from inpatient rehab; (3) within 1 week of referral from other sources. Patients are discharged when they have achieved their discharge goals, or they have reached a plateau, rather than based on a specified maximum number of visits. 	<ul style="list-style-type: none"> Patient care, as defined by delivery of direct services by OT and/or PT) should be started: (1) within 48 hours of discharge from acute care; (2) within 48 hours of discharge from inpatient rehab; (3) within 1 week of referral from other sources. Patients are discharged when they have achieved their discharge goals, or they have reached a plateau, rather than based on a specified maximum number of visits.
Key Activities / Nature of Service	<ul style="list-style-type: none"> Assessments and treatment are focused on patient safety at home as well as physical and functional abilities for daily activities PT intervention includes all of the following: <ul style="list-style-type: none"> Assessment for and development of individualized therapy plans (i.e. 1:1 or group settings) Exercises for ROM and strength, including home exercises¹⁴³ Functional training (e.g., gait, stairs, balance, transfers), including home exercises Hands on therapy as required Pain management Patients are screened for falls risk based on personal and environmental risk factors^{144,145}. Those at increased risk are offered multiple interventions OR are referred to a falls prevention or lifestyle management program (e.g. Arthritis society, YMCA) with their caregiver, if needed¹⁴⁶. These interventions or programs address all of the following areas: osteoporosis management¹⁴⁷, exercise and balance re-training^{148,149}, modification of falls risk factors/hazards and education re: falls prevention¹⁵⁰. A mechanism is in place to liaise with referring providers for 	<ul style="list-style-type: none"> Assessments and treatment are focused on patient safety at home as well as physical and functional abilities for daily activities A mechanism is in place to liaise with referring providers for consultation when patients have multiple comorbidities, as needed. Patients are screened for falls risk based on personal and environmental risk factors^{156,157}. Those at increased risk are offered multiple interventions OR are referred to a falls prevention or lifestyle management program (e.g. Arthritis society, YMCA) with their caregiver, if needed¹⁵⁸. These interventions or programs address all of the following areas: osteoporosis management¹⁵⁹, exercise and balance re-training^{160,161}, modification of falls risk factors/hazards and education re: falls prevention¹⁶². A mechanism is in place to liaise with referring providers for consultation when patients have multiple comorbidities. Communication with both the patient's surgeon AND family physician is established around the time of discharge to support continuity of care and the patient's long term osteoporosis management, falls prevention and rehabilitation plans.^{163,164,165} A mechanism is in place to assess the patient/family's learning needs. Education is available¹⁶⁶ on all of the following topics and reviewed with the patient/family¹⁶⁷ as appropriate: 1) caregiver training; (2) safe activity resumption; (3) delirium management; (4) medications; (5) mobility; (6) expected progress; (7) pain management; (8) sources of help; (9) falls prevention/management; (10) osteoporosis management

Hip Fracture Rehab Definition Framework

OUTPATIENT REHAB	
Single Service in Acute Care, Rehab and Community Health Centres/Clinics/Family Health Teams	Mixed or Dedicated Population Interprofessional Team in Acute Care, Rehab and Community Health Centres/Clinics/Family Health Teams
Key Activities / Nature of Service (cont.)	<p>consultation when patients have multiple comorbidities, as needed.</p> <ul style="list-style-type: none"> • A mechanism is in place to assess the patient/family’s learning needs. Education is available¹⁵¹ on all of the following topics and reviewed with the patient/family¹⁵² as appropriate: (1) caregiver training; (2) safe activity resumption; (3) delirium management; (4) medications; (5) mobility; (6) expected progress; (7) pain management; (8) sources of help; (9) falls prevention/management; (10) osteoporosis management • Communication with both the patient’s surgeon AND family physician is established around the time of discharge to support continuity of care and the patient’s long term osteoporosis management, falls prevention and rehabilitation plans.^{153,154,155} • Appropriate outcome measures are used to document patient progress and guide treatment selection, including performance measures, self report measures, clinical measures.
	<ul style="list-style-type: none"> • Appropriate outcome measures are used to document patient progress and guide treatment selection, including performance measures, self report measures, clinical measures.

Hip Fracture Rehab Definition Framework

COMMUNITY – SINGLE SERVICE	
Rehab is provided in the home environment	
Typical Names	<ul style="list-style-type: none"> • Community Care Access Centre (CCAC)
Services Provided	<ul style="list-style-type: none"> • All of the following providers are available based on patient needs: case manager, nurse, personal support worker, occupational therapist, physiotherapist, social worker. • If both OT and PT are needed by the patient, both are provided. If more than one service is needed, they are provided. • Rehab providers typically work as individual providers; however, communication with other health providers occurs on an as-needed basis. • CCACs provide in-home rehab services through contracts with Provider Agencies and manage clients through a Case Management collaborative model. • Treatment needs vary in protocol (frequency, content, timing, goals, and intensity) based on appropriate clinical pathways.
Specialization	<ul style="list-style-type: none"> • All rehab providers have expertise in senior focused care, which includes <ul style="list-style-type: none"> ▶ Appropriate communication with cognitively impaired persons ▶ A team approach to assess and implement a safe environment ▶ Ability to assess and support patients' informed decision making ▶ Use of interventions which may include: maintenance of vision and hearing, management of sleep, maintenance of adequate fluids and nutrition, minimal use of catheters in order to maintain physical and cognitive functioning, maximize independence, and prevent readmission to hospital.¹⁶⁸ • In addition, all rehab providers have expertise in the management of pre-morbid conditions (e.g. cardiac, dementia) • All rehab providers have established competency in treating patients with hip fractures; specifically, they have competency in each of the following areas: <ul style="list-style-type: none"> ▶ Pain management¹⁶⁹ ▶ Osteoporosis management ▶ Recognizing and managing multiple sequelae and comorbidities ▶ Falls prevention ▶ Competence in assessment, treatment and management of cognitive impairments as a team with respect to functional goals in the home and community ▶ A focus on the individual's personhood (i.e. their unique needs and interests)
Differentiating Criteria	<ul style="list-style-type: none"> • Service is provided in the home. • Some patients may require CCAC rehab services post inpatient rehab if access to outpatient services is limited (e.g. due to availability or transportation) • Some patients may be discharged from acute care or from an inpatient rehab program and require ongoing rehab to achieve their functional goals. • Referrals are accepted from all sources including community (e.g. family physicians, CCAC), acute care, inpatient rehab, other health professionals
Typical Duration	<ul style="list-style-type: none"> • Patient care (as defined by delivery of direct services by OT and/or PT and <i>not including</i> case coordinator assessment or equipment delivery) should be started (1) within 48 hours of discharge from acute care; (2) within 48 hours of discharge from inpatient rehab; (3) within 1 week of referral from other sources • Patients are discharged when they have achieved their discharge outcome (functional goals), or are able to access appropriate community resources (e.g. outpatient services), or they have reached a plateau rather than based on a specified maximum number of visits.
Key Activities/ Nature of Service	<ul style="list-style-type: none"> • Assessments and treatment are focused on patient safety at home as well as physical and functional abilities for daily activities. • A mechanism is in place to liaise with referring providers for consultation when patients have multiple comorbidities. • PT intervention includes all of the following: <ul style="list-style-type: none"> ▶ Assessment for and development of individualized therapy plans (i.e. 1:1 or group settings) ▶ Supervised and unsupervised exercises for ROM and strength ▶ Supervised and unsupervised functional training (e.g., gait, stairs, balance, transfers)

Hip Fracture Rehab Definition Framework

COMMUNITY – SINGLE SERVICE	
Rehab is provided in the home environment	
Key Activities/ Nature of Service	<ul style="list-style-type: none"> ▶ Hands on therapy as required ▶ Pain management • Patients are screened for falls risk based on personal and environmental risk factors^{170,171}. Those at increased risk are offered multiple interventions OR are referred to a falls prevention or lifestyle management program (e.g. Arthritis society, YMCA) with their caregiver, if needed¹⁷². These interventions or programs address all of the following areas: osteoporosis management¹⁷³, exercise and balance re-training^{174,175}, modification of falls risk factors/hazards and education re: falls prevention¹⁷⁶. • A mechanism is in place to assess the patient/family’s learning needs. Education is available¹⁷⁷ on all of the following topics and reviewed with the patient/family¹⁷⁸ as appropriate : (1) caregiver training; (2) safe activity resumption; (3) delirium management; (4) medications; (5) mobility; (6) expected progress; (7) pain management; (8) sources of help; (9) falls prevention/management; (10) osteoporosis management • Communication with both the patient’s surgeon AND family physician is established around the time of discharge to support the patient’s long term osteoporosis management, falls prevention and rehabilitation plans.^{179, 180} • Appropriate outcome measures are used to document patient progress and guide treatment selection, including performance measures, self report measures, clinical measures. • Patients are referred to outpatient rehab for ongoing rehabilitation needs following CCAC services based on need.

Hip Fracture Rehab Definition Framework

APPENDIX A: GUIDING PRINCIPLES IN HIP FRACTURE REHAB

1. All patients with hip fracture have access to some type of rehab. Determination of rehab need is patient-centred rather than driven by perceived length of stay or level of tolerance.
2. Patients from all types of pre-morbid living situations (e.g. home, long term care facility) are considered equally with regard to decision making for inpatient rehab admission.
3. All patients with mild to moderate cognitive impairment should be referred to inpatient rehab and considered equally with cognitively intact patients with regard to decision making for inpatient rehab admission.
4. Patients with severe cognitive impairment may be considered for inpatient rehab with consideration for weight bearing status and pre-morbid function.
5. Once a patient is admitted for rehab, every effort should be made to ensure consistency of the clinical team. If a patient's rehab needs change during the course of their stay, those needs should be met by the current clinical team without requiring the patient to change beds, units, programs or buildings.
6. Due to the nature of the population, all hip fracture programs should have expertise in senior focused care.

This may include interventions such as daily orientation, early mobilization, maintenance of vision and hearing, management of sleep, maintenance of adequate fluids and nutrition, minimal use of restraints and catheters in order to maintain physical and cognitive functioning, maximize independence at discharge, and prevent readmission to hospital.

7. Due to the nature of the population, all hip fracture programs should have expertise in the management of co-morbidities (e.g. cardiac).

Select References

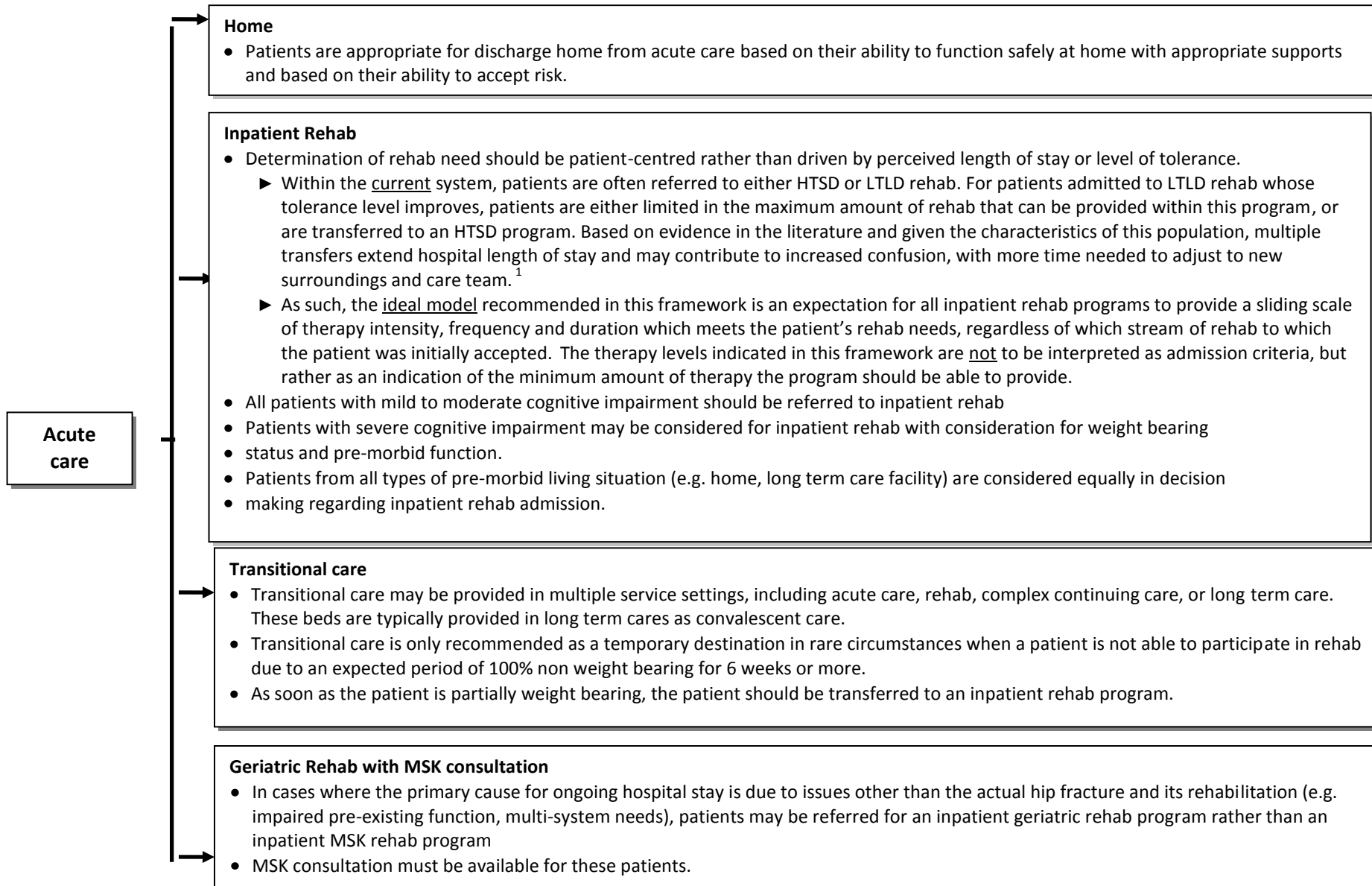
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APPENDIX B: TRIAGE TOOL FOR HIP FRACTURE REHAB



APPENDIX C: SUMMARY OF GTA REHAB NETWORK INPATIENT REHAB / LTLD REFERRAL GUIDELINES

Determining if a patient is a candidate for inpatient rehabilitation ...

- Patient demonstrates by documented progress the potential to return to pre-morbid/baseline functioning or to increase in functional level with participation in rehab program.
- There is reason to believe that, based on clinical expertise and evidence in the literature, the patient's condition is likely to benefit from the rehab program/service.
- Goals for rehabilitation have been established and are specific, measurable, realistic and timely.
- The patient or substitute decision-maker has consented to treatment in the program and demonstrates willingness and motivation to participate in the rehab program. (Exception: patients with reduced motivation/initiation secondary to diagnosis e.g. brain injury, depression).

Determining Medical Stability ...

- A clear diagnosis and co-morbidities have been established.
- At the time of discharge from acute care, acute medical issues have been addressed; disease processes and/or impairments are not precluding participation in the rehab program.
- Patient's vital signs are stable.
- No undetermined medical issues (e.g. excessive shortness of breath, falls, congestive heart failure).
- Medication needs have been determined.

Determining Rehab Readiness ...

- Patient meets the criteria of a rehab candidate as defined in guideline above.
- Patient meets the criteria of medical stability as defined in guideline above.
- All medical investigations have been completed or a follow-up plan is in place at time of referral and follow-up appointments made by time of discharge.
- Patient's special needs have been determined.
- Patient is able to meet the minimum tolerance level of the rehab program as defined by its admission criteria.
- There are no behavioural issues limiting the patient's ability to participate at the minimum level required by the rehab program.
- There are no psychiatric issues limiting the patient's ability to participate at the minimum level required by the rehab program.
- Treatment for other co-morbid illnesses/conditions does not interfere with the patient's ability to participate in rehab (e.g. dialysis or active cancer treatment).
- Patient's discharge options following rehab have been discussed.

Determining Timing of Submission of Application for Rehab ...

- Patient meets the criteria of a rehab candidate as defined in the guideline above.
- Patient meets the criteria of medical stability as defined in the guideline above or patient's date of medical stability can be identified within the next 1-2 days of submission of application.
- Patient meets the criteria for rehab readiness as defined in the guideline above or the date for rehab readiness can be identified.

Note 1: Once it is determined that a patient is rehab candidate, medically stable and the date of rehab readiness is known, the referral to rehab should be submitted. Planning for discharge should begin prior to ALC designation.

Source: GTA Rehab Network. (2009). *Inpatient Rehab / LTLD Referral Guidelines*.

Hip Fracture Rehab Definition Framework

The GTA Rehab Network would like to acknowledge the members of the MSK Rehab Definitions Task Group for their contribution to the development of the MSK Rehab Definitions Frameworks:

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Endnotes

- ¹ A retrospective observational study of 131 participants (68% over the age of 65 years), found a link between “delayed ambulation [and] increased frequency of postoperative complications and prolonged length of stay” and reported that “time to ambulation after hip fracture was significantly less in patients cared for on [an] orthopaedic surgery service compared to general surgery service...or general internal medicine service.”
Kamel, H.K., Iqbal, M.A., Mogallapu, R., Maas, D., and Hoffman, R.G. (2003). Time to ambulation after hip fracture surgery: Relation to hospitalization outcomes. *Journal of Gerontology: Medical Sciences*, 58A(11), 1042-1045.
- ² A systematic review of randomized controlled trials found that “an additional 16% of people with hip fracture are less likely to have a poor outcome after multi-disciplinary rehabilitation following hip fracture” and recommended that “health service resources should be organized to allow patients with hip fracture routinely to receive organized multi-disciplinary rehabilitation.” Note that “poor outcome” in this study was defined as “a pooled outcome including both deaths and nursing home admission at discharge from hospital.”
Halbert, J., Crotty, M., Whitehead, C., Cameron, I., Kurrle, S., Graham, S., Handoll, H., Finnegan, T., Jones, T., Foley, A., and Shanahan, M. (2007). Multi-disciplinary rehabilitation after hip fracture is associated with improved outcome: A systematic review. *Journal of Rehabilitation Medicine*, 39, 507-512.
- ³ There is level A evidence that “hospitals providing treatment for people aged 65 years and over with hip fracture should provide formal hip fracture programmes which include early multidisciplinary assessment by a geriatric team” and level B evidence that “early involvement of a geriatric medical team in hip fracture care has been associated with a significant reduction in the incidence of post-operative delirium.”
New Zealand Guidelines Group. (2003). *Best Practice Evidence-based Guideline: Acute Management and Immediate Rehabilitation After Hip Fracture Amongst People Aged 65 Years and Over*. Wellington, New Zealand.
- ⁴ Authors of a literature review found Level III-2 evidence that “joint orthopaedic-geriatric care is of benefit, reducing inpatient complications, length of stay and mortality.” Note that the authors define Level III-2 evidence as “evidence obtained from comparative studies with concurrent controls and allocation not randomized (cohort studies), case-control studies or interrupted time series with a control group” where the highest level is I and the lowest is IV.
Chong, C.P.W., Savige, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).
- ⁵ Core Team refers to the team members who are essential, actively involved in the assessment and treatment of MSK patients on the unit. In acute care, although team members collaborate closely, they may not participate regularly in team rounds due to the nature of this setting.
- ⁶ Consultation is expected to be available within 24 hours in acute care and within 48 hours in rehab.
- ⁷ Authors of a prospective, blinded randomized controlled trial of 126 patients admitted to an orthopaedic surgery unit after a hip fracture reported that “with relatively good adherence by the orthopaedics team, proactive geriatrics consultation [preoperatively or within 24 hours of surgery] using a structured multimodular protocol can be successfully implemented for hip-fracture patients. This consultation was associated with a statistically significant one-third reduction in the incidence of delirium in the intervention group compared with usual care and an even greater reduction in the incidence of severe delirium

Marcantonio, E.R., Flacker, J.M., Wright, J., and Resnick, N.M. (2001). *Reducing delirium after hip fracture: A randomized trial. Journal of the American Geriatrics Society, 49, 516-522.*

⁸ The Hospital Elder Life Program (HELP) provides targeted interventions for risk factors (cognitive impairment, sleep deprivation, immobility, dehydration, vision or hearing impairment) by a trained, interdisciplinary team including a geriatric nurse specialist, Elder Life Specialists, trained volunteers and geriatricians. Based on tracking of outcomes of 1507 patients, the authors report that “[HELP] successfully prevents cognitive and functional decline in at-risk older patients.” Inouye, S.K., Bogardus, S.T., Baker, D.I., Leo-Summers, L., and Cooney, L.M. (2000). The Hospital Elder Life Program: A model of care to prevent cognitive and functional decline in older hospitalized patients. *Journal of the American Geriatrics Society, 48, 1697-1706.*

⁹ “Adequate numbers of trained orthopaedic nurses and members of AHPs [Allied Health Professionals], especially physiotherapists, must be available. There must be adequate social services support.” British Orthopaedic Association. *Primary total hip replacement: A guide to good practice.* 1999; revised 2006.

¹⁰ “Adequate numbers of trained nurses and the skills of Professions Allied to Medicine must be available. There must be social services back-up.” British Association for Surgery of the Knee. *Knee replacement: A guide to good practice.* 1999.

¹¹ “Following hip fracture, the incidence rate of urinary tract infection is 23% to 25%” (as cited in Beaupre, L.A et al.). A systematic review reported there is level 1 evidence that: “intermittent catheterization is superior to indwelling catheterization.” Note that level 1 evidence was defined as “one or more high quality randomized clinical trials (RCT) or systematic reviews.” Beaupre, L.A., Jones, C.A., Saunders, L.D.S, Johnston, W.C., Buckingham, J. and Majumdar, S.R. (2005). Best practices for elderly hip fracture patients. *Journal of General Internal Medicine, 20, 1019-125.*

¹² “Patients with poorly controlled perioperative pain have reported increased hospital [length of stay], delayed ambulation, and decreased 6-month mobility” Morrison, R.S., Magaziner, J., McLaughlin, M.A. et al. (2003). The impact of post-operative pain on outcomes following hip fracture. *Pain, 103, 303-11.*

¹³ A prospective cohort study of 126 patients aged 65 and older with a hip fracture found that “delirium is common, persistent, and independently associated with poor functional recovery 1 month after hip fracture even after adjusting for prefracture frailty.” Marcantonio, E.R., Flacker, J.M., Michaels, M., and Resnick, N.M. (2000). Delirium is independently associated with poor functional recovery after hip fracture. *Journal of the American Geriatrics Society, 48(6), 618-624.*

¹⁴ A longitudinal retrospective feasibility study was completed with 31 community-dwelling geriatric patients with a hip fracture who did and did not have cognitive impairments. The cognitively impaired group included those with mild, moderate and severe impairments, as determined by the MMSE. The authors reported that “higher [motor] functional gain was achieved for those admitted to the rehabilitation facility within 15 days from the surgery.” Furthermore, “functional gain achieved for each inpatient day of stay (rehabilitation efficiency) was greater for those patients entering rehabilitation facilities in less than 15 days after surgery and for those having surgery up to 2 days post-injury.” McGilton, K.S., Mahomed, N., Davis, A.M., Flannery, J., Calabrese, S. (2009). Outcomes for older adults in an inpatient rehabilitation facility following hip fracture (HF) surgery. *Archives of Gerontology and Geriatrics, 49, e23-e31.*

¹⁵ GTA Rehab Network. (2009). *Inpatient Rehab / LTLD Referral Guidelines*.

¹⁶ A randomized trial of 100 patients was completed to compare ADL and IADL abilities of patients receiving early, individualized, postoperative occupational therapy training program vs. routine postoperative care. The authors reported that “individualized OT-training [sped] up the ability of patients to perform ADL, thus enhancing the likelihood of patients returning to independent living and reducing the need for postoperative care at home.” The authors stated that, “age, sex, type of fracture, or length of stay at the hospital made no significant contribution to explaining the better ADL ability on discharge...We therefore believe that individualized OT training, including how to use technical aids, has a clinical effect in the early phases of rehabilitation”
Hagsten, B., Svensson, O. and Gardulf, A. (2004). Early individualized postoperative occupational therapy training in 100 patients improves ADL after hip fracture: A randomized trial. *Acta Orthopaedica Scandinavia*, 75(2), 177-183.

¹⁷ Authors of a literature review found Level III-2 evidence to support “perioperative pain management” for patients with hip fractures. Note that the authors define Level III-2 evidence as “evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case-control studies or interrupted time series with a control group” where Level I is the highest and level IV is the lowest.
Chong, C.P.W., Savige, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).

¹⁸ “Patients with poorly controlled perioperative pain have reported increased hospital LOS, delayed ambulation, and decreased 6-month mobility”
Morrison R.S., Magaziner, J., McLaughlin, M.A. et al. (2003). The impact of post-operative pain on outcomes following hip fracture. *Pain*, 103, 303-11.

¹⁹ There is level D evidence for “careful fluid management” due to “risk of dehydration because of inability to gain access to sufficient fluids” as well as “risk of fluid overload when fluid replacement is given intravenously.”
New Zealand Guidelines Group. (2003). *Best Practice Evidence-based Guideline: Acute Management and Immediate Rehabilitation After Hip Fracture Amongst People Aged 65 Years and Over*. Wellington, New Zealand.

²⁰ Authors of a literature review found Level II evidence to support “nutritional management with oral protein supplementation in malnourished patients” with hip fractures. Note that the authors define Level II evidence as “evidence obtained from at least one properly designed randomised controlled trial” where Level I is the highest and level IV is the lowest.
Chong, C.P.W., Savige, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).

²¹ A quasi-experimental, pre-post test comparison group study of 100 patients with hip fractures compared a control group of patients who received regular nutritional support with an intervention group who received nutrition according to nutritional guidelines. The authors reported that “significantly fewer ($p=0.043$) patients in the intervention group (18%) had pressure ulcers five days postoperatively compared with the control group (36%). Nutrient and liquid intake was significantly higher ($p<0.001$) in the intervention group.”
Gunnarsson, A-K., Lonn, K., and Gunningberg, L. (2009). Does nutritional intervention for patients with hip fractures reduce postoperative complications and improve rehabilitation? *Journal of Clinical Nursing*, 18(9), 1325-1333.

²² Researchers of a study of 433 elderly patients with a hip fracture admitted for rehabilitation found that “Albumin gain emerged as a significant predictor for higher discharge FIM scores. We conclude that greater attention and efforts should be made regarding the dietary intervention and protein supplementation, in order to improve the rehabilitation outcome.

Mizrahi, E.H., Fleissig, Y., Arad, M., Blumstein, T., and Adunsky, A. (2008). Rehabilitation outcome of hip fracture patients: The importance of a positive albumin gain. *Archives of Gerontology and Geriatrics*, 47(3), 318-326.

²³ An Israeli prospective cohort study of 946 patients aged 65 years and over reported that a significant association between “the outcome of rehabilitation of elderly patients after surgical repair of hip fracture” (as measured by the percentage change in the FIM score by the end of inpatient rehabilitation) with “4 correctable...parameters.” The authors state that “the results...point to the possibility of improving rehabilitation outcome by therapeutic intervention in its early phases. The aim of this intervention should be to increase the serum albumin levels by appropriate dietary adjustments and supplementation, to correct those visual defects that can be corrected such as prescription of suitable eyeglasses, to improve dyspnea by optimal treatment of the diseases that cause it, and to correct decreased serum folic acid levels by supplementation. However, the results...can only support an association and not a causality between these 4 parameters and rehabilitation outcomes.”

Lieberman, D., Friger, M., Lieberman, D. (2006). Inpatient rehabilitation outcome after hip fracture surgery in elderly patients: A prospective cohort study of 946 patients. *Archives of Physical Medicine and Rehabilitation*, 87, 167-171.

²⁴ “In elderly medical patients, five independent precipitating factors have been found to predict the development of delirium: immobility, malnutrition, more than three medications added, use of bladder catheter, and any iatrogenic event during hospitalization”

Inouye, S.K. and Charpentier, P.A. (1996). Precipitating factors for delirium in hospitalized elderly persons: A predictive model and interrelationship with baseline vulnerability. *Journal of the American Medical Association*, 275, 852-857.

²⁵ A prospective randomized study of 60 patients assigned to either an early ambulation (first walk post op day 1 or 2) or a delayed ambulation group (first walk post op day 3 or 4) found that “at 1 week post-surgery, patients in the [early ambulation] group walked further than those in the [delayed ambulation] group...and required less assistance to transfer...Patients in the [early ambulation] group were more likely to be discharged directly home from the acute care than those in the [delayed ambulation] group...and less likely to need high-level care.”

Oldmeadow, L.B., Edwards, E.R., Kimmel, L.A., Kipen, E., Robertson, V.J. and Bailey, M.J. (2006). No rest for the wounded: Early ambulation after hip surgery accelerates recovery. *Australia and New Zealand Journal of Surgery*, 76(7), 607-611.

²⁶ Authors conducted a prospective cohort study of 532 patients aged 50 or older from 4 hospitals who received surgical intervention following a hip fracture using the FIM at 2 and 6 months. The authors also followed up on survival at 6 months. The authors found that “increased immobility was associated with higher mortality at 6 months and poorer function at 2 months...the potentially adverse effect of immobility was strongest in patients more dependent in mobility at baseline”

Siu, A.L., Penrod, J.D., Boockvar, K.S., Koval, K., Strauss, E., and Morrison, S. (2006). Early ambulation after hip fracture. *Archives of Internal Medicine*, 166, 766-771.

²⁷ A prospective, multisite observational study of 443 patients discharged post hip fracture surgery found that “more PT immediately after hip fracture surgery was associated with significantly better locomotion 2 months later. Each additional session from the day of surgery through [post operative day 3] was associated with an

increase of 0.4 points...on the 14 point locomotion scale, but the positive relationship between early PT and mobility was attenuated by 6 months postfracture.” The FIM was used as the outcome measure in this study.

Penrod, J.D., Boockvar, K.S., Litke, A., Magaziner, J., Hannan, E.L., Halm, E.A., Silberzweig, S.B., Sean Morrison, R., Orosz, G.M., Koval, K.J. and Siu, A.L. (2004). Physical therapy and mobility 2 and 6 months after hip fracture. *Journal of the American Geriatrics Society*, 52(7), 1114-1120.

²⁸ A retrospective observational study of 131 participants (68% over the age of 65 years), found that “time to ambulation after surgery was an independent predictor for the development of pneumonia..., new onset delirium..., and to prolonged length of hospital stay...but not to the development of pressure ulcers, deep venous thrombosis, or urinary tract infection...Early ambulation after hip fracture surgery should be encouraged.” Note that time frame to ambulation was measured in increments of: 1 day, 2 days, 3 days, 4 or more days

Kamel, H.K., Iqbal, M.A., Mogallapu, R., Maas, D., and Hoffman, R.G. (2003). Time to ambulation after hip fracture surgery: Relation to hospitalization outcomes. *Journal of Gerontology: Medical Sciences*, 58A(11), 1042-1045.

²⁹ “Following hip fracture, the incidence rate of urinary tract infection is 23% to 25%” (as cited in Beaupre, L.A et al.). A systematic review reported there is level 1 evidence that: “intermittent catheterization is superior to indwelling catheterization.” Note that level 1 evidence was defined as “one or more high quality randomized clinical trials (RCT) or systematic reviews.”

Beaupre, L.A., Jones, C.A., Saunders, L.D.S, Johnston, W.C., Buckingham, J. and Majumdar, S.R. (2005). Best practices for elderly hip fracture patients. *Journal of General Internal Medicine*, 20, 1019-125.

³⁰ A retrospective cohort study of Medicare patient with hip fractures who were admitted to skilled nursing facilities found that “extended use of indwelling urinary catheters postoperatively is associated with poor outcomes.”

Wald, H., Epstein, A. and Kramer, A. (2005). Extended use of indwelling urinary catheters in postoperative hip fracture patients. *Medical Care*, 43(10), 1009-1017.

³¹ “Following hip fracture, the incidence rate of urinary tract infection is 23% to 25%” (as cited in Beaupre, L.A et al.). A systematic review stated that there is level 1 evidence that “intermittent catheterization is superior to indwelling catheterization.” Note that level 1 evidence was defined as “one or more high quality randomized clinical trials (RCT) or systematic reviews.”

Beaupre, L.A., Jones, C.A., Saunders, L.D.S, Johnston, W.C., Buckingham, J. and Majumdar, S.R. (2005). Best practices for elderly hip fracture patients. *Journal of General Internal Medicine*, 20, 1019-125.

³² Authors of a literature review found Level II evidence that “catheters should be removed the morning after surgery to lower the rate of urinary retention” for patients with hip fractures. Note that the authors define Level II evidence as “evidence obtained from at least one properly designed randomised controlled trial” where Level I is the highest and level IV is the lowest.

Chong, C.P.W., Savige, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).

³³ Authors of a literature review found Level II evidence to support “pressure sore prevention” for patients with hip fractures and state that “clinicians should ensure that good pressure care occurs by the use of pressure relieving devices and monitoring for pressure areas by ward staff.” Note that the authors define Level II evidence as “obtained from at least one properly designed randomised controlled trial” where Level I is the highest and level IV is the lowest.

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Chong, C.P.W., Savage, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).

³⁴ A prospective cohort study of 658 patients with a hip fracture aged 65 and older found that “approximately one-third...experienced one or more new pressure ulcers during the 32 days after hospitalization for fracture. The rate at which pressure ulcers occurred was highest in the acute hospital setting, during the initial stay and rehospitalization.” The authors reported that “...pressure ulcer risk persists, albeit diminished, after discharge from the hospital, with 18.2% of patients still having an [acquired pressure ulcer] at the end of the 3-week study period.... Although the acute care hospital is the setting where pressure ulcer risk is highest, the findings of the current study should also increase awareness of the importance of pressure ulcer prevention...in postacute settings and on maintaining the continuity of care across transitions between settings.”

Baumgarten, M., Margolis, D.J., Orwig, D.L., SHardell, M.D., Hawkes, W.G., Langenberg, P., Palmer, M.H., Jones, P.S., McArdle, P.F., Sterling, R., Kinoshian, B.P. Rich, S.E., Sowinski, J. and Magaziner, J. (2009). Pressure ulcers in elderly patients with hip fracture across the continuum of care. *Journal of the American Geriatrics Society*, 57, 863-870.

³⁵ A systematic review reported level 1 evidence that “Pressure-reducing mattresses appear to be beneficial in reducing pressure sore development.” Note that level 1 evidence was defined as “one or more high quality randomized clinical trials (RCT) or systematic reviews.” Note that level 1 evidence was defined as “one or more high quality randomized clinical trials (RCT) or systematic reviews.”

Beaupre, L.A., Jones, C.A., Saunders, L.D.S, Johnston, W.C., Buckingham, J., and Majumdar, S.R. (2005). Best practices for elderly hip fracture patients. *Journal of General Internal Medicine*, 20, 1019-125.

³⁶ Authors of a literature review found Level III-2 evidence to support “delirium detection and management minimizing the use of sedative drugs and anticholinergic medications” for patients with hip fractures. The authors state “ensuring any medical issues are addressed early together with attention to environmental and supportive measures should be the mainstay of treatment.” Note that the authors define Level III-2 evidence as “evidence obtained from comparative studies with concurrent controls and allocation not randomized (cohort studies), case-control studies or interrupted time series with a control group” where Level I is the highest and level IV is the lowest.

Chong, C.P.W., Savage, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).

³⁷ Authors of a descriptive cohort study with 428 patients aged 65 or older with a hip fracture reported that “postoperative confusion developed in nearly 43% of the patients who were not registered at admission or preoperatively as being confused...The incidence of confusion...is based on the documentation in medical records and nursing charts. This may indicate that the real incidence is even higher because confusion often tends to be underreported.”

Bjorkelund, K.B., Hommel, A., Thorngren, K-G., and Larsson, S. (2009). Factors at admission associated with 4 months outcome in elderly patients with hip fracture. *American Association of Nurse Anesthetists Journal*, 77(1), 49-58.

³⁸ A prospective cohort study of 126 patients aged 65 and older with a hip fracture found that “delirium is common, persistent, and independently associated with poor functional recovery 1 month after hip fracture even after adjusting for prefracture frailty.”

Marcantonio, E.R., Flacker, J.M., Michaels, M., and Resnick, N.M. (2000). Delirium is independently associated with poor functional recovery after hip fracture. *Journal of the American Geriatrics Society*, 48(6), 618-624.

³⁹ A clinical trial of 362 patients with hip fractures compared the agreement level between cognitive assessments based on nurses' documentation and subjective assessment of patients' cognitive status as opposed to a cognitive assessment using the Short Portable Mental Status Questionnaire, a validated evaluation tool. The authors found that "among the patients with impaired cognitive ability according to the Short Portable Mental Status Questionnaire, only 58% [of patients] were identified as being cognitively impaired [by nursing staff]." Furthermore, 12% of the patients did not have a cognitive assessment completed by nursing staff. The authors stated that "cognitive dysfunction is frequently underdiagnosed in routine health care and that "patient care could be improved if the patients' cognitive function was assessed regularly and objectively by means of a validated evaluation instrument."

Soderqvist, A., Stromberg, L., Ponzer, S., and Tidermark, J. (2006). Documenting the cognitive status of hip fracture patients using the Short Portable Mental Status Questionnaire. *Journal of Clinical Nursing*, 15, 308-314.

⁴⁰ Components of the Delirium Abatement Program: "these included standardized screening for symptoms and signs of delirium upon admission..., assessment and treatment of possible causes of and contributors to delirium, prevention and management of common delirium complications, and restoration of patient cognitive and self-care function" by "creating rehabilitation environments that enhance cognitive reintegration"

Bergmann, M.A., Murphy, K.M., Kiely, D.K., Jones, R.N., and Marcantonio, E.R. (2005). A model for management of delirious postacute care patients. *Journal of the American Geriatrics Society*, 53, 1817-1825

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⁴² Authors of a literature review found Level III-3 evidence that "timing of surgery should be within 24-48 hours in stable patients." Note the authors define Level III-3 as "evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time series without a parallel control group" where the highest level is I and the lowest is IV.

Chong, C.P.W., Savage, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).

⁴³ Authors of a systematic review of 16 studies (including 257,367 patients) on surgical timing and mortality in patients with a hip fracture reported that, "operative delay of more than 48 hours is associated with increased short term and mid-term mortality in elderly patients with hip fracture" (by 41% and 32%, respectively). The authors state that "early surgery is associated with an increased benefit in patients at low risk or those who are young."

Shiga, T., Wajima, Z. and Ohe, Y. (2008). Is operative delay associated with increased mortality of hip fracture patients? Systematic review, meta-analysis, and meta-regression. *Canadian Journal of Anesthesiology*, 55(3), 146-154.

⁴⁴ A retrospective review of records for 1880 elderly patients admitted to 284 different acute care hospitals with an acute hip fracture found that "surgical repair within the first 2 days of hospitalization and more than 5 PT/OT sessions per week were associated with better health outcomes in a nationally representative sample of elderly patients with hip fracture"

Hoeing, H., Rubenstein, L.V., Sloane, R., Horner, R., and Kahn, K. (1997). What is the role of timing in the surgical and rehabilitative care of community-dwelling older persons with acute hip fracture? *Archives of Internal Medicine*, 157(5), 513-520.

⁴⁵ "It is recommended that nurses should assess patients' pre-fracture functional and cognitive capacities" and "the number and type of comorbidities" soon after admission."

Schuermans, M.J., Duursma, S.A., Shortridge-Baggett, L.M., Clevers, G-J. and Pel-Little, R. (2003). Elderly patients with a hip fracture: The risk for delirium. *Applied Nursing Research*, 16(2), 75-84.

⁴⁶ There is level B evidence that "...a corroborated history should be obtained, which should include: premorbid function and mobility, available social support, current relevant clinical conditions and mental state."

Scottish Intercollegiate Guidelines Network. (2002). *Prevention and Management of Hip Fracture in Older People: A National Clinical Guideline*. Edinburgh, Scotland

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⁵³ A prospective randomized study of 60 patients assigned to either an early ambulation (first walk post op day 1 or 2) or a delayed ambulation group (first walk post op day 3 or 4) found that “at 1 week post-surgery, patients in the [early ambulation] group walked further than those in the [delayed ambulation] group...and required less assistance to transfer...Patients in the [early ambulation] group were more likely to be discharged directly home from the acute care than those in the [delayed ambulation] group...and less likely to need high-level care.”

Oldmeadow, L.B., Edwards, E.R., Kimmel, L.A., Kipen, E., Robertson, V.J. and Bailey, M.J. (2006). No rest for the wounded: Early ambulation after hip surgery accelerates recovery. *Australia and New Zealand Journal of Surgery*, 76(7), 607-611.

⁵⁴ A retrospective observational study of 131 participants (68% over the age of 65 years), found that “time to ambulation after surgery was an independent predictor for the development of pneumonia..., new onset delirium..., and to prolonged length of hospital stay...but not to the development of pressure ulcers, deep venous thrombosis, or urinary tract infection...Early ambulation after hip fracture surgery should be encouraged.” Note that time frame to ambulation was measured in increments of: 1 day, 2 days, 3 days, 4 or more days

Kamel, H.K., Iqbal, M.A., Mogallapu, R., Maas, D., and Hoffman, R.G. (2003). Time to ambulation after hip fracture surgery: Relation to hospitalization outcomes. *Journal of Gerontology: Medical Sciences*, 58A(11), 1042-1045.

⁵⁵ A prospective cohort study of 469 older adults admitted to an ortho-geriatric unit with an osteoporotic hip fracture found that “[immediate weight-bearing and assisted ambulation training on the first postoperative day] is feasible in a high proportion of patients after surgical stabilization of [the hip fracture]. Neither cognitive impairment nor high comorbidity influenced significantly the adherence to the protocol....The day of surgery (e.g. preholiday or not) was the only variable influencing the participation to the [immediate weight-bearing and assisted ambulation training] protocol, suggesting the importance of maintaining the same standard of daytime care every day of the week.

Barone, A., Giusti, A., Pizzonia, M., Razzano, M., Oliveri, M., Palummeri, E., and Pioli, G. (2009). Factors associated with an immediate weight-bearing and early ambulation program for older adults after hip fracture repair. *Archives of Physical Medicine and Rehabilitation*, 90(9), 1495-1498.

⁵⁶ Authors of a literature review found Level II evidence that “catheters should be removed the morning after surgery to lower the rate of urinary retention” for patients with hip fractures and state “catheters should be taken out as soon as practically possible and may assist in mobilisation.” Note that the authors define Level II evidence as “evidence obtained from at least one properly designed randomised controlled trial” where Level I is the highest and level IV is the lowest.

Chong, C.P.W., Savige, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).

⁵⁷ “Following hip fracture, the incidence rate of urinary tract infection is 23% to 25%” (as cited in Beaupre, L.A et al.). A systematic review reported level 1 evidence that “intermittent catheterization is superior to indwelling catheterization.” Note that level 1 evidence was defined as “one or more high quality randomized clinical trials (RCT) or systematic reviews.”

Beaupre, L.A., Jones, C.A., Saunders, L.D.S, Johnston, W.C., Buckingham, J. and Majumdar, S.R. (2005). Best practices for elderly hip fracture patients. *Journal of General Internal Medicine*, 20, 1019-125.

⁵⁸ A clinical trial of 362 patients with hip fractures compared the agreement level between cognitive assessments based on nurses’ documentation and subjective assessment of patients’ cognitive status as opposed to a cognitive assessment using the Short Portable Mental Status Questionnaire, a validated evaluation tool. The

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authors found that “among the patients with impaired cognitive ability according to the Short Portable Mental Status Questionnaire, only 58% [of patients] were identified as being cognitively impaired [by nursing staff].” Furthermore, 12% of the patients did not have a cognitive assessment completed by nursing staff. The authors stated that “cognitive dysfunction is frequently underdiagnosed in routine health care and that “patient care could be improved if the patients’ cognitive function was assessed regularly and objectively by means of a validated evaluation instrument.”

Soderqvist, A., Stromberg, L., Ponzer, S., and Tidermark, J. (2006). Documenting the cognitive status of hip fracture patients using the Short Portable Mental Status Questionnaire. *Journal of Clinical Nursing*, 15, 308-314.

⁵⁹ There is level C evidence that “initial admission data should include a formal measure of cognitive function.”

New Zealand Guidelines Group. (2003). Best Practice Evidence-based Guideline: Acute Management and Immediate Rehabilitation After Hip Fracture Amongst People Aged 65 Years and Over. Wellington, New Zealand.

⁶⁰ Researchers in a multi-centre study of 7753 randomly selected people across Canada stated, “Our results show a strong association between vertebral and hip fractures and death. Given this association, interventions need to be implemented to reduce the likelihood that patients will experience fractures that increase their risk of death. These might include the use of interventions such as osteoporosis medications, strategies to prevent falls or the use of hip protectors”

Ioannidis, G., Papaioannou, A., Hopman, W.M., Akhtar-Danesh, N., Anastassiades, A, Pickard, L., Kennedy, C.C., Prior, J.C, Olszynski, W.P., Davison, K.S., Goltzman, D., Thabane, L., Gafni, A., Papadimitropoulos, E.A., Brown, J.P., Josse, R.G., Hanley, D.A. and Adachi, J.D. (2009). Relation between fractures and mortality: results from the Canadian Multicentre Osteoporosis Study. *Canadian Medical Association Journal*, 181(5), 181-237.

⁶¹ There is level A evidence that “older people should have their risk of falls and fractures assessed” and that “those at increased risk should be offered multiple interventions aimed at reducing the identified individual and environmental risks.”

Scottish Intercollegiate Guidelines Network. (2002). Prevention and Management of Hip Fracture in Older People: A National Clinical Guideline. Edinburgh, Scotland.

⁶² For older persons living in the community, evidence shows that health and environment risk-factor assessment with interventions based on assessment results, is highly effective in reducing falls among community-dwelling older persons who are cognitively intact....Within a multifactorial approach, the components of successful health interventions focus on post-fall clinical assessment followed by treatment involving a multidisciplinary-team approach.”

World Health Organization. (2007). *WHO Global Report on Falls Prevention in Older Age*. Geneva, Switzerland: WHO Press.

⁶³ A prospective study of 174 hip fracture patients studied the compliance with Canadian Consensus recommendations on the management of osteoporosis. 174 were patients discharged from primary care to the care of their family physician; all physicians had received a copy of the Canadian Consensus recommendations. After 12 months post hip fracture rehab, few were following the recommendations of the Canadian Consensus for osteoporosis management, suggesting that “ongoing treatment and management post fracture needs to be developed and implemented.”

Petrella, R.J. and Jones, T.J. (2006). Do patients receive recommended treatment of osteoporosis following hip fracture in primary care? *BMC Family Practice*, 7, 31.

⁶⁴ A clinical practice guideline developed by the American Geriatrics Society, British Geriatrics Society and the American Academy of Orthopaedic Surgeons Panel on Falls Prevention found Level B evidence that, “older people who have had recurrent falls should be offered long-term exercise and balance training.” See Appendix C for details on grading system used by the authors.

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American Geriatrics Society (AGS) Panel on Falls in Older Persons. (2001). Guideline for the Prevention of Falls in Older Persons. *Journal of the American Geriatrics Society*, 49, 664-672.

⁶⁵ A systematic review with meta-analysis of randomized controlled trials was conducted to compare fall rates in the elderly with and without exercise interventions. The authors report there is “strong evidence that exercise programs can reduce fall rates in older people. The overall reduction of 17% based on 44 trials involving 9,603 participants provides confidence that these findings are robust and generalizable to a broad section of older people. Furthermore...three factors (balance training, exercise dose, and the absence of a walking program) are associated with the efficacy of exercise programs.”

Sherrington, C., Whitney, J.C., Lord, S.R., Herbert, R.D., Cumming, R.G., Close, J.C.T. (2008). Effective exercise for the prevention of falls: A systematic review and meta-analysis. *Journal of the American Geriatrics Society*, 56, 2234–2243.

⁶⁶ Two parallel, randomized controlled trials were conducted on depression after hip fracture surgery in older people. The authors measured the effect of depressive symptoms, pain, cognition, and fear of falling at 2 weeks and 6 weeks post surgery on functional recovery 6 months post surgery in 187 patients (as measured by: “up and go test, gait test, functional reach...self-report Sickness Impact Profile”). The authors reported that at 6 months post surgery, “cognitive functioning and fear of falling assessed 6 weeks after surgery consistently predicted functional recovery, whereas pain and depressive symptoms were no longer significant.” The authors recommended that “rehabilitation strategies should take this into account.”

Oude Voshaar, R.C., Banerjee, S., Horan, M., Baldwin, R., Pendleton, N., Proctor, R., TARRIER, N., Woodward, Y., and Burns, A. (2006). Fear of falling more important than pain and depression for functional recovery after surgery for hip fracture in older people. *Psychology of Medicine*, 36(11), 1635-1645.

⁶⁷ A prospective study of 174 hip fracture patients studied the compliance with Canadian Consensus recommendations on the management of osteoporosis. 174 were patients discharged from primary care to the care of their family physician; all physicians had received a copy of the Canadian Consensus recommendations. After 12 months post hip fracture rehab, few were following the recommendations of the Canadian Consensus for osteoporosis management, suggesting that “ongoing treatment and management post fracture needs to be developed and implemented.”

Petrella, R.J. and Jones, T.J. (2006). Do patients receive recommended treatment of osteoporosis following hip fracture in primary care? *BMC Family Practice*, 7, 31.

⁶⁸ “GPs have an important role to play in post discharge rehabilitation and should receive early and comprehensive information on hospital stay, services arranged and future follow up arrangements. Complicated discharges that may have considerable impact on the primary care team should be discussed in advance with the GP” Scottish Intercollegiate Guidelines Network. (2002). *Prevention and Management of Hip Fracture in Older People: A National Clinical Guideline*. Edinburgh, Scotland

⁶⁹ Authors of a study of 244 patients with a hip fracture at a large teaching hospital stated that, “effective [osteoporosis] care for the vulnerable hip fracture patient should be initiated early but may be complex and require coordination....Linkage between the orthopaedic team and the discharge destination caregivers, an established discharge diagnosis of osteoporosis, and ensuring patients are discharged on supplements and medication will promote patient, caregiver, and primary care physician awareness of the patient’s [osteoporosis] care needs.”

Switzer, J.A., Jaglal, S., and Bogoch, E.R. (2009). Overcoming barriers to osteoporosis care in vulnerable elderly patients with hip fractures. *Journal of Orthopaedic Trauma*, 23(6), 454-459.

⁷⁰ A systematic review of effectiveness of health information provision recommended “the use of both verbal and written health information when communicating about care issues with patients and/or significant others on discharge from hospital to home” as this “appears to improve knowledge and satisfaction.”

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Sandford, J.A. and Tyndall, J. (2003). Written and verbal information versus verbal information only for patients being discharged from acute hospital settings to home. *Cochrane Database of Systematic Reviews*, 4:CD003716.

⁷¹ “Written information on medication, mobility, expected progress, pain control and sources of help and advice should be available to patient and carer”
Scottish Intercollegiate Guidelines Network. (2002). *Prevention and Management of Hip Fracture in Older People: A National Clinical Guideline*. Edinburgh, Scotland

⁷² An observational prospective clinical study with repeat measurements of 444 hospitalized patients found that “a higher cumulative number of room changes” was associated with a “greater severity of delirium symptoms, even when controlling for initial severity of delirium and other relevant patient characteristics...” This tendency was “quite marked in patients without dementia” as compared with those with dementia and that “the effect of isolation was greater in patients with a greater number of room changes.”

McCusker, J., Cole, M., Abrahamowicz, M., Han, L., Podoba, J.E. and Ramman-Haddad, L. (2001). Environmental risk factors for delirium in hospitalized older people. *Journal of the American Geriatrics Society*, 49, 1327-1334.

⁷³ A multicentre, prospective study measured the walking ability and Katz ADL index scores of 246 patients with a femoral neck fracture, aged 65 and older, who were able to walk pre-fracture, and who had a cognitive impairment described as a “known dementia or low [0-2 points] score in [the] Short Portable Mental Status Questionnaire.” This study observed that patients admitted from and discharged back to an institution as soon as they were medically stable “were less likely to preserve walking ability and ADLs index than patients discharged to geriatric rehabilitation units. The authors suggested that “if better functional outcomes could be achieved for hip fractures in patients with cognitive impairment, all patients should receive the same treatment.” Note that a score of 0-2 points on the SPMSQ (maximum score of 10) indicates a severe cognitive impairment.

Al-Ani, A.N., Flodin, L., Soderqvist, A., Ackermann, P., Samnegard, E., Dalen, N., Saaf, M., Cederholm, T., and Hedstrom, M. (2010). Does rehabilitation matter in patients with femoral neck fracture and cognitive impairment? A prospective study of 246 patients. *Archives of Physical Medicine and Rehabilitation*, 9, 51-57.

⁷⁴ Authors of an Australian prospective audit of patient outcomes reported “Our results suggest that...patients from residential care have less access to services to restore mobility and reduce fall risks, following a fractured hip.” The authors acknowledged that the group differed from community-dwelling patients by having “higher prefracture levels of comorbidities, use of mobility aids and diagnoses of dementia. However, 61% of those from residential care were classified as walking independently prior to fracture and the loss of the ability to move around would impact substantially on quality-of-life”; this percentage was reduced to “32% of survivors” at 4 months post-surgery. The authors noted that “the amount of physiotherapy available in residential care settings is limited” and that “while no trials have been performed to assess the cost-benefit aspects of rehabilitation in this frail residential care group it is likely that increased treatment would have produced better outcomes.”

Crotty, M., Miller, M., Whitehead, C., Krishnan, J., and Hearn, T. (2000). Hip fracture treatments – what happens to patients from residential care? *Journal of Quality in Clinical Practice*, 20, 167-170.

⁷⁵ A systematic review reported level 1 evidence that the “presence of mild or moderate dementia should not preclude inclusion in a rehabilitation program.” Note that level 1 evidence was defined as “one or more high quality randomized clinical trials (RCT) or systematic reviews.”

Beaupre, L.A., Jones, C.A., Saunders, L.D.S, Johnston, W.C., Buckingham, J., and Majumdar, S.R. (2005). Best practices for elderly hip fracture patients. *Journal of General Internal Medicine*, 20, 1019-125.

Hip Fracture Rehab Definition Framework

⁷⁶ Authors of a systematic review of rehabilitation outcomes for older patients with a hip fracture and cognitive impairments assigned a Grade B to the statement “After the surgical repair of a hip fracture, patients with mild to moderate cognitive impairment benefit from participation in a multidisciplinary inpatient rehabilitation program” and reported that “there is some evidence that older adults with cognitive impairment who receive intensive inpatient rehabilitation after surgical repair of a hip fracture may be able to gain comparable benefit in physical function as cognitively intact patients.”

Muir, S.W. and Yohannes, A.M. (2009). The impact of cognitive impairment on rehabilitation outcomes in elderly patients admitted with a femoral neck fracture: A systematic review. *Journal of Geriatric Physical Therapy*, 32(1), 24-32.

⁷⁷ A longitudinal retrospective feasibility study was completed with 31 community-dwelling geriatric patients with a hip fracture who did and did not have cognitive impairments. The cognitively impaired group included those with mild, moderate and severe impairments, as determined by the MMSE. This study provided training for staff in caring for frail patients with multiple co-morbidities, including cognitive impairments. Once staff were trained in this model of care, the authors found that “there were no differences in length of stay, rehabilitation efficiency [i.e. functional gain achieved for each day of inpatient stay], and motor FIM gain scores” between cognitively impaired and unimpaired patients, “despite the former’s greater degree of functional dependence at baseline.” The authors concluded that staff can learn how to care for patients with cognitive impairments in rehabilitation settings, and that such clients can achieve outcomes comparable to those without [cognitive impairment] in a setting dedicated to caring for patients with a hip fracture.”

McGilton, K.S., Mahomed, N., Davis, A.M., Flannery, J., and Calabrese, S. (2009). Outcomes for older adults in an inpatient rehabilitation facility following hip fracture surgery. *Archives of Gerontology and Geriatrics*, 49(1), e23-31.

⁷⁸ A randomized, clinically controlled trial of intensive geriatric rehabilitation was conducted in Finland with 243 independently living patients aged 65 and older who were admitted to hospital with a hip fracture. The intervention group was discharged to a geriatric rehab unit, received 2 weeks of intensive rehabilitation with “significantly more physiotherapy sessions a week”; in addition, those who were “discharged to independent living were visited 10 times by a physiotherapist for individual exercises in the patient’s home during the first 2 months after discharge.” The control group was discharged to a local rehab unit where they were treated by general practitioners. The authors reported that at 3 months post surgery, 91% of the patients with mild dementia and 63% of the patients with moderate dementia were living independently after having received intensive geriatric rehabilitation (vs. 67% and 17%, respectively in the control group). However, the authors found no significant difference in mortality or length of stay for patients with severe dementia. The authors state that “length of hospital stay of community dwelling hip fracture patients can be diminished significantly by intensive geriatric rehabilitation, which continues in the patients’ homes after their discharge from hospital...Intensive geriatric rehabilitation...should be considered especially for patients who already were having problems with ADL and IADL functions before their hip fracture.”

Huusko, T.M., Karppi, P., Avikainen, V., Kautiainen, H., and Sulkava, R. (2002). Intensive geriatric rehabilitation of hip fracture patients: A randomized controlled trial. *Acta Orthopaedica Scandinavia*, 73(4), 425-431.

⁷⁹ Authors of a prospective study of 58 patients compared functional recovery (as measured by the FIM motor scale) over 12 weeks of rehab for patients with and without cognitive impairments in both inpatient rehab and skilled nursing facility settings. Mild and moderately impaired patients were included, as determined by the MMSE; severely impaired patients were excluded. The authors reported “there was no overall effect of cognitive impairment on functional outcomes, nor an effect of cognition on superior functional outcome in [inpatient rehab facilities] compared with [skilled nursing facilities]. These results did not change when controlling for age and social support.” Furthermore, the authors reported that “patients with...cognitive impairment who received rehabilitation at an [inpatient rehab facility] had significantly better functional outcomes than similarly-impaired patients at [skilled nursing facilities], and similar outcomes as...cognitively intact elderly at [inpatient rehab facilities].”

Hip Fracture Rehab Definition Framework

Lenze, E.J., Skidmore, E.R., Dew, M.A., Butters, M.A., Rogers, J.C., Begley, A., Reynolds, C.F., and Munin, M.C. (2007). Does depression, apathy, or cognitive impairment reduce the benefit of inpatient rehabilitation facilities for elderly hip fractures patients? *General Hospital Psychiatry*, 29(2), 141-146.

⁸⁰ Authors of a randomized clinically controlled trial found that although “the odds of successful rehabilitation in patients without dementia were found to be 20 times higher than for a patient with dementia,” “hip fracture patients with mild or moderate dementia can often return to the community if they are provided with active geriatric rehabilitation.”

Huusko, T.M., Karppi, P., Avikainen, V., Kautiainen, H., Sulkava, R. (2000). Randomised, clinically controlled trial of intensive geriatric rehabilitation in patients with hip fracture: Subgroup analysis of patients with dementia. *British Medical Journal*, 321, 1107-1111.

⁸¹ A small randomized controlled trial of 11 severely cognitively impaired women who were residents of nursing homes found that “no definite conclusion can be drawn about the effectiveness of the intervention because of its premature termination. However, the study established that it is feasible to provide an interdisciplinary rehabilitation for older people with hip fracture and severe disablement.”

Uy, C., Kurrle, S.E. and Cameron, I.D. (2008). Inpatient multidisciplinary rehabilitation after hip fracture for residents of nursing homes: A randomized trial. *Australasian Journal of Ageing*, 27(1), 43-44.

⁸² A multicentre, prospective study evaluated walking ability and Katz ADL index of 246 patients with a femoral neck fracture, aged 65 and older, who were able to walk pre-fracture, and who had a cognitive impairment described as a “known dementia or low [0-2 points] score in [the] Short Portable Mental Status Questionnaire [0-10 points].” The results of this study indicated that “significant predictors of preserved walking ability at 12-month follow-up were discharge to [a] rehabilitation unit...and walking ability before the fracture.” Similarly, “predictors of preserved Katz ADLs index at 12-month follow-up after adjustment for age and sex, were discharge to [a] rehabilitation unit... and ADLs index before fracture.” The authors suggested that “if better functional outcomes could be achieved for hip fractures in patients with cognitive impairment, all patients should receive the same treatment.” Note that a score of 0-2 points on the SPMSQ indicates a severe cognitive impairment.

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⁸⁴ Patients in the most severe cognitively impaired group required a longer [length of stay] and more therapy hours to obtain a good clinical outcome....The results suggest that, regardless of the severity of cognitive impairment, patients were able to recover significant function with rehabilitation intervention

Hip Fracture Rehab Definition Framework

Barnes, C., Conner, D., Legault, L., Reznickova, N. and Harrison-Felix, C. (2004). Rehabilitation outcomes in cognitively impaired patients admitted to skilled nursing facilities from the community. *Archives of Physical Medicine and Rehabilitation*, 85, 1602-1607

⁸⁵ A systematic review of RCTs comparing coordinated multidisciplinary rehabilitation with usual orthopaedic care found that “patients who received multi-disciplinary rehabilitation were at lower risk of a “poor outcome” – that is dying or admission to a nursing home at discharge from the programme, and showed a trend towards higher levels of return home.” There was no difference in mortality “between multidisciplinary rehabilitation and usual orthopaedic care” Halbert, J., Crotty, M., Whitehead, C., Cameron, I., Kurrle, S., Graham, S., Handoll, H., Finnegan, T., Jones, T., Foley, A., and Shanahan, M. (2007). Multi-disciplinary rehabilitation after hip fracture is associated with improved outcome: A systematic review. *Journal of Rehabilitation Medicine*, 39(7), 507-512.

⁸⁶ Authors of a systematic review and meta-analysis of literature on inpatient rehabilitation specifically designed for geriatric patients (including general or orthopaedic geriatric rehabilitation programs) found “beneficial effects over usual care for functional improvement, preventing admissions to nursing homes, and reducing mortality. For all outcomes inpatient rehabilitation showed a short term effect after discharge as well as a less pronounced longer term effect at the end of follow-up.” Bachmann, S., Finger, C., Huss, A., Egger, M., Stuck, A.E., and Clough-Gorr, K.M. (2010). Inpatient rehabilitation specifically designed for geriatric patients: Systematic review and meta-analysis of randomised controlled trials. *British Medical Journal*, 340, c1718. doi:10.1136/bmj.c1718

⁸⁷ Core Team refers to the team members who are essential, actively involved in the assessment and treatment of MSK patients on the unit. In acute care, although team members collaborate closely, they may not participate regularly in team rounds due to the nature of this setting.

⁸⁸ Consultation is expected to be available within 24 hours in acute care and within 48 hours in rehab.

⁸⁹ A retrospective review of records for 1880 elderly Medicare patients admitted to 284 different acute care hospitals with an acute hip fracture found that “more than 5 PT/OT sessions per week were associated with better health outcomes in a nationally representative sample of elderly patients with hip fracture.” Note also that the consensus of the task group is that in general, higher intensity of rehab for hip fracture patients would increase chances of better outcomes, such as decreasing delirium, minimizing iatrogenic effects, etc.

Hoening, H., Rubenstein, L.V., Sloane, R., Horner, R., and Kahn, K. (1997). What is the role of timing in the surgical and rehabilitative care of community-dwelling older persons with acute hip fracture? *Archives of Internal Medicine*, 157(5), 513-520.

⁹⁰ An observational prospective clinical study with repeat measurements of 444 hospitalized patients found that “a higher cumulative number of room changes” was associated with a “greater severity of delirium symptoms, even when controlling for initial severity of delirium and other relevant patient characteristics...” This tendency was “quite marked in patients without dementia” as compared with those with dementia and that “the effect of isolation was greater in patients with a greater number of room changes.”

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⁹³ Currently, there is no based literature to support the amount of staffing required.

⁹⁴ Authors of a systematic review and meta-analysis of literature on inpatient rehabilitation specifically designed for geriatric patients (including general or orthopaedic geriatric rehabilitation programs) found “beneficial effects over usual care for functional improvement, preventing admissions to nursing homes, and reducing mortality. For all outcomes inpatient rehabilitation showed a short term effect after discharge as well as a less pronounced longer term effect at the end of follow-up.” Bachmann, S., Finger, C., Huss, A., Egger, M., Stuck, A.E., and Clough-Gorr, K.M. (2010). Inpatient rehabilitation specifically designed for geriatric patients: Systematic review and meta-analysis of randomised controlled trials. *British Medical Journal*, 340, c1718. doi:10.1136/bmj.c1718

⁹⁵ The Hospital Elder Life Program (HELP) provides targeted interventions for risk factors (cognitive impairment, sleep deprivation, immobility, dehydration, vision or hearing impairment) by a trained, interdisciplinary team including a geriatric nurse specialist, Elder Life Specialists, trained volunteers and geriatricians. Based on tracking of outcomes of 1507 patients, the authors report that “[HELP] successfully prevents cognitive and functional decline in at-risk older patients.”

Inouye, S.K., Bogardus, S.T., Baker, D.I., Leo-Summers, L., and Cooney, L.M. (2000). The Hospital Elder Life Program: A model of care to prevent cognitive and functional decline in older hospitalized patients. *Journal of the American Geriatrics Society*, 48, 1697-1706.

⁹⁶ Patients with poorly controlled perioperative pain have reported increased hospital LOS, delayed ambulation, and decreased 6-month mobility” Morrison R.S., Magaziner, J., McLaughlin, M.A. et al. (2003). The impact of post-operative pain on outcomes following hip fracture. *Pain*, 103, 303-11.

⁹⁷ A multicentre, prospective study measured the walking ability and Katz ADL index scores of 246 patients with a femoral neck fracture, aged 65 and older, who were able to walk pre-fracture, and who had a cognitive impairment described as a “known dementia or low [0-2 points] score in [the] Short Portable Mental Status Questionnaire.” This study observed that patients admitted from and discharged back to an institution as soon as they were medically stable “were less likely to preserve walking ability and ADLs index than patients discharged to geriatric rehabilitation units. The authors suggested that “if better functional outcomes could be achieved for hip fractures in patients with cognitive impairment, all patients should receive the same treatment.” Note that a score of 0-2 points on the SPMSQ (maximum score of 10) indicates a severe cognitive impairment.

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Hip Fracture Rehab Definition Framework

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¹⁰² An Australian assessor-blinded randomised controlled trial of 150 patients was conducted to compare the effects of two different exercise programmes for hip fracture. All interventions started in an inpatient rehabilitation unit. The intervention group received a higher dose (twice daily for a total of 60min/day over 16 weeks) of primarily weight-bearing exercises with structured home exercises and home visits which tapered off. The control group received a lower dose (a 30min/day over 4 weeks) of primarily seated/supine exercises followed by home visits and a structured home exercise program for 4 weeks. Outcome measures of knee extensor muscle strength and walking speed were taken at 4 and 16 weeks post surgery. The authors reported that “there was no benefit (or harm) due to the higher dose, weight-bearing exercise programme with respect to the primary outcome measures. However, people with hip fracture and cognitive impairment gained greater benefit from the higher dose [rehabilitation] program than from the lower dose program.” Note that in this study, cognitive impairment included mild, moderate and severe impairment as determined by the Short Portable Mental Status Questionnaire and subjects with moderate or severe cognitive impairment were only included if a carer could supervise the exercise programme.

Moseley, A.M., Sherrington, C., Lord, S.R., Barraclough, E., St.George, R.J., and Cameron, I.D. (2009). Mobility training after hip fracture: A randomized controlled trial. *Age and Ageing*, 38, 74-80.

¹⁰³ A small randomized controlled trial of 11 severely cognitively impaired women who were residents of nursing homes found that “no definite conclusion can be drawn about the effectiveness of the intervention because of its premature termination. However, the study established that it is feasible to provide an interdisciplinary rehabilitation for older people with hip fracture and severe disablement.”

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McGilton, K.S., Mahomed, N., Davis, A.M., Flannery, J., Calabrese, S. (2009). Outcomes for older adults in an inpatient rehabilitation facility following hip fracture (HF) surgery. *Archives of Gerontology and Geriatrics*, 49, e23-e31.

¹⁰⁷ An observational prospective clinical study with repeat measurements of 444 hospitalized patients found that “a higher cumulative number of room changes” was associated with a “greater severity of delirium symptoms, even when controlling for initial severity of delirium and other relevant patient characteristics...” This tendency was “quite marked in patients without dementia” as compared with those with dementia and that “the effect of isolation was greater in patients with a greater number of room changes.”

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¹⁰⁸ A randomized trial of 100 patients was completed to compare ADL and IADL abilities of patients receiving early, individualized, postoperative occupational therapy training program vs. routine postoperative care. The authors reported that “individualized OT-training [sped] up the ability of patients to perform ADL, thus enhancing the likelihood of patients returning to independent living and reducing the need for postoperative care at home.” The authors stated that, “age, sex, type of fracture, or length of stay at the hospital made no significant contribution to explaining the better ADL ability on discharge...We therefore believe that individualized OT training, including how to use technical aids, has a clinical effect in the early phases of rehabilitation”

Hagsten, B., Svensson, O. and Gardulf, A. (2004). Early individualized postoperative occupational therapy training in 100 patients improves ADL after hip fracture: A randomized trial. *Acta Orthopaedica Scandinavia*, 75(2), 177-183.

¹⁰⁹ Authors of a literature review found Level II evidence to support “nutritional management with oral protein supplementation in malnourished patients” with hip fractures. Note that the authors define Level II evidence as “evidence obtained from at least one properly designed randomised controlled trial” where Level I is the highest and level IV is the lowest.

Chong, C.P.W., Savige, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).

¹¹⁰ A quasi-experimental, pre-post test comparison group study of 100 patients with hip fractures compared a control group of patients who received regular nutritional support with an intervention group who received nutrition according to nutritional guidelines. The authors reported that “significantly fewer (p=0.043) patients in the

intervention group (18%) had pressure ulcers five days postoperatively compared with the control group (36%). Nutrient and liquid intake was significantly higher ($p < 0.001$) in the intervention group.”

Gunnarsson, A-K., Lonn, K., and Gunningberg, L. (2009). Does nutritional intervention for patients with hip fractures reduce postoperative complications and improve rehabilitation? *Journal of Clinical Nursing*, 18(9), 1325-1333.

¹¹¹ Researchers of a study of 433 elderly patients with a hip fracture admitted for rehabilitation found that “Albumin gain emerged as a significant predictor for higher discharge FIM scores. We conclude that greater attention and efforts should be made regarding the dietary intervention and protein supplementation, in order to improve the rehabilitation outcome.

Mizrahi, E.H., Fleissig, Y., Arad, M., Blumstein, T., and Adunsky, A. (2008). Rehabilitation outcome of hip fracture patients: The importance of a positive albumin gain. *Archives of Gerontology and Geriatrics*, 47(3), 318-326.

¹¹² An Israeli prospective cohort study of 946 patients aged 65 years and over reported that a significant association between “the outcome of rehabilitation of elderly patients after surgical repair of hip fracture” (as measured by the percentage change in the FIM score by the end of inpatient rehabilitation) with “4 correctable...parameters.” The authors state that “the results...point to the possibility of improving rehabilitation outcome by therapeutic intervention in its early phases. The aim of this intervention should be to increase the serum albumin levels by appropriate dietary adjustments and supplementation, to correct those visual defects that can be corrected such as prescription of suitable eyeglasses, to improve dyspnea by optimal treatment of the diseases that cause it, and to correct decreased serum folic acid levels by supplementation. However, the results...can only support an association and not a causality between these 4 parameters and rehabilitation outcomes.”

Lieberman, D., Friger, M., Lieberman, D. (2006). Inpatient rehabilitation outcome after hip fracture surgery in elderly patients: A prospective cohort study of 946 patients. *Archives of Physical Medicine and Rehabilitation*, 87, 167-171.

¹¹³ “In elderly medical patients, five independent precipitating factors have been found to predict the development of delirium: immobility, malnutrition, more than three medications added, use of bladder catheter, and any iatrogenic event during hospitalization”

Inouye, S.K. and Charpentier, P.A. (1996). Precipitating factors for delirium in hospitalized elderly persons: A predictive model and interrelationship with baseline vulnerability. *Journal of the American Medical Association*, 275, 852-857.

¹¹⁴ There is level D evidence for “careful fluid management” due to “risk of dehydration because of inability to gain access to sufficient fluids” as well as “risk of fluid overload when fluid replacement is given intravenously.”

New Zealand Guidelines Group. (2003). *Best Practice Evidence-based Guideline: Acute Management and Immediate Rehabilitation After Hip Fracture Amongst People Aged 65 Years and Over*. Wellington, New Zealand.

¹¹⁵ Authors of a literature review found Level II evidence to support “pressure sore prevention” for patients with hip fractures and state that “clinicians should ensure that good pressure care occurs by the use of pressure relieving devices and monitoring for pressure areas by ward staff.” Note that the authors define Level II evidence as “obtained from at least one properly designed randomised controlled trial” where Level I is the highest and level IV is the lowest.

Chong, C.P.W., Savige, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).

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¹¹⁶ A prospective cohort study of 658 patients with a hip fracture aged 65 and older found that “approximately one-third...experienced one or more new pressure ulcers during the 32 days after hospitalization for fracture. The rate at which pressure ulcers occurred was highest in the acute hospital setting, during the initial stay and rehospitalization.” The authors reported that “...pressure ulcer risk persists, albeit diminished, after discharge from the hospital, with 18.2% of patients still having an [acquired pressure ulcer] at the end of the 3-week study period.... Although the acute care hospital is the setting where pressure ulcer risk is highest, the findings of the current study should also increase awareness of the importance of pressure ulcer prevention...in postacute settings and on maintaining the continuity of care across transitions between settings.”

Baumgarten, M., Margolis, D.J., Orwig, D.L., SHardell, M.D., Hawkes, W.G., Langenberg, P., Palmer, M.H., Jones, P.S., McArdle, P.F., Sterling, R., Kinoshian, B.P. Rich, S.E., Sowinski, J. and Magaziner, J. (2009). Pressure ulcers in elderly patients with hip fracture across the continuum of care. *Journal of the American Geriatrics Society*, 57, 863-870.

¹¹⁷ A systematic review reported level 1 evidence that, “pressure-reducing mattresses appear to be beneficial in reducing pressure sore development.” Note that level 1 evidence was defined as “one or more high quality randomized clinical trials (RCT) or systematic reviews.”

Beaupre, L.A., Jones, C.A., Saunders, L.D.S, Johnston, W.C., Buckingham, J., and Majumdar, S.R. (2005). Best practices for elderly hip fracture patients. *Journal of General Internal Medicine*, 20, 1019-125.

¹¹⁸ Authors conducted a prospective cohort study of 532 patients aged 50 or older from 4 hospitals who received surgical intervention following a hip fracture using the FIM at 2 and 6 months. The authors also followed up on survival at 6 months. The authors found that “increased immobility was associated with higher mortality at 6 months and poorer function at 2 months...the potentially adverse effect of immobility was strongest in patients more dependent in mobility at baseline”

Siu, A.L., Penrod, J.D., Boockvar, K.S., Koval, K., Strauss, E., and Morrison, S. (2006). Early ambulation after hip fracture. *Archives of Internal Medicine*, 166, 766-771.

¹¹⁹ Authors of a literature review found Level III-2 evidence to support “delirium detection and management minimizing the use of sedative drugs and anticholinergic medications” for patients with hip fractures. The authors state “ensuring any medical issues are addressed early together with attention to environmental and supportive measures should be the mainstay of treatment.” Note that the authors define Level III-2 evidence as “evidence obtained from comparative studies with concurrent controls and allocation not randomized (cohort studies), case-control studies or interrupted time series with a control group” where Level I is the highest and level IV is the lowest.

Chong, C.P.W., Savige, J.A., and Lim, W.K. (2010). Medical problems in hip fracture patients. *Archives of Orthopaedic Trauma and Surgery*. DOI 10.1007/s00402-009-1038-y. (Epub ahead of print).

¹²⁰ Authors of a descriptive cohort study with 428 patients aged 65 or older with a hip fracture reported that “postoperative confusion developed in nearly 43% of the patients who were not registered at admission or preoperatively as being confused...The incidence of confusion...is based on the documentation in medical records and nursing charts. This may indicate that the real incidence is even higher because confusion often tends to be underreported.”

Bjorkelund, K.B., Hommel, A., Thorngren, K-G., and Larsson, S. (2009). Factors at admission associated with 4 months outcome in elderly patients with hip fracture. *American Association of Nurse Anesthetists Journal*, 77(1), 49-58.

¹²¹ A prospective cohort study of 126 patients aged 65 and older with a hip fracture found that “delirium is common, persistent, and independently associated with poor functional recovery 1 month after hip fracture even after adjusting for prefracture frailty.”

Marcantonio, E.R., Flacker, J.M., Michaels, M., and Resnick, N.M. (2000). Delirium is independently associated with poor functional recovery after hip fracture. *Journal of the American Geriatrics Society*, 48(6), 618-624.

¹²² A clinical trial of 362 patients with hip fractures compared the agreement level between cognitive assessments based on nurses' documentation and subjective assessment of patients' cognitive status as opposed to a cognitive assessment using the Short Portable Mental Status Questionnaire, a validated evaluation tool. The authors found that "among the patients with impaired cognitive ability according to the Short Portable Mental Status Questionnaire, only 58% [of patients] were identified as being cognitively impaired [by nursing staff]." Furthermore, 12% of the patients did not have a cognitive assessment completed by nursing staff. The authors stated that "cognitive dysfunction is frequently underdiagnosed in routine health care and that "patient care could be improved if the patients' cognitive function was assessed regularly and objectively by means of a validated evaluation instrument."

Soderqvist, A., Stromberg, L., Ponzer, S., and Tidermark, J. (2006). Documenting the cognitive status of hip fracture patients using the Short Portable Mental Status Questionnaire. *Journal of Clinical Nursing*, 15, 308-314.

¹²³ Components of the Delirium Abatement Program: "these included standardized screening for symptoms and signs of delirium upon admission..., assessment and treatment of possible causes of and contributors to delirium, prevention and management of common delirium complications, and restoration of patient cognitive and self-care function" by "creating rehabilitation environments that enhance cognitive reintegration"

Bergmann, M.A., Murphy, K.M., Kiely, D.K., Jones, R.N., and Marcantonio, E.R. (2005). A model for management of delirious postacute care patients. *Journal of the American Geriatrics Society*, 53, 1817-1825

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¹²⁵ GTA Rehab Network. (2009). Discharge Planning Guidelines for Inpatient Rehabilitation.

¹²⁶ Researchers in a multi-centre study of 7753 randomly selected people across Canada stated, "Our results show a strong association between vertebral and hip fractures and death. Given this association, interventions need to be implemented to reduce the likelihood that patients will experience fractures that increase their risk of death. These might include the use of interventions such as osteoporosis medications, strategies to prevent falls or the use of hip protectors"

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¹²⁷ There is level A evidence that "older people should have their risk of falls and fractures assessed" and that "those at increased risk should be offered multiple interventions aimed at reducing the identified individual and environmental risks."

Scottish Intercollegiate Guidelines Network. (2002). Prevention and Management of Hip Fracture in Older People: A National Clinical Guideline. Edinburgh, Scotland.

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- ¹²⁸ For older persons living in the community, evidence shows that health and environment risk-factor assessment with interventions based on assessment results, is highly effective in reducing falls among community-dwelling older persons who are cognitively intact....Within a multifactorial approach, the components of successful health interventions focus on post-fall clinical assessment followed by treatment involving a multidisciplinary-team approach.”
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Petrella, R.J. and Jones, T.J. (2006). Do patients receive recommended treatment of osteoporosis following hip fracture in primary care? *BMC Family Practice*, 7, 31.
- ¹³⁰ A clinical practice guideline developed by the American Geriatrics Society, British Geriatrics Society and the American Academy of Orthopaedic Surgeons Panel on Falls Prevention found Level B evidence that, “older people who have had recurrent falls should be offered long-term exercise and balance training.” See Appendix C for details on grading system used by the authors.
American Geriatrics Society (AGS) Panel on Falls in Older Persons. (2001). Guideline for the Prevention of Falls in Older Persons. *Journal of the American Geriatrics Society*, 49, 664-672.
- ¹³¹ A systematic review with meta-analysis of randomized controlled trials was conducted to compare fall rates in the elderly with and without exercise interventions. The authors report there is “strong evidence that exercise programs can reduce fall rates in older people. The overall reduction of 17% based on 44 trials involving 9,603 participants provides confidence that these findings are robust and generalizable to a broad section of older people. Furthermore...three factors (balance training, exercise dose, and the absence of a walking program) are associated with the efficacy of exercise programs.”
Sherrington, C., Whitney, J.C., Lord, S.R., Herbert, R.D., Cumming, R.G., Close, J.C.T. (2008). Effective exercise for the prevention of falls: A systematic review and meta-analysis. *Journal of the American Geriatrics Society*, 56, 2234–2243.
- ¹³² Two parallel, randomized controlled trials were conducted on depression after hip fracture surgery in older people. The authors measured the effect of depressive symptoms, pain, cognition, and fear of falling at 2 weeks and 6 weeks post surgery on functional recovery 6 months post surgery in 187 patients(as measured by: “up and go test, gait test, functional reach...self-report Sickness Impact Profile”). The authors reported that at 6 months post surgery, “cognitive functioning and fear of falling assessed 6 weeks after surgery consistently predicted functional recovery, whereas pain and depressive symptoms were no longer significant.” The authors recommended that “rehabilitation strategies should take this into account.”
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¹³⁷ “Written information on medication, mobility, expected progress, pain control and sources of help and advice should be available to patient and carer” Scottish Intercollegiate Guidelines Network. (2002). *Prevention and Management of Hip Fracture in Older People: A National Clinical Guideline*. Edinburgh, Scotland

¹³⁸ Core Team refers to the team members who are essential, actively involved in the assessment and treatment of MSK patients on the unit. In acute care, although team members collaborate closely, they may not participate regularly in team rounds due to the nature of this setting.

¹³⁹ Consultation is expected to be available within 24 hours in acute care and within 48 hours in rehab.

¹⁴⁰ Inouye, S.K., Bogardus, S.T., Baker, D.I., Leo-Summers, L., and Cooney, L.M. (2000). The Hospital Elder Life Program: A model of care to prevent cognitive and functional decline in older hospitalized patients. *Journal of the American Geriatrics Society*, 48, 1697-1706.

¹⁴¹ Inouye, S.K., Bogardus, S.T., Baker, D.I., Leo-Summers, L., and Cooney, L.M. (2000). The Hospital Elder Life Program: A model of care to prevent cognitive and functional decline in older hospitalized patients. *Journal of the American Geriatrics Society*, 48, 1697-1706.

¹⁴² Patients with poorly controlled perioperative pain have reported increased hospital LOS, delayed ambulation, and decreased 6-month mobility” Morrison R.S., Magaziner, J., McLaughlin, M.A. et al. (2003). The impact of post-operative pain on outcomes following hip fracture. *Pain*, 103, 303-11.

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¹⁷² For older persons living in the community, evidence shows that health and environment risk-factor assessment with interventions based on assessment results, is highly effective in reducing falls among community-dwelling older persons who are cognitively intact....Within a multifactorial approach, the components of successful health interventions focus on post-fall clinical assessment followed by treatment involving a multidisciplinary-team approach.”
World Health Organization. (2007). *WHO Global Report on Falls Prevention in Older Age*. Geneva, Switzerland: WHO Press.

¹⁷³ A prospective study of 174 hip fracture patients studied the compliance with Canadian Consensus recommendations on the management of osteoporosis. 174 were patients discharged from primary care to the care of their family physician; all physicians had received a copy of the Canadian Consensus recommendations. After 12 months post hip fracture rehab, few were following the recommendations of the Canadian Consensus for osteoporosis management, suggesting that “ongoing treatment and management post fracture needs to be developed and implemented.”
Petrella, R.J. and Jones, T.J. (2006). Do patients receive recommended treatment of osteoporosis following hip fracture in primary care? *BMC Family Practice*, 7, 31.

¹⁷⁴ A clinical practice guideline developed by the American Geriatrics Society, British Geriatrics Society and the American Academy of Orthopaedic Surgeons Panel on Falls Prevention found Level B evidence that, “older people who have had recurrent falls should be offered long-term exercise and balance training.” See Appendix C for details on grading system used by the authors.
American Geriatrics Society (AGS) Panel on Falls in Older Persons. (2001). Guideline for the Prevention of Falls in Older Persons. *Journal of the American Geriatrics Society*, 49, 664-672.

¹⁷⁵ A systematic review with meta-analysis of randomized controlled trials was conducted to compare fall rates in the elderly with and without exercise interventions. The authors report there is “strong evidence that exercise programs can reduce fall rates in older people. The overall reduction of 17% based on 44 trials involving 9,603 participants provides confidence that these findings are robust and generalizable to a broad section of older people. Furthermore...three factors (balance training, exercise dose, and the absence of a walking program) are associated with the efficacy of exercise programs.”
Sherrington, C., Whitney, J.C., Lord, S.R., Herbert, R.D., Cumming, R.G., Close, J.C.T. (2008). Effective exercise for the prevention of falls: A systematic review and meta-analysis. *Journal of the American Geriatrics Society*, 56, 2234–2243.

¹⁷⁶ Two parallel, randomized controlled trials were conducted on depression after hip fracture surgery in older people. The authors measured the effect of depressive symptoms, pain, cognition, and fear of falling at 2 weeks and 6 weeks post surgery on functional recovery 6 months post surgery in 187 patients(as measured by: “up and go test, gait test, functional reach...self-report Sickness Impact Profile”). The authors reported that at 6 months post surgery, “cognitive functioning and fear of falling assessed 6 weeks after surgery consistently predicted functional recovery, whereas pain and depressive symptoms were no longer significant.” The authors recommended that “rehabilitation strategies should take this into account.”

Hip Fracture Rehab Definition Framework

Oude Voshaar, R.C., Banerjee, S., Horan, M., Baldwin, R., Pendleton, N., Proctor, R., Tarrier, N., Woodward, Y., and Burns, A. (2006). Fear of falling more important than pain and depression for functional recovery after surgery for hip fracture in older people. *Psychology of Medicine*, 36(11), 1635-1645.

¹⁷⁷ A systematic review of effectiveness of health information provision recommended “the use of both verbal and written health information when communicating about care issues with patients and/or significant others on discharge from hospital to home” as this “appears to improve knowledge and satisfaction.” Sandford, J.A. and Tyndall, J. (2003). Written and verbal information versus verbal information only for patients being discharged from acute hospital settings to home. *Cochrane Database of Systematic Reviews*, 4:CD003716.

¹⁷⁸ “Written information on medication, mobility, expected progress, pain control and sources of help and advice should be available to patient and carer” Scottish Intercollegiate Guidelines Network. (2002). *Prevention and Management of Hip Fracture in Older People: A National Clinical Guideline*. Edinburgh, Scotland

¹⁷⁹ A prospective study of 174 hip fracture patients studied the compliance with Canadian Consensus recommendations on the management of osteoporosis. 174 were patients discharged from primary care to the care of their family physician; all physicians had received a copy of the Canadian Consensus recommendations. After 12 months post hip fracture rehab, few were following the recommendations of the Canadian Consensus for osteoporosis management, suggesting that “ongoing treatment and management post fracture needs to be developed and implemented.” Petrella, R.J. and Jones, T.J. (2006). Do patients receive recommended treatment of osteoporosis following hip fracture in primary care? *BMC Family Practice*, 7, 31.

¹⁸⁰ “GPs have an important role to play in post discharge rehabilitation and should receive early and comprehensive information on hospital stay, services arranged and future follow up arrangements. Complicated discharges that may have considerable impact on the primary care team should be discussed in advance with the GP” Scottish Intercollegiate Guidelines Network. (2002). *Prevention and Management of Hip Fracture in Older People: A National Clinical Guideline*. Edinburgh, Scotland