

# Senior Managed Care System for Hip Fracture in the United States

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**Background:** It is debatable whether a managed care model would affect the quality of care and length of hospital stay in the treatment of hip fractures in elderly patients.

**Methods:** This prospective study was undertaken to determine whether or not a managed care critical pathway tool shortened hospital stay in a group of 102 senior patients with fractures of the hip during follow-up. We compared our study findings with two equivalent populations of senior hip fracture patients not treated using a critical care pathway concerning specific markers of quality.

**Results:** The managed care group had a 9% mortality rate, 95% return to prefracture living and 63% return to ambulatory status. The rates compared favorably with previous studies. The quality of care provided before and after the critical pathway was equivalent, while the post-pathway length of stay dropped 30%.

**Conclusions:** The proposed care protocol is recommended to shorten hospital stay in elderly patients with hip fractures.

**Keywords:** Hip fractures, Aged, Length of stay

Hip fracture in geriatric patients is an important concern for healthcare systems worldwide. It is the number one cause of hospitalization in elderly patients. Hip fractures increase in prevalence with age. The aging of global society has resulted in increasing prevalence of hip fractures.<sup>1-3)</sup> Expenditures for hip fractures in the United States is rising faster than the general rate of inflation.<sup>4,5)</sup>

Hip fractures in the elderly can lead to severe complications and consequences.<sup>3)</sup> Severe complications can increase the mortality rate of elderly patients by 3-fold when compared to those without hip fracture history.<sup>5-8)</sup> The life expectancy falls by 38% to 58% in the elderly

with hip fractures.<sup>9)</sup> Among those surviving the first year after hip surgery, about 25% to 75% achieve full ambulatory status. Many patients that have a successful first year of recovery will never regain complete independence of physical activities that they had before the fracture. Approximately half of the elderly patients regain their pre-hip fracture health status and around 20% are in need of extra medical and supportive care.<sup>7,10)</sup>

Hip fractures also reduce the level of daily living activities and, consequently, the quality of life in elderly patients. About half of hip fracture patients are still disabled 1 year after the time of fracture with only about one-quarter of patients regaining their prefracture activities of daily living.<sup>7,11)</sup> The primary purpose of treatment and rehabilitation in the elderly after a hip fracture is to improve the quality of life. Introduction of achievable aims through an adequate rehabilitation program allows for maximally independent life of the elderly after a hip fracture.<sup>3,12)</sup> The rehabilitation program should consist of a multidisciplinary approach with coordination of members through

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a comprehensive schedule<sup>3)</sup> to maximize adherence to the rehabilitation protocols.<sup>13-17)</sup>

Since the treatment for a hip fracture is associated with significant rates of mortality and morbidity, optimizing medical care is important. Developing multidisciplinary care pathways for older patients with hip fractures could reduce the high burden on the medical and social system.<sup>16)</sup> This study was based on the hypothesis that a comprehensive care pathway for elderly patients with hip fracture to improve the quality of care has the additional benefit of shortened length of hospital stay. The study compared a cohort of hip fractures patients treated using the managed care model to a cohort of similar patients who did not undergo this pathway. The research team evaluated and compared the measured outcomes before and after the establishment of the critical care pathway, including length of stay (LOS), mortality, major and minor complications, reoperation rate, readmission rate, ambulatory status, and living status.

## METHODS

### Study Population

In this prospective study, 102 patients (50 females and 52 males) between 63 and 93 years of age (average age of 79 years) were recruited during a 12-month period from Charter Community Hospital, a large Health Maintenance Organization in Los Angeles. They were treated according to a proposed specific treatment protocol shown in Appendix 1 and described below. The measured outcomes after the establishment of the critical care pathway were compared with the outcome data related to an equivalent population of elderly patients with hip fractures who were treated without the protocol during two equivalent 12-month period (2 years [period A] and 3 years [period B] prior to implementation of the managed care system). The patients and/or their families were informed that data from the case would be submitted for publication, and gave their consent. In addition, approval was given by the Charter Community Hospital Institutional Review Board and consent was obtained from each patient.

### Protocol and Postoperative Care

The patients were treated according to a proposed specific treatment protocol for hip fracture in elderly patients (Appendix 1). This protocol is a written critical pathway that includes a daily schedule for patient care with input concerning physician care, physical therapy, nursing care, dietary care, social work, and discharge planning. Additionally, a rehabilitation program was initiated by the

orthopedic surgeon, often within a day after surgery, with mobilization out of bed to a chair and progression to ambulation training. The main aim of the rehabilitation program was to prevent complications caused by bed rest and to retain the level of activity strength that patients had before the fracture. As long as the orthopedic surgeon clinically determined that patients could comfortably bear full weight on the injured leg, ambulation (walking) and exercises were started. Additionally, during the 1 to 2 months after discharge, patients were trained and supervised by a physical therapy team to do daily muscle strengthening exercises. Also, postoperative pain was clinically managed by the surgeon with systemic opioids, paracetamol and nonsteroidal anti-inflammatory drugs as well as local anesthetic blocks. Patients were educated by a trained nurse on nutrition supplements and fall prevention.

### Study Variables

The patients were prospectively evaluated within 12 months after being admitted to the Charter Community Hospital for treatment of a hip fracture. Information concerning patient age, gender, type of fracture, type of treatment, pre- and postoperative ambulatory status, and pre- and postoperative living arrangements were recorded. These records were made by the participating orthopedic surgeons on a questionnaire, broken down into in different time intervals including time of admission within 24, 40, 72 hours postoperatively and the day of this discharge (Appendix 2). Information from the questionnaires was computerized for retrieval of appropriate information.

### Comparative Variables

In addition to evaluation of information concerning the study group of patients, we compared the recorded data from the 102 patients with the data from two equivalent groups of elderly patients with hip fractures who were treated without implementing any protocol in the same hospital. These groups were treated 2 year (period A: 57 females and 41 males; average age, 77 years) and 3 years (period B: 54 females and 42 males; average age, 79 years) prior to the use of the critical pathway protocol. These two periods represented equivalent periods of time with equivalent patient populations. The data was provided by Charter Community Hospital data center after matching the two groups' characteristics with the study population. There was no statistically significant difference among the groups compared ( $p < 0.05$ ) and these two groups were similar to the study participants in age, sex, race, chronic condition, and type of fracture. There were no major changes in the population patient base being treated

during the years under consideration. The research team were able to compare those available data from these two groups, which could be considered as sensitive indicators of quality of care within 12 months follow-up after surgery, including re-admission rate, mortality rate, complication rate, reoperation rate, and LOS.

### Surgical Treatment

The surgical treatment of the hip fractures was accomplished according to the judgment and experience of the individual surgeon treating that particular patient. The types of treatment employed were: open reduction internal fixation (ORIF) with cannulated screws or Knowles pins, ORIF with dynamic hip screw (DHS), arthroplasty with Austin Moore prosthesis, unipolar arthroplasty, Leinbach arthroplasty, and bipolar arthroplasty. The operative techniques consisted of numerous surgical approaches including a small lateral incision for percutaneous cannulated screw fixation, standard lateral approach for insertion of a DHS compression screw-plate, and lateral and posterior approaches for hip arthrotomy for insertion of hip prostheses. In the cases of prosthetic insertion, cement may or may not have been used according to the individual desires of the treating surgeons.

### Statistical Analyses

Statistical analyses were performed using IBM SPSS ver. 20.0 (IBM Co., Armonk, NY, USA). In addition to a descriptive analysis of all variables, bivariate analysis was conducted to determine the correlates of independent variables. At the descriptive level, the distribution and frequency of all items were examined. The chi-square test was performed to examine the association between independent variables and outcome variables. And a  $p$ -value  $< 0.05$  was considered statistically significant. Additionally, the chi-square test was used to match two study populations (in periods A and B) with the critical pathway population, to ensure there was no statistically significant difference among the groups compared ( $p < 0.05$ ).

## RESULTS

Of the initial 135 patients from 176 screened patients, 33 could not be located for final follow-up. The data of 102 patients were analyzed.

### Study Variables

#### *Type of fracture*

Out of the 102 hip fractures, 42 (41%) were femoral neck fractures and 60 (58%) were intertrochanteric hip fractures.

#### *Type of surgery*

Fourteen patients had Austin-Moore arthroplasties, four had cannulated screw fixation, 41 had a DHS hip sliding screw device, 14 had a Leinbach arthroplasty, seven had a unipolar arthroplasty, and 13 patients had a bipolar arthroplasty. Thirty-eight patients were treated for femoral neck fractures, of which four patients (11%) had internal fixation, while 34 (89%) were treated with femoral head replacement. Fifty-five procedures were done for intertrochanteric hip fractures. Of the 55 procedures, 42 (75%) were internally fixed with DHS screw plates and 13 (25%) were treated with a Leinbach head neck replacements.

#### *Ambulatory status*

Prior to the occurrence of the hip fracture, 68 patients (67%) were independently ambulatory without aid, while 26 patients (25%) used a cane or walker and eight patients (8%) were nonambulatory. Post-fracture, 32 patients (31%) remained independently ambulatory, while 63 patients (62%) used a cane or walker at 1 year.

#### *Living status*

Ninety-three patients (91%) were available for review. Preoperatively, 31 patients (33%) lived alone, 56 patients (60%) lived with their family, and six (7%) lived in a care facility, such as a nursing home. Postoperatively, 29 patients (31%) continued living alone, 53 patients (57%) continued to live with family, and 11 patients (12%) lived in a care facility.

### Comparative Variables

#### *Mortality rate*

Of the 102 patients who were followed for an average of 1 year postsurgery, nine deaths occurred, representing a 9% death rate. According to actuarial tables, this represents the expected average death rate for the normal population at age 79. Reported rates in the literature of 12% to 30%,<sup>3-5,7</sup> corresponding to 2- to 4-fold increase in death rates in the elderly populations following hip fracture, were not evident in our study.

No increase in death rate over what would be expected for age was found. Four of these deaths occurred in the immediate postoperative period, while five occurred within the ensuing postoperative period. The mortality rate for period A and B was 8.3% and 9.1%, respectively.

#### *Complications*

The complication for patients treated using the critical pathway and those in period A and B was 28%, 27%, and 28%, respectively. These were mainly minor medical

Table 1. Comparison of Surgery Outcome before and after Institution of the Critical Pathway

Comparative variable	Pre-critical pathway		Post-critical pathway	p-value
	Period A (n = 98)	Period B (n = 96)	This study (n = 102)	
Readmission rate	3 (2.6)	3 (3.1)	3 (3)	0.432
Reoperation rate	1 (1.4)	2 (1.6)	1 (1.4)	0.403
Complication rate	26 (27)	24 (25)	29 (28)	0.261
Mortality rate	8 (8.3)	9 (9.1)	9 (9)	0.395
Length of stay (day)	6.45	7.15	4.5	0.043*

Values are presented as number (%).

\*Statistically significant ( $p < 0.05$ ).

complications, such as urinary tract infections, and minor respiratory dysfunction such as postoperative atelectasis.

#### Readmission and reoperation rates

The rate of readmission and reoperation for the study patients was 3% and 1.4%, respectively. The respective rates were 2.6% and 3.1% for period A, and 3.1% and 1.6% for period B (Table 1).

#### Length of stay

Mean  $\pm$  standard deviation LOS for patients in the critical pathway, period A, and period B, groups was  $4.5 \pm 0.5$ ,  $6.45 \pm 0.7$ , and  $7.15 \pm 0.5$  days, respectively, representing a statistically significance 30% decrease for the treatment group ( $p = 0.043$ ). The majority of the patients in the three groups who were surgically and medically stable were discharged to a secondary care facility for continued physical therapy at a reduced expense compared to a much more expensive care received in our primary hospital. Thus, the decreased LOS was directly attributable to the institution of the critical care pathway.

#### Quality of Care

There were no statistically significant differences in complications, readmissions, mortality, and reoperations between the critical pathway, period A, and period B groups. From this limited perspective of the study, no statistical differences in quality markers were evident between the three groups. This makes sense as the same group of physicians cared for these patients.

## DISCUSSION

It is widely accepted that surgical treatment of hip fractures is appropriate to insure the best possible outcome in

a group of elderly patients. Previous studies on conservative hip fractures with methods like traction, casting, and bed rest have been shown to have high morbidity and mortality rates.<sup>18-20</sup> Despite aggressive interventional treatment, which has improved results,<sup>21-25</sup> most physicians continue to view hip fracture in the elderly population as a significant medical event that may herald the demise of many of these patients, further decreasing their quality of life. Developing and implementing comprehensive care pathways for elderly patients with a hip fracture could improve the quality of care and also reduce the related costs in the health care system.

This study proposed and employed a comprehensive care pathway among 102 elderly patients with hip fractures. The patients were followed prospectively for specific markers of quality. Additionally, the findings of this study were compared with two equivalent groups (A and B) of senior hip fracture patients treated by the same group of surgeons who did the surgeries in the same manner without institution of any critical care pathway. Additionally, the post-discharge rehabilitation programs were tailored individually by the surgeon for each patient, based on patient age, medical condition (physical and mental), place of residence (e.g., home, skilled nursing facility, nursing home, rehab facility), and type of surgery. These post-discharge rehabilitation programs were not as a part of the introduced protocol.

Contrary to this commonly held gloomy point of view, the mortality rates did not increase above what would be predicted. This suggests that our intervention, both surgically and preoperatively, played a major role in preventing the increased mortality rate expected in similar patient populations in other studies.<sup>18,23-25</sup>

In addition to this finding we evaluated the quality of life post-fracture by evaluating differences in their

ambulatory status and living arrangements. Only 45% of patients who were ambulatory without a supportive device remained the same post-fracture. However, 93% of those who were able to ambulate by some means prefracture remained able to ambulate by some means posttreatment.

Although this data suggests that many patients do not regain their previous independent ambulatory status, their quality of life is not significantly altered. We also found that our treatment allowed most of these patients to return to their prefracture living arrangements, which also enhanced their quality of life.

In regards to treatment of specific fracture pattern types, 90% of the patients with femoral neck fractures were treated with femoral head replacement. This pattern reflects the belief that due to the high incidence of nonunion and avascular necrosis in femoral neck fractures, femoral head replacement is the best way to achieve a consistently good surgical outcome and mobilize the patients earlier. On the other hand, intertrochanteric femur fractures were predominantly treated with ORIF. This is also consistent with the belief that this fracture will heal appropriately and result in a good short and long term outcome.

In the elderly, treatment of hip fracture is costly. In an era when health care costs are an important issue in the American economy, it is important that medical providers develop and implement feasible care pathways to reduce the cost in the treatment of hip fracture.<sup>26)</sup> One of the important drivers of hospital cost and resource utilization in patients with hip fracture is hospital stay.<sup>27,28)</sup> LOS is an important factor when considering the medical economics of hip fracture care, and reducing LOS is an important method to reduce hip fracture associated costs. Previous studies

focused on identifying and modifying factors associated with LOS. However, to the best of our knowledge, no studies have introduced and implemented a care pathway with the aim of shortening LOS among elderly patients with hip fracture.<sup>26,29-30)</sup> Presently, patients in the period A and B groups, who had a significantly longer LOS than those treated using the critical pathway, displayed an increased rate of efficiency in progressing through the initial perioperative period. This increased efficiency would translate to considerable savings in treatment costs.

A potential limitation of this study is the heterogeneity of study population, which could contribute to post-operative results after operation of the hip fractures. Also, since the data related to periods A and B were provided by Charter Community Hospital data center (after matching the two groups' characteristics with the study population), the study team did not have access to the detailed information of periods A and B, and were not able to present the comparison results between these groups with each parameter.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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**Appendix 1.** Treatment protocol for hip fracture in elderly patients.

CHECK BOX WHEN ITEM COMPLETED. DRAW LINES THROUGH ITEMS NOT TO BE DONE

**CHARTER COMMUNITY HOSPITAL/FHP**

**DLAGNOSIS: FRACTURED HIP UNCOMPLICATED**

ANTICP.LOS: ..... (96 HOURS)

ADM DT: .....

ACTUAL LOS: .....

ADM TIME: .....

DICHG. DT:.....

INDICATOR	TIME OF ADMISSION	WITHIN 24 HOURS/POST-OP	WITHIN 48 HOURS/POST-OP	WITHIN 72 HOURS/POST-OP	DAY OF DISCHARGE
PHYSIOLOGIC	<input type="checkbox"/> 1. Assess resp, neuro vascular, nutritional, integumentary status, hearing, visual, & presence of other diseases. <input type="checkbox"/> 2. VS q 4 hrs. IFT> 101.6, or not alert, then VS q 1 hr. X's 2, then q 2 hrs. X's 2, then q 4 hrs. <input type="checkbox"/> 3. I&O. <input type="checkbox"/> 4. Weight/bed scale (NOTE: Set up bed scale prior to placing Pt. in bed).	<input type="checkbox"/> 1. Skin care assess in OR & then q 6 hrs. <input type="checkbox"/> 2. VS per RR, then q 1 hr X's 4, then q 8 hrs. Report Temp > 101.6 <input type="checkbox"/> 3. → <input type="checkbox"/> 5. Follow spinal / Epidural Protect. If indicated. <input type="checkbox"/> 6. CK surgical dressing q 2 hrs., reinforce PRN.	<input type="checkbox"/> 1. Skin care assess q 0 hrs., esp. note heels, coccyx & ankles. <input type="checkbox"/> 2. VS q 8 hrs., Report Temp> 101.6 <input type="checkbox"/> 3. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. → q 4 hrs.	<input type="checkbox"/> 1. Skin care assess q 8 ankles. <input type="checkbox"/> 2. → T.> 101.6 (oral) <input type="checkbox"/> 3. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. → q 6 hrs.	<input type="checkbox"/> 6. Pt assess. @ discharge according to DX. Include skin assess.
DIAGNOSTIC	<input type="checkbox"/> 1. UA <input type="checkbox"/> 2. Labs : CBC w/diff.Chem 7. PT. PTT, Type & Screen 2 UPC. <input type="checkbox"/> 3. X-RAYS: AP & Lat. Of Fx Hip: CXR PA & Lat. <input type="checkbox"/> 4. EKG for pts. Over 40 yrs.	<input type="checkbox"/> 2. Labs: H & H q AM X's 3 PT q AM X's 3 Chem. 7 X's 1 if Pt receiving Coumadin. <input type="checkbox"/> 3 X-rays: AP & Lat. Of affected hip in RR.	<input type="checkbox"/> 2. → <input type="checkbox"/> 3. Consider X – ray: AP & Lat. Of affected hip if excessive pain.	<input type="checkbox"/> 2. H & H, & PT (if on Coumadin). <input type="checkbox"/> 3. →	<input type="checkbox"/> 2. →
THERAPEUTIC	<input type="checkbox"/> 1. IV access w/18g Angiocath rate & additives to meet hydration & electrolyte needs. IV fluids as ordered. <input type="checkbox"/> 2. Consent for surgery. <input type="checkbox"/> 3. Pressure relief mattress. <input type="checkbox"/> 4. Heat protectors. <input type="checkbox"/> 5. Consider urinary indwelling catheter to bedside drainage <input type="checkbox"/> 6. Incentive spirometer per resp. therapy protocol <input type="checkbox"/> 7. Overhead frame & trapeze <input type="checkbox"/> 8. Consider 5 lbs. Bucks TX. DC in OR. <input type="checkbox"/> 9. Consider Pneumatic stockings. <input type="checkbox"/> 10. C/M/S q 8 hrs. <input type="checkbox"/> 11. Antibiotic Prophylaxis suggest. IVPB Anker 1 gin. Completed prior to surgical incision & not more than 1 1/2 hr. prior surgical incision. <input type="checkbox"/> 12. Pain Mgmt. Alternatives: PCA. P.O. pain nails. Spinal Epidural. <input type="checkbox"/> 13. Routine index. per IM Consult. <input type="checkbox"/> 14. Follow pressure Decubitus Protocol <input type="checkbox"/> 15. Consider IM Consult. <input type="checkbox"/> 16. Consider sedative, anti-anxiety meds. <input type="checkbox"/> 17. Review routine meds.	<input type="checkbox"/> 1. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. → <input type="checkbox"/> 7. → <input type="checkbox"/> 8. Dc in Or. <input type="checkbox"/> 9. → <input type="checkbox"/> 10. → <input type="checkbox"/> 11. →Suggest: Anef 1 gm IVPB q 8 hrs. X s 3 doses @ MDS discretion – if no urinary of surgical drains/ pt. in good general condition. <input type="checkbox"/> 12. → <input type="checkbox"/> 13. → <input type="checkbox"/> 14. → <input type="checkbox"/> 15. Colace 100 gm.bid <input type="checkbox"/> 16. Laxative of choice PRN if no BM in 24 hrs. <input type="checkbox"/> 17. If no adequate stool recorded for more than 36 hrs., notify MD. <input type="checkbox"/> 18. Coumadin if high risk for DVT. <input type="checkbox"/> 19. Tylenol gr. 10 q 4-6 hrs. PRN Terup > 101. F. <input type="checkbox"/> 20. Tigan Supp . q 4-6hrs. PRN N/V. <input type="checkbox"/> 21. Ferrous Gluconate 325 mg. P.O.bid. <input type="checkbox"/> 22. Turn q 2 hrs. <input type="checkbox"/> 23. Blood replacement, if needed.	<input type="checkbox"/> 1. Consider DC IV after IVPB antibiotics completed. <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. Consider DC Foley Catheter, assess & evaluate for bi adder training. <input type="checkbox"/> 6. → <input type="checkbox"/> 7. → <input type="checkbox"/> 8. → <input type="checkbox"/> 9. → <input type="checkbox"/> 10. → <input type="checkbox"/> 11. → <input type="checkbox"/> 12. → <input type="checkbox"/> 13. → <input type="checkbox"/> 14. → <input type="checkbox"/> 15. → <input type="checkbox"/> 16. Consider enema if no BM. <input type="checkbox"/> 17. → <input type="checkbox"/> 18. Coumadin QD. <input type="checkbox"/> 19. → <input type="checkbox"/> 20. → <input type="checkbox"/> 21. → <input type="checkbox"/> 22. → <input type="checkbox"/> 23. →	<input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. Eliminate Foley <input type="checkbox"/> 6. → <input type="checkbox"/> 7. → <input type="checkbox"/> 8. → <input type="checkbox"/> 9. → <input type="checkbox"/> 10. → <input type="checkbox"/> 11. → <input type="checkbox"/> 12. → <input type="checkbox"/> 13. → <input type="checkbox"/> 14. → <input type="checkbox"/> 15. → <input type="checkbox"/> 16. → <input type="checkbox"/> 17. → <input type="checkbox"/> 18. Coumadin as ordered <input type="checkbox"/> 19. → <input type="checkbox"/> 20. → <input type="checkbox"/> 21. → <input type="checkbox"/> 22. → <input type="checkbox"/> 23. → <input type="checkbox"/> 24 Report all adverse drug reaction(s) to the ADR Hot Line: 809-9690 Ext. RASH	<input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. → <input type="checkbox"/> 7. → <input type="checkbox"/> 8. → <input type="checkbox"/> 9. D/C @ discharge. Send stockings if transferred to SNF. <input type="checkbox"/> 10. Document final C/M/S. <input type="checkbox"/> 11. → <input type="checkbox"/> 12. Document level of Pain @ discharge. <input type="checkbox"/> 13. → <input type="checkbox"/> 14. → <input type="checkbox"/> 15. → <input type="checkbox"/> 16. → <input type="checkbox"/> 17. → <input type="checkbox"/> 18. Coumadin as ordered <input type="checkbox"/> 19. → <input type="checkbox"/> 20. → <input type="checkbox"/> 21. → <input type="checkbox"/> 22. → <input type="checkbox"/> 23. → <input type="checkbox"/> 24 Report all adverse drug reaction(s) to the ADR Hot Line: 809-9690 Ext. RASH

Appendix 1. Continued.

INDICATOR	TIME OF ADMISSION	WITHIN 24 HOURS/POST-OP	WITHIN 48 HOURS/POST-OP	WITHIN 72 HOURS/POST-OP	DAY OF DISCHARGE
CONSULTATION	<input type="checkbox"/> 1. Consider Anesthesia consultation. <input type="checkbox"/> 2. Internal Med. Follow as needed.	<input type="checkbox"/> 3. Dietary	<input type="checkbox"/> 4. P.T		
NUTRITION	<input type="checkbox"/> 1. NPO; Food/liquids 6 hrs. Prior to surgery; meds.,4 hrs. Prior to surgery. <input type="checkbox"/> 2. >6 hrs. Prior to surgery. Diet as tolerated.	<input type="checkbox"/> 1. Fast meal. Clear liquid then*dict as tolerated* (DAT)	<input type="checkbox"/> 1. DAT including P.O. fluids (2000-3000cc/24hrs) <input type="checkbox"/> 2. Dict supplements if cath _____%	<input type="checkbox"/> 1. → <input type="checkbox"/> 2. →	<input type="checkbox"/> 2. Document nutritional status at discharge
PHYSICAL THERAPY	<input type="checkbox"/> 1. Overhead Frame & Trapeze <input type="checkbox"/> 2. Apply Buck's Traction as ordered	<input type="checkbox"/> 1. P.T. Initial Evaluation <input type="checkbox"/> 2. Pain Mgmt. is addressed & Meds administered. <input type="checkbox"/> 3. Instruct pr. In hip precautions & proper positioning. <input type="checkbox"/> 4. Instruct pt. in isometric exs. <input type="checkbox"/> 5. Initial gentle Active – Asst exs. For involved ext. <input type="checkbox"/> 6. Initial transfer training. Consider wt. bearing status as ordered by M.D. <input type="checkbox"/> 7. Arrange for a raised commode to be available in pt's room	<input type="checkbox"/> 2. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. Review → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. → <input type="checkbox"/> 8. Initiate gait training with walker. Consider tearing status as ordered.	<input type="checkbox"/> 2. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. → <input type="checkbox"/> 8. Progress to increase tolerance & stability <input type="checkbox"/> 9. O.T. consult for ADL training	<input type="checkbox"/> 10. Instruct & educate family. <input type="checkbox"/> 11. P.T. Evacuation & D.C. Summary.
ACTIVITY	<input type="checkbox"/> 1. Bed rest	<input type="checkbox"/> 1. → <input type="checkbox"/> 2. Centum side to side q 2 hrs <input type="checkbox"/> 3. Pillow to back & between knees when on side. <input type="checkbox"/> 4. Elevate heels off of bed w/pillow under ankle. <input type="checkbox"/> 5. "Head of bed" (HOB) elevation 0 to 60.	<input type="checkbox"/> 1. Begin P.T. plan per therapist. → <input type="checkbox"/> 2. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. →	<input type="checkbox"/> 1. → <input type="checkbox"/> 2. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. →	<input type="checkbox"/> 1.P.T. to eval & write activity plan for discharge.
COGNITIVE/EMOTIONAL	<input type="checkbox"/> 1. Asses mental alertness <input type="checkbox"/> 2. Assess Pt's ability to comprehend instructions, repeat & re-inforce. <input type="checkbox"/> 3. Discuss & assist PL in dealing w/fears. <input type="checkbox"/> 4. Encourage communication w/significant other. <input type="checkbox"/> 5. Review Tx Plan w/ Pl/family. <input type="checkbox"/> 6. Establish Pt. directives.	<input type="checkbox"/> 1. → <input type="checkbox"/> 2. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. → <input type="checkbox"/> 7. Provide praise or encouragement for tasks attempted & competed.	<input type="checkbox"/> 1. → <input type="checkbox"/> 2. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. → <input type="checkbox"/> 7. →	<input type="checkbox"/> 1. → <input type="checkbox"/> 2. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. → <input type="checkbox"/> 7. If Pt. going home, ask Pt/ family about their concerns.	<input type="checkbox"/> 7. → <input type="checkbox"/> 8. Assess Pt./s/family ability to carry out DC instructions.
SOCIAL DISCHARGE PLANNING	<input type="checkbox"/> 1. Identify support systems. <input type="checkbox"/> 2. Identify cause of injury: if a fall, reason for fall.	<input type="checkbox"/> 3. DC Planner to interview Pt/ family if not previously done. <input type="checkbox"/> 4. Follow-up <input type="checkbox"/> 5. Keep family aware of Tx plan. <input type="checkbox"/> 6. Identify barriers to DC Pt. to home	<input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. Review DC Plan W/ surgeon; identify if Pt. to be DCd to SNF ECF, or home	<input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. If Pt. going home, identify what pt. needs; if going to SNF/ECF, complete inter-facility Transfer form	<input type="checkbox"/> 6. (a) if Pt. going home, review & document instructions: Rx, level Of activity, diet, reason to call MD before F/U appt. (b) if DC to SNF: Arrange complementary facility Transfer form; send picture of any skin break down. <input type="checkbox"/> 7. Arrange for necessary equipment. <input type="checkbox"/> 8. Provide instructions to patient's family
EDUCATION PLANNING	Discuss with & teach Pt: <input type="checkbox"/> 1. Method of coughing & deep breathing. & use of incentive spirometer <input type="checkbox"/> 2. ROM exercises to unaffected extremities. <input type="checkbox"/> 3. Post – operative positioning <input type="checkbox"/> 4. Use of trapeze & bowel crmination. <input type="checkbox"/> 5. Method of blades & bowel elimination. <input type="checkbox"/> 6. Methods of pain management & their role in management.	Repeat admission instructions. <input type="checkbox"/> 1. → <input type="checkbox"/> 2. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. →	<input type="checkbox"/> 1. → <input type="checkbox"/> 2. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. →	<input type="checkbox"/> 1. → <input type="checkbox"/> 2. → <input type="checkbox"/> 3. → <input type="checkbox"/> 4. → <input type="checkbox"/> 5. → <input type="checkbox"/> 6. →	<input type="checkbox"/> 7. Ask Pt/ family to aerosolize Tx . Par.

The Critical Pathway reflects clinical and scientific opinion as of the date issues, and is subject to change. It is not intended to dictate an exclusive course of management. Variations o practice or management. Considering the needs of the individual patient. Resources available. And limitations unique to the type of practice, may be appropriate.

OUTCOMES:

HOME: Pt. demonstrates ability to manage post-hospital treatment plan independently of with family/friend support meds, hydration, scheduled appointment, activity. etc.

HOME HEALTH: Pt. demonstrates requirement for assistance in managing post-hospital treatment plan; mods, hydration, follow-up appointment, ADLS, activity. etc.

TRANSITIONAL CARE: Pt. demonstrates requirement for institutional management of treatment course/plan, meds. Hydration. Nutrition, ADLS, etc.



**Appendix 2.** Evaluation forms.

A



**HIP FRACTURE STUDY**

↑ Hospital Imprint Card (MUST Be Clear)

Date Of Surgery ..... Surgeon: .....

Type of Fracture: Pauwel 1 2 3 4 Boyd 1 2 3 4 Subtrochanteric

(Circle as Appropriate)

Type of Surgery: None Can Screws A/Moore Bipolar DHS Leinbach Unipolar Other Cemented

Orthotech: Chris  Frank  Greg  Jerry  Robin

**PRE-INJURY DATA**

Mechanism of Injury: Fall  Spontaneous  Assault  MVA  Unknown

Surgery time: <30min  <45min  <60min  <90min  <120min  <180min  >180min

Estimated Blood Loss: <500cc  <750cc  <1000cc  >100cc

Complications: None..... Other: .....

Residence Phone: ( .....). ..... Residence Pre-Injury: ..... Mental Status: .....

Address: ..... City ..... State (.....) Zip code .....

Retirement Home  Nursing Home  Alert  Confused  Home Alone  Home with Someone  Demented

**Ambulatory Status Pre – Injury:**

Independent ..... Cane ..... Walker ..... House Ambulator..... ComMunity Ambulator ....

**Comorbidity:**

Age>80  Previous M.I.  Cancer  Renal Insufficiency  Decubitus

G.I. Disorder  CVA  Lwr.Ext. Contracture  Urinary Tract infection  Pneumonia

Septicemai  Heart Disease  Diabetes Mellitus  Lack of family involvement

**Post Op Visits**

**Ambulatory Status**

P.O. VISTF:	ONE	TWO	THREE	FOUR	FIVE	SIX
DATE	/ /	/ /	/ /	/ /	/ /	/ /
Independent						
Cane						
Crutches						
Walker						
Non Ambulator						
House Ambltr						
Comm Ambltr						

**Appendix 2.** Continued.

**B**



**HIP FRACTURE STUDY**

↑ **Hospital Imprint Card (MUST Be Clear)**

**Residence Post Op**

P.O. VISIT#:	ONE	TWO	THREE	FOUR	FIVE	SIX
DATE	/ /	/ /	/ /	/ /	/ /	/ /
Home Alone						
Home / Someone						
Retirement Home						
Nursing Home						

**Post Op Complications**

	ONE	TWO	THREE	FOUR	FIVE	SIX
DATE	/ /	/ /	/ /	/ /	/ /	/ /
Death (due to :)						
Device Loose						
Device Painful						
DVT						
Heart						
CVA						
Decubitus						
Infection						
Refracture						
Screws Loose						
.....						
.....						
.....						

**Post Op Pain Status**

Visit	ONE	TWO	THREE	FOUR	FIVE	SIX
DATE	/ /	/ /	/ /	/ /	/ /	/ /
None						
Mild						
Moderate						
Severe						