



Final Report

**MSK Flow task group initiative
primary, elective, unilateral Total
Joint Replacement - Fall 2010 / Spring 2011**

June 2011

Table of Contents

1. Executive Summary	3
2. Introduction	5
3. Overview of MSK Flow Initiative	6
4. Summary of Activities to Date	7
4.1. <i>Analysis of Data</i>	8
4.1.1. <i>Acute Care Discharges</i>	8
4.1.2. <i>Inpatient Rehab</i>	10
4.2. <i>Key Informant Interviews</i>	13
4.2.1. <i>Major themes from interviews</i>	13
4.3. <i>Orthopaedic Surgeon Survey</i>	15
4.4. <i>Projected Volumes for Redirection and Potential Impact on MSK Inpatient Rehab Beds</i>	17
4.5. <i>Projected Needs for Community Based Rehabilitation (CCAC and outpatient)</i>	20
4.5.1. <i>Projected Outpatient Rehab Resources Required</i>	21
4.5.2. <i>Projected CCAC Rehab Requirements</i>	22
5. Next Steps	23
6. Conclusion	23
7. Appendix	25
7.1. <i>Appendix A: Task Group Members</i>	25
7.2. <i>Appendix B: Current and Adjusted Admission Volumes for Primary, Unilateral, Elective TJR to Inpatient Rehab</i>	28
7.3. <i>Appendix C: Proposed Outpatient Rehab and CCAC Model for Primary, Unilateral, Elective Total Joint Replacement</i>	32
7.4. <i>APPENDIX D: ESTIMATED OUTPATIENT REHAB AND CCAC RESOURCES FOR PATIENTS DISCHARGED HOME POST UNILATERAL, PRIMARY, ELECTIVE TJR</i>	33

1. Executive Summary

The MSK Flow Task Group together with representatives from the Joint Health and Disease Management Committee was convened in August 2010 to lead an initiative at the request of the Toronto Central LHIN to identify factors to enhance system-wide performance for primary, elective unilateral hip and knee total joint replacement (TJR). Analysis of 09/10 data from the National Rehabilitation Reporting System indicates that more than half (51%) of orthopaedic inpatient rehab admissions in the Toronto Central LHIN were comprised of patients with primary, unilateral hip and knee replacements¹. However, current evidence indicates that patients undergoing these procedures are able to achieve comparable outcomes in the community if they receive the requisite level of rehabilitation². In light of this evidence, the Orthopaedic Expert Panel has recommended an increased rate of discharge to home set at a provincial target of 90% with a $\pm 10\%$ corridor. A target of 80% was agreed upon for Toronto Central LHIN hospitals by the Joint Health and Disease Management Committee and supported by the CEOs of the Toronto Central LHIN.

The MSK Flow initiative involved two phases. The first phase of the initiative (Fall 2010) focused on gathering and analyzing information obtained through (1) key informant interviews; (2) an on-line survey of orthopaedic surgeons pertaining to post-surgical referral practices; and (3) data extracted by the Toronto Central LHIN from the Discharge Abstract Database and National Rehabilitation Reporting System. The second phase (winter/spring 2011) focused on identifying the processes and resources required to achieve the 80% target for discharge home from acute care and analysis of the impact on rehabilitation resources.

Through the information gathering phase of the initiative, several key findings emerged:

- The average rate of referral to home was far lower than the 80% target. In 2009/10, only 66% of patients post primary, unilateral, elective arthroplasty were discharged to home from acute care hospitals within the Toronto Central LHIN. With the exception of Mississauga Halton LHIN (whose rate of discharge to home was 87%), the rate of discharge to home was even lower in the other GTA LHINs.

¹ The analysis encompassed only primary, unilateral total joint replacements and did not include a review of revisions or bilateral cases.

² Mahomed, N. N., Lin, M. J. K. S., Levesque, J., Lan, S., & Bogoch, E. R. (2000). Determinants and outcomes of inpatient versus home based rehabilitation following elective hip and knee replacement. *Journal of Rheumatology*, 27, 1753-1758.

- Despite the common belief that referral to inpatient rehab reduced length of stay in acute care, the data indicated that the discharge destination (e.g. discharge to home versus inpatient rehab) or LHIN of the patient's home residence did not account for any marked difference in average length of stay (ALOS) in acute care.
- On average, in 2009/2010, more than half (59%) of TJR patients admitted to rehab hospitals had a FIM³ rating greater than 90.
- There is room for improvement in the preadmission phase to better manage patient's expectations regarding post acute rehabilitation and to better prepare them for a discharge to home. The triage criteria used to determine if a patient requires inpatient rehab is also not found to be adequate or consistent.
- Current outpatient rehabilitation resources are not able to meet an increased demand for services in terms of the resources that are available and the admission criteria that are in place in many organizations.
- The majority of surgeons (69%) indicated that they would change their referral practice and increase the number of referrals to community-based rehab post surgery *if* such capacity was available.

The second phase of the initiative, focused on identifying the resources required to support achievement of the 80% target and analysis of the impact on rehabilitation resources.

Through consultation with clinical and decision support working groups and using 09/10 data, the following was determined:

- If the 80% target was achieved by acute care hospitals within the Toronto Central LHIN, a total of 586 patients (i.e. 343 TKR patients and 243 THR patients) would have been discharged to home instead of inpatient rehabilitation.
- A reduction of 586 fewer patients being admitted to inpatient rehab would result in the "freeing up" of 23 inpatient rehab beds.
- The impact on inpatient rehab admissions, based on organizations within all of the GTA LHINs achieving the 80% target, would result in 898 patients (520 TKR patients and 378 THR patients) being redirected from inpatient rehab across rehab beds in the Toronto Central LHIN and St. John's Rehab Hospital.
- The projected outpatient rehab resources required to accommodate 898 patients is 3 physiotherapists and 3 physiotherapy assistants, based on the therapy model proposed. However, it is recommended that outpatient hospital-based rehab resources of 1 physiotherapist and 1 physiotherapy assistant be invested in the

³ FIM® is a trademark of the Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.

north, south, east and west quadrants of the city to provide rehab to the newly redirected volume of TJR patients and address the current wait list to ensure that outpatient rehab can be accessed within the recommended timeframes.

- Projected reductions in rehab admissions (i.e. 898 patients) were also used to calculate the estimated rehab resource requirements for CCAC resulting in up to 430 patients (52 TKR patients and 378 THR patients) who may require some CCAC services post acute care discharge.

The expectation to move towards an increased rate of discharge to home from acute care post primary, unilateral, elective arthroplasty is based on two fundamental premises. First, patients will have timely access (ideally within 2-3 days of discharge from acute care for outpatient rehab and within 48 hours of discharge for CCAC) to the amount of rehabilitation that they need in the community. Second, overall average lengths of stay in acute care and patient flow will not be compromised by the system change. Through discussions during this initiative, a number of strategies were considered and identified to address these concerns. These include the use of a conservative framework for estimating the impact on MSK rehab beds; a recommendation for transitional funding to support investment in outpatient rehab resources up front; and recommendations regarding the use of indicators to closely monitor the impact of the changes.

As of spring 2011, the MSK Flow Task Group completed its mandate to identify the potential implications of moving towards an increased rate of discharge to home for patients following primary, elective, unilateral total joint replacement. While the planning phase of the initiative has ended, the GTA Rehab Network is working with a clinical subgroup to determine common triage considerations and optimal timing of patient education/information in the pre-operative phase. The GTA Rehab Network also looks forward to participating in the implementation phase of the initiative, which will be led by Dr. Jim Waddell, chair of the provincial orthopedic expert panel, former chair of the Joint Health and Disease Management Committee and orthopedic surgeon from St. Michael's, together with Anne Marie MacLeod, Operations Director of the Musculoskeletal Program at Sunnybrook.

2. Introduction

Evidence indicates that the majority of patients can achieve comparable outcomes in community based rehabilitation post primary, unilateral hip/knee replacement versus

inpatient rehabilitation provided that adequate therapy resources are available in a timely manner.

In absence of referral practices and enhanced community based resources to support discharge to home post-operatively, a significant number of inpatient MSK rehab beds are being used for this population⁴.

- 1) While patients get access to timely high quality rehab services on an inpatient basis, it is not the most efficient use of these resources.
- 2) As a result, other MSK populations that are waiting for rehabilitation have less access (i.e., hip fracture patients) impacting on ALC in acute care.

The MSK Flow Task Group together with representatives from the Joint Health and Disease Management Committee was convened in August 2010 to lead an initiative at the request of the Toronto Central LHIN to identify factors to enhance system-wide performance for primary, elective unilateral hip and knee arthroplasty. Given current evidence indicating that many of these patients can be discharged directly home from acute care to receive their rehabilitation in the community, there was an expectation that efficiencies could be identified to support a greater rate of discharge to home. While the Orthopaedic Expert Panel has recommended a provincial target of 90% with a $\pm 10\%$ corridor, a target of 80% was agreed upon for TC LHIN hospitals by the Joint Health and Disease Management Committee and supported by the CEOs of the Toronto Central LHIN.

This report summarizes the activities of the MSK Flow Task Group from fall 2010 to spring 2011, which were directed towards understanding referral volumes and processes for this population; the potential impact on acute care and inpatient rehabilitation if an increased rate of discharge to home is achieved; and the planning requirements – both process and resource-related – that would be needed to support the desired system change.

3. Overview of MSK Flow Initiative

The first phase of the initiative (Fall 2010) focused on gathering and analyzing information obtained through (1) key informant interviews regarding preadmission and acute care

⁴ In the Toronto Central LHIN in 09/10, 51% of inpatient rehab admissions under the RCG of Orthopaedic Conditions were made up of patients with primary, unilateral hip and knee replacements.

processes, outpatient rehab referral processes and availability of services; (2) an on-line survey of orthopaedic surgeons pertaining to post-surgical referral practices; and (3) data extracted by the Toronto Central LHIN from the Discharge Abstract Database and National Rehabilitation Reporting System on utilization, length of stay and discharge disposition from 2007 to 2010. A key outcome of this analysis was the identification of the processes and other requirements needed to support an increased rate of discharge to home from acute care.

Phase 2 of the project (Winter/Spring 2011) focused on identifying the processes and resources required to achieve the 80% target for discharge home from acute care. To this end, two areas of work pursued. One was to provide further data analysis to understand potential implications on use of MSK rehab beds and requirements for community based rehab resources and the other was to review the TJR pathway and identify process changes required to support achievement of the target. A summary of these activities and outcomes follows.

4. Summary of Activities to Date

Over the course of the initiative, the activities undertaken pertained to the following five areas:

- a)** An analysis of data from the Discharge Abstract Database for 2009/2010 and the National Rehabilitation Reporting System. (Section 3.1)
- b)** Key informant interviews with representatives from acute care and outpatient rehab hospitals. (Section 3.2)
- c)** Implementation and analysis of surveys sent to orthopaedic surgeons in Toronto Central LHIN and adjacent GTA hospitals. (Section 3.3)
- d)** Projected volumes for redirection and impact on MSK inpatient rehab beds (Section 3.4)
- e)** Projection of resources for community-based rehabilitation. (Section 3.5)

4.1. Analysis of Data

In fall 2010, the GTA Rehab Network conducted an analysis of the 2009/2010 data from the Discharge Abstract Database (DAD) and the National Rehabilitation Reporting System (NRS)⁵. Separate analyses were conducted for total knee replacements (TKR) and total hip replacements (THR) pertaining to volume of discharges from acute care hospitals by home LHIN and other LHINs; average rate of discharge to inpatient rehab and other destinations; average length of stay (ALOS) in acute care by discharge destination; average age; and average FIM rating scores⁶ on admission to inpatient rehab.

4.1.1. Acute Care Discharges

Findings pertaining to acute care discharges from this analysis include the following key points:

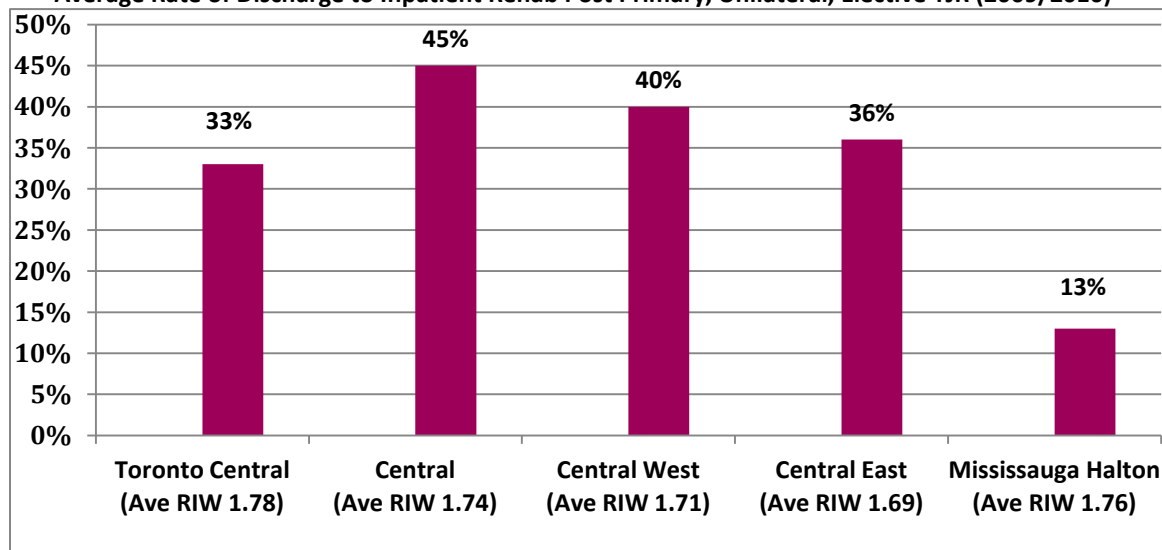
- The total number of discharges from Toronto Central LHIN acute care hospitals following primary, unilateral elective arthroplasty was 4580. Of these, 2606 were discharges for total knee replacements and 1974 were discharges for total hip replacements.
- Patients in the Toronto Central LHIN had the highest average Resource Intensity Weighting (ARIW) at 1.7783 across the GTA LHINs. Central East LHIN had the lowest ARIW at 1.7023.
- The average rate of discharge to inpatient rehab varied substantially across the 5 GTA LHINs, ranging from 13% to 45%. There was no marked difference between total knee replacement and total hip replacements with respect to the rate of discharge to inpatient rehab. Overall rates of discharge to inpatient rehab by GTA LHINs following total joint replacement were:
 - Mississauga Halton LHIN (13%)
 - Toronto Central LHIN (33%)
 - Central East LHIN (36%)
 - Central West LHIN (40%)
 - Central LHIN (45%)
 - (See Figure 1)

⁵ The data was extracted by the Toronto Central LHIN

⁶ FIM® is a trademark of the Uniform Data System for Medical Rehabilitation, a division of UB Foundation Activities, Inc.

Figure 1:

Average Rate of Discharge to Inpatient Rehab Post Primary, Unilateral, Elective TJR (2009/2010)⁷



- The discharge destination or LHIN of the patient’s home residence did not account for any marked difference in average length of stay (ALOS) in acute care across most LHINs. In the Toronto Central LHIN, the ALOS across discharge destinations (e.g. discharge to home with or without CCAC, discharge to inpatient and outpatient rehab) ranged from 4.4 to 4.8 days. The overall ALOS for patients who were residents of the Toronto Central versus residents of other LHINs was the same at 4.7 days. (See Figure 2)

Figure 2

Average Length of Stay (ALOS) in Acute Care Hospitals Per Discharge Status Toronto Central LHIN (N=4580)								
	Discharge Home with No Support	Discharge Home with Support from All CCACs	Discharge Home with Support From GTA LHIN CCACs	Discharge to Inpatient Rehab [^]	Discharge to Ambulatory Rehab	Other: Deceased	Other: Left Against Medical Advice	Other: Transferred to an Acute Inpatient Facility
No. of Patients	N=1728	N=1178	N=941	N=1503	N=82	N=6	N=5	N=19
ALOS (days)	4.7	4.6	4.7	4.8	4.4	7.3	4.0	7.9
Average Resource Intensity Weighting RIW	1.7188	1.7430*	--	1.8567**	1.7825***	3.5964	1.3119	2.5912

⁷ Discharge Abstract Database, 2009/10

Average Length of Stay (ALOS) in Acute Care Hospitals Per Discharge Status Toronto Central LHIN (N=4580)								
	Discharge Home with No Support	Discharge Home with Support from All CCACs	Discharge Home with Support From GTA LHIN CCACs	Discharge to Inpatient Rehab [^]	Discharge to Ambulatory Rehab	Other: Deceased	Other: Left Against Medical Advice	Other: Transferred to an Acute Inpatient Facility
% of Total Discharges	38%	26%	21%	33%	2%	0.1%	0.1%	0.4%

[^]With the exception of RIW, figures do not include referrals to CCC, Homes for the Aged, Nursing Homes or Other

* Includes 8 additional cases discharged to other programs (e.g. Home for the Aged, Other Hospital)

** Includes 32 additional cases discharged to other programs (e.g. CCC, Homes for the Aged, Nursing Homes)

*** Includes 19 additional cases discharged to other programs (e.g. CCC, Nursing Homes or unclassified)

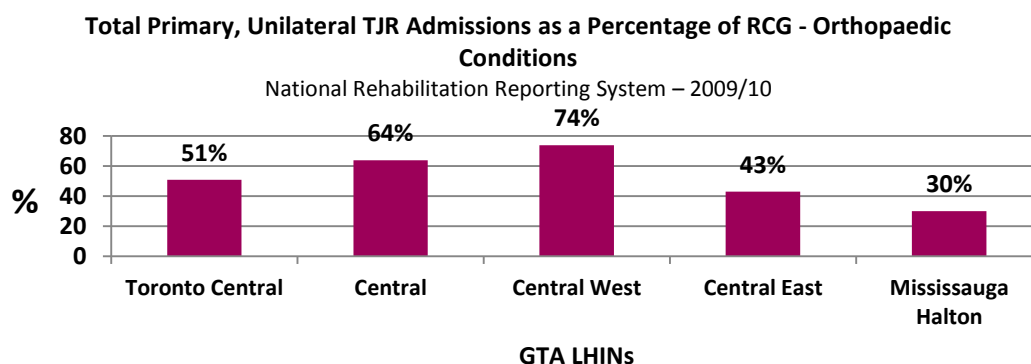
- The majority of patients across LHINs were in the 45-64 and 65-75 age groups. Patients in the 75+ age group represented 24% of patients or fewer across the LHINs. Very few patients were seen in the 20-44 year age group (Range: 0.5% to 4.6% of total discharges). The ALOS typically increased with age.
- A review of the incidence of patients undergoing total joint replacement across the GTA was conducted by Forward Sortation Area (first 3 digits of patients' postal code) over the past 3 fiscal years (i.e. 2007 – 2010). The analysis indicated fairly even distribution across all regions of the GTA.

4.1.2. Inpatient Rehab

Findings pertaining to admissions to inpatient rehab include the following key points:

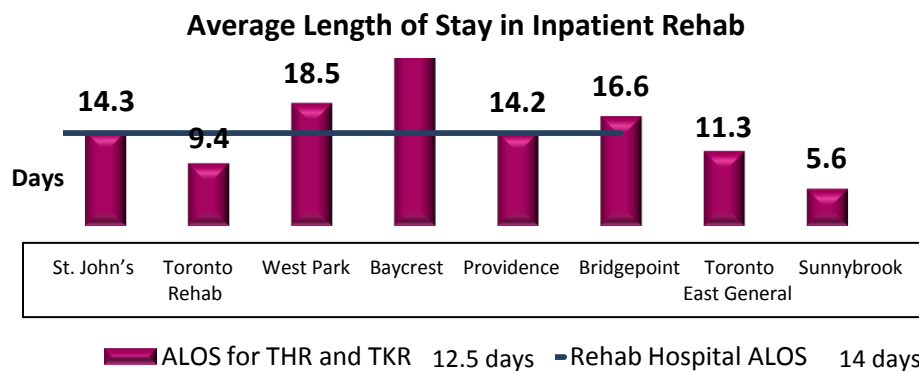
- In three of the five GTA LHINs, primary, unilateral total joint replacement admissions represented more than half of admissions to inpatient rehab as a percentage of RCG – Orthopaedic Conditions: (See Figure 3)

Figure 3:



- The ALOS in inpatient rehab is shorter for total knee replacement versus total hip replacement. The ALOS for patients following primary, unilateral total *knee* replacement across Toronto Rehab, West Park Healthcare Centre, Baycrest, Providence, Bridgepoint Health, Toronto East General Hospital, Sunnybrook Health Sciences Centre and St. John’s Rehab Hospital was 11.24 days. The ALOS in inpatient rehab following primary, unilateral total *hip* replacement in these same hospitals was 14.21 days. Overall average for all primary, unilateral TJR patients was 12.5 days; however, across the rehab hospitals alone⁸, the ALOS was higher at 14 days.

Figure 4:



- For each year from 2006 – 2007, there were a higher number of TKR patients admitted to Toronto Central LHIN inpatient rehab programs than THR patients. The number of TKR discharges from inpatient rehab from 2006 to 2009 ranged from 990 to 1054 discharges, with 2007 and 2008 having the highest volumes (1054 and 1028 respectively). There were 999 patients discharged in 2009. In contrast, for patients with total hip replacements, while the overall range of discharges across these years was 725 to 793 the volume of discharges decreased during 2007 and 2008 (647 and 676 respectively) from the highest volume of discharges in 2006 (793). In 2009, the total volume of discharges from inpatient rehab was 725.
- Unlike the other GTA LHINs, the majority of patients admitted to inpatient rehab within the Toronto Central LHIN were from other LHINs (61% TKR; 60% THR). With the exception of the Central LHIN, at least 71% or more of patients in the Central East, Mississauga Halton and Central West LHINs were residents of the home LHIN. In the Central LHIN, just over half of patients were residents of the home LHIN. (See Figures 5 and 6)

⁸ Toronto Rehab, West Park Healthcare Centre, Baycrest, Providence, Bridgepoint Health and St. John’s Rehab Hospital.

Figure 5:

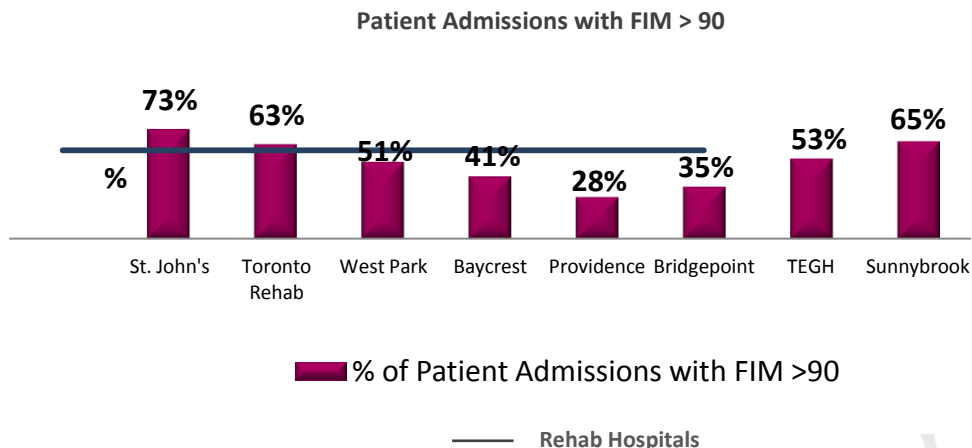
Primary, Unilateral Knee Replacements TORONTO CENTRAL LHIN			
	Home LHIN (% of Grand Total)	Other LHIN (% of Grand Total)	Grand Total
2006	427 (43%)	563 (57%)	990
2007	395 (37%)	659 (63%)	1054
2008	403 (39%)	625 (61%)	1028
2009	376 (38%)	623 (62%)	999
Total	1601 (39%)	2470 (61%)	4071

Figure 6:

Primary, Unilateral Hip Replacements TORONTO CENTRAL LHIN			
	Home LHIN (% of Grand Total)	Other LHIN (% of Grand Total)	Grand Total
2006	336 (42%)	457 (58%)	793
2007	274 (42%)	373 (58%)	647
2008	249 (37%)	427 (63%)	676
2009	270 (37%)	455 (63%)	725
Total	1129 (40%)	1712 (60%)	2841

- The overall average age of patients in inpatient rehab within the Toronto Central LHIN was 72 for both TKR and THR patients.
- More than half of TJR patients (59% overall; 64% of TKR patients and 55% of THR patients) at inpatient rehab programs within the Toronto Central LHIN (i.e. located at Baycrest, Bridgepoint Health, Providence Healthcare, Sunnybrook Health Sciences Centre – Holland Centre, Toronto East General Hospital, Toronto Rehab and West Park Healthcare Centre) and at St. John’s Rehab Hospital (within the Central LHIN) had an average admission FIM rating of 90 or greater. (See Figure 7)

Figure 7:



4.2. Key Informant Interviews

In fall 2010, 13 acute care interviews and 18 outpatient rehab interviews were completed spanning TC LHIN and other GTA hospitals. Additional feedback was received from the Windsor Regional Hospital, Sudbury Regional Hospital, St. Joseph's Care Group and Rouge Valley Health System on their acute care processes for this population. Interviews with Toronto Central, Central CCAC and Central West CCAC were also conducted.

4.2.1. Major themes from interviews

Pre-admission Phase:

- Discharge plans are either first discussed in the surgeon's office or during a pre-admission visit (usually involving a medical screen and a multidisciplinary education class). While patients are encouraged to plan for a discharge home, consistency in the messaging between the surgeon and team to patients around planning for a discharge home could be improved in some hospitals.
- Most hospitals do not find the Total Joint Network's admission criteria (2005)⁹ to be adequate in the screening process.
- One hospital does not use any pre-admission discharge screening – all patients are told, first in the surgeon's office and then in the pre-admission clinic, that they will go home by post-op Day 4.

Adherence to Care Pathway:

- In general, the original care pathway timeline for discharge to home (by post-op Day 5) and inpatient rehab (by post-op Day 3) is followed for most patients. Discharge home by post-op Day 5 may be delayed if: (1) the patient is older and/or has medical complications; and (2) the patient's post-op days occur over the weekend when there may not be adequate resources to mobilize the patient post-surgery.
- The recommended timelines for community-based rehab post TKR are supported (i.e. Outpatient rehab should ideally begin within 2-3 days (and not more than 1 week post discharge) and CCAC treatment should begin within 48 hours post discharge from hospital).

⁹ (1) Is the patient able to walk for one block or for 15 minutes without stopping (with or without assistance)? (2) Is the patient free of heart problems that limit his/her activity? (3) Does the patient have family/friends to physically support him/her at home after surgery? (If yes to ≥ 2 questions, patient can go home).

Referral to Outpatient rehab:

- Most acute care/community hospitals with outpatient rehab have a process in place to ensure that TKR patients are seen quickly post acute care discharge or from time of referral (typically within 1 week; some programs have a slightly longer wait list). There are varying outpatient referral practices that include:
 - Making referrals during the preadmission phase once the date of surgery is known or at the time of discharge from acute care
 - Having the patient activate the referral to outpatient rehab once CCAC has been completed
 - Waiting until the follow-up appointment to determine if an outpatient rehab appointment is needed (i.e. post THR)
- Acute teaching hospitals without in-house publicly-funded outpatient rehab primarily refer their TJR patients to CCAC.
- Almost all of the acute care/community hospitals prioritize internal referrals over external referrals. However, externally referred post-surgical patients are given a high priority and are seen relatively quickly but may take up to 3 weeks from time of referral. Typically, external referrals are accepted only for patients living within the catchment area. (See Figure 8)

Figure 8:

Outpatient Rehab Programs – GTA LHINs (Fall 2010)			
LHIN	OP Rehab Programs	External Referrals Accepted?	Internal TKR Referrals Prioritized over External Referrals?
TC LHIN	Providence Healthcare	No	--
	West Park Healthcare Centre	Yes	No
	Toronto Rehab	Yes	Yes
	Bridgepoint Health	Yes	Yes
	Sunnybrook Health Sciences Centre	No	--
	St. Joseph's Health Centre	Yes	Yes
CE LHIN	Lakeridge Health	Yes	No
	Rouge Valley Health System	Yes	Yes
	The Scarborough Hospital	No	--
C LHIN	St. John's Rehab Hospital	Yes	No
	Markham Stouffville Hospital	Yes	No
	Southlake Regional Health Centre	Yes	Yes
	York Central Hospital	Yes	No
	Humber River Regional Hospital	No	--
MH LHIN	Credit valley Hospital	No	--
	Halton Healthcare Services	Yes	Yes
	Trillium Health Centre	Yes	Yes
CW LHIN	William Osler Health System	Yes	Yes

- Five programs do not accept external referrals.
- THR patients are referred to CCAC and are not typically seen in outpatient rehab.
- Rehab hospitals in the TC LHIN do not typically receive outpatient referrals from acute care for TJR patients discharged directly home from acute care. One rehab hospital does not accept external referrals.

CCAC:

- There is inconsistent use of CCAC pre-admission visits. The care pathway provides for 8 physiotherapy visits in 90 days, typically provided once per week initially.
- There is no established process for CCAC to make a referral to outpatient rehab following CCAC rehab service; typically, CCAC would not make this referral.

4.3. Orthopaedic Surgeon Survey

Surveys were developed, piloted and implemented in October 2010 to obtain information on:

- Post-surgical rehab referral practices (i.e. inpatient rehab, home with CCAC, home with outpatient rehab, home with no services) and estimation of rate of referral for each
- Reasons for sending patients to inpatient rehab
- Potential support for referral to outpatient rehab instead of inpatient rehab and reasons why

Status:

- 40 surveys were returned representing the following hospitals:

19 TC LHIN Hospitals:

Mount Sinai Hospital, University Health Network, Sunnybrook Health Sciences Centre, Toronto East General Hospital, St. Joseph's Health Centre and St. Michael's

21 GTA Hospitals:

The Scarborough Hospital, Humber River Regional Hospital, North York General Hospital, Southlake Regional Health Centre and Markham Stouffville Hospital.

General Findings:

- Half of the surgeons (55%) indicated that the responsibility for determining where a patient will be referred post surgery rests with the case manager/team or 'other'

(i.e. 'other' included a nurse in the preadmission clinic or social worker) while 45% indicated that the responsibility lies with the orthopaedic surgeon.

- Although all surgeons refer some proportion of their patients to inpatient rehab, outpatient rehab and CCAC, the highest patient volumes per surgeon are referred to CCAC and outpatient rehab respectively for post-acute rehab. The breakdown is as follows:

CCAC:

- 17 surgeons (45%)¹⁰ indicated that they refer half or more of their patient volume to CCAC. Of these, 14 surgeons refer 60% - 90% of their patient volume to CCAC and 3 surgeons refer 50% of their patient volume to CCAC. Four of these 17 surgeons have outpatient rehab at their own hospital.

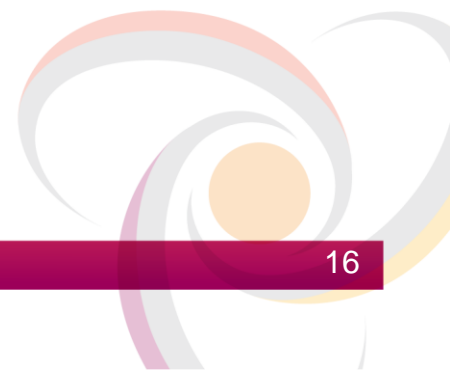
Outpatient rehab:

- 15 surgeons (39%)¹⁰ indicated that they refer half or more of their patient volume to outpatient rehab. Of these, 9 surgeons refer 60% – 89% of their patient volume to outpatient rehab and 6 other surgeons indicated that they refer 50% of their patient volume to outpatient rehab. Eleven of the 15 surgeons who responded have outpatient rehab at their own hospital.

Inpatient Rehab:

- With the exception of 5 surgeons, the rate of referral by all other surgeons to inpatient rehab ranged from 5% - 40% of their patient volume (median = 23%). Of the 5 surgeons with higher rates of referral, one surgeon indicated that s/he refers 75% to inpatient rehab and 4 surgeons (3 from the same hospital) indicated that they refer 50% of their patients to inpatient rehab.
- Most frequent reasons for referring to inpatient rehab were: (note: reasons are not mutually exclusive)
 - Poor pre-operative function and/or comorbidities which may impact functional status and slow recovery (indicated by 34 physicians)
 - Limited or no access to adequate social supports for discharge to a home environment (indicated by 33 physicians)
 - Belief that CCAC is not available or cannot meet the patient's rehab needs (indicated by 15 physicians)

¹⁰ This figure is based on responses from 38 surgeons who responded to this question.



- Pressures/expectations of the patient/family to go to inpatient rehab (indicated by 8 physicians)
- No access to outpatient rehab (indicated by 6 physicians)
- Surgeons indicated that patients' requests for inpatient rehab do not greatly influence their discharge/referral practice – 77% of the surgeons indicated that requests from patients have an influence less than 20% of the time.
 - < 5% of the time ⇒ indicated by 16 physicians (41%)¹¹
 - 6 – 20% of the time ⇒ indicated by 14 physicians (36%)⁵
 - 21- 50% of the time ⇒ indicated by 6 physicians (15%)⁵
 - > 50% of the time ⇒ indicated by 3 surgeons (8%)⁵
- The majority of surgeons (69%)⁵ indicated that they would change their referral practice and increase the number of referrals to community-based rehab post-surgery instead of inpatient rehab if community-based rehab capacity was available. However, 1 surgeon who responded “no” to this question (i.e. would not change referral practice) stated that he is already referring to community-based rehab and 2 surgeons responded that they are not involved in the referral decision. Several surgeons commented that the services in the community are not available (e.g. outpatient rehab) or not adequate to meet patient needs (e.g. CCAC)

4.4. Projected Volumes for Redirection and Potential Impact on MSK Inpatient Rehab Beds

The analysis of the DAD data also focussed on estimating the number of patients who would have been redirected home from acute care if the 80% target was achieved by hospitals and the subsequent potential impact on inpatient rehab admissions. Specifically, the 2009/10 DAD data was used to identify for hospitals within the Toronto Central LHIN and the four adjoining GTA LHINs:

- The number of patients post primary, unilateral elective knee and hip replacement who will be redirected from inpatient rehab and instead discharged directly home
- The adjusted inpatient rehab admission volumes for rehab hospitals/units and potential impact on community based services as a result of this redirection

¹¹ This figure is based on responses from 39 surgeons who responded to this question.

A TJR Decision Support Task Group was convened to help identify questions for analysis and review methodologies used to identify the impact on acute care discharges and inpatient rehab admissions if the 80% rate of discharge to home was met. Calculations for determining the projected number of acute care patients who would be redirected from acute care was based on each organization achieving the target.

The estimated total number of inpatient rehab beds that would be available for re-allocation is based on a conservative estimate of the number of patients that would be redirected from *Toronto Central LHIN acute care hospitals* if each hospital met the 80% target. Using this methodology, a total of 586 patients (i.e. 343 TKR patients and 243 THR patients) would be discharged home.

As there would be 586 fewer patients going to inpatient rehab, the impact on inpatient rehab was explored from two related perspectives: (1) the potential impact on MSK rehab beds based on the number of beds “freed up” with fewer patients admitted; and (2) the potential impact on overall inpatient rehab admissions. The first level of analysis, relying on acute care data from TC LHIN hospitals, was used to estimate the potential for re-allocating inpatient rehab resources to support an investment in outpatient rehab. The second level of analysis, relying on reductions to inpatient rehab admissions from all GTA LHIN hospitals, was used to estimate the amount of outpatient rehab resources that would be required.

Potential Impact on MSK Rehab Beds

To calculate the potential impact on MSK rehab beds resulting from 586 fewer patients being sent to inpatient rehab *from Toronto Central LHIN acute care hospitals*, the following assumptions were used:

- Average rehab LOS of 13 days for primary, unilateral, elective TJR
- 90% occupancy in rehab = 328.5 days/year therefore there would be 25.27 patients/bed/year ($328.5 \div 13$)
- $586 \div 25.27$ pts/bed/year = 23 inpatient rehab beds available for re-allocation.
 - The resources attached to a portion of these 23 inpatient rehab beds could be considered for re-allocation to support outpatient rehab resource needs. The remaining beds could be used to accommodate more medically complex MSK patients, such as hip fracture patients.

- Of the 586 patients who would be redirected from TC LHIN acute care hospitals, if the breakdown by home LHIN in the 2009/10 DAD data is used, approximately 45% or ~264 patients would be residents of the GTA LHINs and 32% or ~188 would be residents of the TC LHIN.

Potential Impact on Inpatient Rehab Admissions

Calculations for determining the impact on the number of inpatient rehab admissions was based on achievement of the 80% target *across GTA LHIN acute care hospitals* and the associated reductions in admissions to inpatient rehab. Using this methodology, the total number of TJR patients projected to be redirected from inpatient rehab provided by Baycrest, Bridgepoint Health, Providence Healthcare, Sunnybrook Health Sciences Centre – Holland Centre, Toronto East General Hospital, Toronto Rehab, West Park Healthcare Centre and St. John’s Rehab Hospital is 898. This includes 520 TKR patients and 378 THR patients who would be redirected home from GTA acute care hospitals. These volumes were used to calculate the estimated resource requirements for outpatient rehab and are intentionally generous (i.e. calculation includes redirected patients from referring hospitals in the adjoining GTA LHINs) to allow for patients from the border LHINs who may elect to utilize outpatient rehab services within the TC LHIN. Projected outpatient rehab resource requirements are discussed in Section 3.4.1.

A template of the findings illustrating the methodology that has been used is provided in Appendix B.

Other Considerations

There are a number of other factors that require consideration during future discussions regarding the potential impact on MSK inpatient rehab beds. These include, but are not limited to, the following:

- Number of beds that could be closed versus those that should remain open for other MSK admissions. A preliminary analysis of this was initiated using acute care ALC MSK data from the Toronto Central LHIN to help inform what the balance should be.
- Analyzing staffing ratios available across MSK rehab beds to determine potential resources that may become available to support outpatient enhancements. However, given the relatively inexpensive costs of outpatient rehabilitation, hospitals may choose to find resources from other sources.

- Considerations for consolidating inpatient and outpatient TJR rehabilitation across a fewer number of sites as suggested by the Toronto Central LHIN Clinical Efficiency and Utilization Task Force and possible criteria for making such decisions.
- Identification of a methodology to run scenarios to confirm the patient flow from acute care will not be affected with reduced beds and potentially longer ALOS in rehab for patients who are more medically complex. In the analysis that has been conducted to date, the following mitigating strategies were taken into account or suggested to address the potential risk of impacting flow from acute care beds:
 - It is recommended that initially, rehab beds be maintained for a transitional period and increase outpatient rehab capacity with one-time funding from the LHIN.
 - A conservative framework was used for estimating the number of MSK rehab beds that may be reallocated (TC LHIN perspective only) while a broader framework (GTA LHIN perspective) was used to estimate the anticipated demand on outpatient rehabilitation.
 - It is suggested that not all MSK beds available for reallocation be closed and that a proportion (~half) of these beds be retained to address current acute care MSK ALC pressures and act as a buffer to ensure hip and knee replacement patients do not block acute beds.
 - Identify and implement monitoring indicators (e.g. ALOS in acute care and inpatient rehab; % of acute discharges to inpatient rehab/community; and time to access outpatient rehabilitation post discharge).

4.5. Projected Needs for Community Based Rehabilitation (CCAC and outpatient)

A key principle underlying the MSK Flow initiative is that patients post primary, unilateral arthroplasty can achieve comparable rehabilitation outcomes in the community provided that they receive the required amount of therapy in a timely manner. Feedback from orthopaedic surgeons and clinical staff clearly indicated that referral practices would not change unless they were certain that their patients would receive the recommended rehab therapy from skilled rehab therapists. As a result, projected needs for community based rehabilitation were determined.

The projected volumes and required resources were based on consultations with two groups. The TJR Decision Support Task Group, comprised of representatives from

Sunnybrook Health Sciences Centre, Bridgepoint Health, Providence Healthcare, St. John's Rehab Hospital, Toronto Rehab and the Toronto Central LHIN reviewed the methodologies and case scenarios used to project the volume of patients who would require community-based rehabilitation if the target rate of discharge to home was achieved. A clinical consultation group was convened to review the therapy model proposed for outpatient rehab (based on the Holland Model) and CCAC. (See Appendix B) The clinical consultation group was comprised of advanced practice physiotherapists and other rehab professionals from Sunnybrook Health Sciences Centre; Mount Sinai Hospital, St. Joseph's Health Centre, St. Michael's and Toronto Rehab. Separate analyses were conducted for TKR and THR.

4.5.1. Projected Outpatient Rehab Resources Required

The projected volume of patients requiring outpatient rehab was based on an analysis of patient volumes admitted to inpatient rehab at Baycrest, Bridgepoint Health, Providence Healthcare, St. John's Rehab Hospital, Toronto East General Hospital, Sunnybrook Health Sciences Centre, Toronto Rehab and West Park Healthcare Centre. This estimate (based on 2009/10 CIHI DAD data) was determined through an analysis of every acute care hospital in the 5 GTA LHINs achieving an 80% rate of discharge to home and the subsequent impact on the number of inpatient rehab admissions across the 7 rehab hospitals or rehab units within the Toronto Central LHIN as well other rehab hospitals/units in the GTA LHINs. The estimated resource requirements were also based on the planning assumption that increased outpatient rehab resources within the Toronto Central LHIN would be accessed by Toronto Central LHIN *and* GTA LHIN residents who were previously referred to inpatient rehab at these hospitals.

The estimated demand on outpatient rehabilitation using this methodology is 898 patients annually (520 TKR and 378 THR patients). Analysis to determine the outpatient rehab resources required to accommodate this demand indicates that 3 physiotherapists and 3 physiotherapy assistants would be needed to provide rehab for the projected volume of TJR patients discharged directly home from acute care. (See Appendix C) As noted earlier, a review of the incidence of patients undergoing total joint replacement across the GTA was conducted by Forward Sortation Area (first 3 digits of patients' postal code) over the past 3 fiscal years. The analysis indicated that patients were fairly evenly distributed across all areas with respect to the areas of their home residences.

While it was suggested that the existing administrative infrastructure at hospitals currently providing outpatient rehab could meet this demand, other considerations to support this investment in outpatient rehab include:

- 1) The availability of space;
- 2) Timely access to outpatient rehab as per clinical recommendations (i.e. Outpatient rehab for TKR patients should begin within 1 week -- ideally within 2-3 days -- of discharge from acute care or CCAC); and
- 3) Changes to admission criteria to support access to outpatient rehab (i.e. programs to accept external referrals with equal and high priority given to TKR and THR patients). (See Appendix C: Estimated Outpatient Rehab Resources)

Recommended Investment in Outpatient Rehabilitation

Based on the analysis and consultations that were conducted, the following recommendations were presented to the Toronto Central LHIN Clinical Efficiency and Utilization Task Force on May 12, 2011:

- 1) It is recommended that outpatient hospital-based rehab resources of 1 physiotherapist and 1 physiotherapy assistant be invested in the north, south, east and west quadrants of the city to provide rehab to the newly redirected volume of TJR patients and address the current wait list to ensure that outpatient rehab can be accessed within the recommended timeframes (i.e. TKR patients to be seen within 1 week of discharge from acute care or CCAC). The estimated investment required is \$155,000 per site or \$620,000 in total. Proposed locations given space and other considerations are still to be determined.
- 2) One-time transitional funding in 11/12 from the Toronto Central LHIN is recommended to support outpatient rehabilitation enhancement, with sustained funding to be the responsibility of the health service providers thereafter.

4.5.2. Projected CCAC Rehab Requirements

In the current state, both total hip and knee replacement patients receive 8 CCAC visits over 90 days. In the proposed model, it is recommended that the frequency of CCAC visits to TKR patients be increased such that patients would receive 8 CCAC visits (with a focus on increasing range of motion) within the first 3 weeks of discharge to home. Patients discharged home post primary, unilateral total hip replacement do not typically require this intensity of treatment upon discharge due to the precautions that have been prescribed to them. However, it is recommended that these patients may require up to 2

CCAC visits between the time that they are discharged and their first hospital follow-up visit to address any of their questions and concerns. (See Appendix B)

The projected volume for patients requiring CCAC is up to 10% of the projected 520 TKR patients (52) will need the recommended 8 physiotherapy visits within the first 3 weeks of discharge home. Up to 100% of 378 THR patients will need on average, up to 2 physiotherapy visits between discharge home and their first hospital follow-up appointment. This projection totals an additional 430 patients that may require CCAC services post acute care discharge. (See Appendix C)

Of note, it is recommended that:

- Patients from LHINs outside of the GTA who have their surgery in Toronto Central LHIN acute care hospitals continue to receive inpatient rehabilitation as required. Thus the additional projected volumes would be across the GTA CCACs; and Current GTA CCAC utilization post TJR relative to allocated volumes be determined.

5. Next Steps

In discussion with members of the Toronto Central LHIN Joint Health and Disease Management Committee, leadership for implementation of next steps will transition to Dr. Jim Waddell, chair of the provincial orthopedic expert panel, former chair of the JHDM and orthopedic surgeon from SMH, together with Anne Marie MacLeod, Operations Director of the Musculoskeletal Program at Sunnybrook.

While the GTA Rehab Network has concluded its meetings with the MSK Flow Task Group and the TJR Decision Support Task Group at this time, the Network is continuing to work with a clinical subgroup to determine common triage considerations and optimal timing of patient education/information in the pre-operative phase.

6. Conclusion

The Toronto Central LHIN and GTA Rehab Network MSK Flow Task Group have conducted a comprehensive review of patients post primary, unilateral, elective total joint replacement in the Toronto Central and adjoining GTA LHINs. The review has consisted of in-depth analyses of

patient volumes in acute care and inpatient rehab settings; average lengths of stay and rates of discharge by discharge destination from acute care; average lengths of stay and functional status in inpatient rehab; current practices in the pre-operative; acute care and post-acute care phases; and referral practices among orthopaedic surgeons. The task group also examined the potential implications of moving towards an 80% rate of discharge to home on acute care discharges, inpatient rehab admissions and requirements for community-based rehab resources to support the change in practice.

Over the course of the MSK Flow Task Group meetings, there have been important key messages that have been highlighted in the discussion which will need to be kept in mind for development of an implementation plan going forward. These include:

- The need for pre-planning/education and preparation is of utmost importance to achieve the targets for acute length of stay and discharge to home post-op and to ensure linkage to appropriate and timely rehabilitation services.
- Management of patient expectations is critical and should be supported through consistent messaging to patients and more comprehensive triage considerations for use in the pre-admission process. The GTA Rehab Network is currently engaged with a clinical task group to develop standardized guidelines for the pre-admission process.
- System changes should not impact acute care length of stay and overall patient flow.
- Patients who are discharged home must get timely access to outpatient rehabilitation in accordance with best practice timelines, regardless of referral source or LHIN of home residence. This is particularly important for patients post primary, unilateral elective total knee replacement who require community-based rehabilitation within one week of discharge from acute care to ensure optimal recovery.

The GTA Rehab Network looks forward to participating in the implementation phase of this initiative. It will work with its members to improve the care pathway for patients undergoing primary, elective unilateral arthroplasty and to support the system changes required to optimize access to and utilization of rehabilitation resources.

7. Appendix

7.1. Appendix A: Task Group Members

MSK Flow Task Group Members	
Dr. Peter Nord (<i>Co-Chair</i>), Vice President Medical Affairs and Chief of Staff, Providence Healthcare	Charissa Levy (<i>Co-Chair</i>), Executive Director, GTA Rehab Network
Sue Balogh, Project Planner/Coordinator, GTA Rehab Network	Jane Keppy, Manager of Inpatient and Outpatient Rehabilitation and Reactivation, William Osler Health Centre
Sonya Canzian, Program Director, Trauma/Neurosurgery and Mobility Programs, St. Michael's	Anne-Marie MacLeod, Operations Director, Musculoskeletal Program, Sunnybrook Health Sciences Centre
Dina D'Agostino-Rose, Clinical Director, Surgical Services, University Health Network	Carol Millar, Director, Hospital Transitions and Relationships, Toronto Central CCAC
Marlene DaGraca, Education Coordinator for Surgery, St. Joseph's Health Centre	Jackie Minezes, Acting Manager, Outpatient Rehabilitation and Geriatrics; Kelly Roy, Patient Care Manager / Halton Healthcare Services
Dr. Rod Davey, Associate Director Surgical Services, UHN; Medical Director Operating Room, TWH; Associate Professor, University Health Network	Elaine Murphy, Program Services Manager, Toronto Rehab
Ankur Desai, Professional Practice Leader of Physiotherapy, The Scarborough Hospital	Leonard Ojha, Case Manager, St. Michael's Hospital
Dr. John Flannery, Medical Director, Musculoskeletal Rehabilitation, Toronto Rehab	Lydia Baksh, Patient Care Manager, Rehab/CCC; Helen Andersen, Administrative Director, Programme Management; Heather Reid, Clinical Educator/ Credit Valley Hospital
Glen Flint, Consultant, Health System Design, Toronto Central LHIN	Donna Renzetti Vice President, Programs ; Laura Forma, Director of Program Operations / West Park Healthcare Centre
Dr. Jeff Gollish, Medical Director of the Holland Orthopaedic and Arthritic Centre, Sunnybrook Health Sciences Centre	Dr. Ted Rumble, Physician, North York General Hospital
Michelle Goulbourne, Senior Analyst, CEO Forum-Hospital Sector Performance Management, Toronto Central LHIN	Dr. James Seligman, Chief of Surgery, Member of the Division of Orthopedic Surgery, Humber River Regional Hospital
Jane Harwood, Inpatient Surgery Manager, Toronto East General Hospital	Dr. Rajka Soric, Psychiatrist, West Park Healthcare Centre
Dilys Houghton, Senior Director Client Services Central, West CCAC	Justin Stone, Patient Service Manager, St. John's Rehab Hospital

MSK Flow Task Group Members

Laurie Jenkins, Senior Director, Surgery and Oncology, Mt. Sinai Hospital	Dr. Milan Unarket, Director of Physical and Rehabilitation Medicine, Bridgepoint Health
Linda Jussaume, Program Director, Surgery, North York General Hospital	Sandy Vicente, Education Coordinator, Surgery & Oncology Program, St. Joseph's Health Centre
Tini Le, Director Contact Centre, Central CCAC	

TJR Decision Support Collaborative Task Group Members

Saba Ateyah, Director, Information & Performance, Providence Healthcare	Michelle Goulbourne, Senior Analyst, CEO Forum-Hospital Sector Performance, TC LHIN
Sue Balogh, Project Coordinator/Planner, GTA Rehab Network	Charissa Levy, Executive Director, GTA Rehab Network
David Couch, Director, Decision Support, Sunnybrook Health Sciences Centre	Justin Stone, Patient Service Manager, St. John's Rehab Hospital
Glen Flint, Consultant, Health System Design, TC LHIN	Gail Terashita, Senior Decision Support Analyst, Toronto Rehab
Michael Gekas, Director of Ambulatory Care and Business Operations, Bridgepoint Health	

TJR Clinical Consultation Group

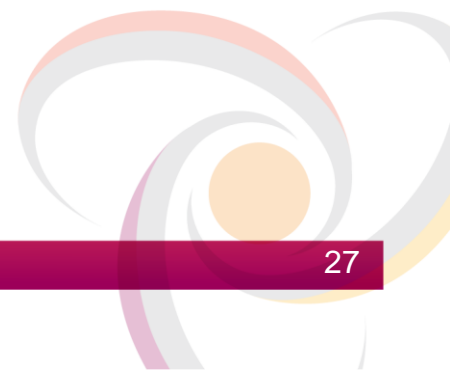
Chris Ashdown, Practice Leader for Physiotherapy, St. Joseph's Health Centre	Leslie Soever, Advanced Practice Physiotherapist – Musculoskeletal, Mount Sinai Hospital
Deborah Kennedy, Manager, Rehabilitation and Program Development, Sunnybrook Health Sciences Centre	Charissa Levy, Executive Director, GTA Rehab Network
Mandy McGlynn, Advanced Practice Lead – Musculoskeletal and LTLT, Toronto Rehab	Sue Balogh, Project Coordinate/Planner, GTA Rehab Network
Leonard Ojha, Clinical Leader/Manager, Outpatient Mobility Program, St. Michael's	

TJR Triage/Admission Task Group Members

Charissa Levy (<i>Chair</i>), Executive Director, GTA Rehab Network	Raymond Kao /Alicia Clark, Case Managers, St. Michael's
Sue Balogh, Project Coordinate/Planner, GTA Rehab Network	Debbie Kennedy, Manager, Rehabilitation and Program Development, Sunnybrook Health Sciences Centre
Colleen Briggs, Senior Client Services Manager; Naomi Cornfield, Short Stay Case Manager, Client Services - Contact Centre / Central CCAC	Fiona Mackenzie, Physiotherapist, Southlake Regional Health Centre
Natasha Briggs, Advanced Practice Nurse for Orthopedics,	Mandy McGlynn, Advanced Practice Lead –

TJR Triage/Admission Task Group Members

University Health Network	Musculoskeletal and LTLD, Toronto Rehab
Ankur Desai, Professional Practice Leader of Physiotherapy, The Scarborough Hospital	Tova Milnes, Social Worker, North York General Hospital
Marie Eason Klatt , Advanced Practice Clinician, St. Joseph's Health Centre	Rosemarie Moher, Physiotherapist, St. John's Rehab Hospital
Beatrice Edelstein, Clinical Manager, Rehab Services and Orthopaedic Clinics, Markham Stouffville Hospital	Ellen Richards, Manager of Professional Practitioners, William Osler Health System
Jane Harwood, Inpatient Surgery Manager; Carol Ross, Director of Complex Continuing Care and Rehabilitation /Toronto East General Hospital	Kathryn Wise, Manager, Client Services, Adult Supportive Care Program; Carol Millar, Director, Hospital Transitions and Relationships /Toronto Central CCAC
Laurie Jenkins, Senior Director, Surgery and Oncology, Mt. Sinai Hospital	Joanne Zee, Executive Director for the MSK and Geriatric Programs, Toronto Rehab



7.2. Appendix B: Current and Adjusted Admission Volumes for Primary, Unilateral, Elective TJR to Inpatient Rehab

The following anonymous information is a sample of the methodology used to conduct a detailed analysis. The analysis, conducted by the GTA Rehab Network using 2009-2010 data from the DAD, included information based on both the sending and receiving hospitals across the 5 GTA LHINs. A separate analysis was conducted for TKR and THR patients.

Volume of Primary, Unilateral, Elective TKR Patients to Inpatient Rehab by Sending/Receiving Hospital						
Planning Assumption: These allocations are based on existing referral patterns and based on the assumption that the relative acuity of patients discharged does not change.						
LHIN	(A) Sending Hospital	(B) % of Total Primary, Unilateral, Elective TKR Patients Transferred to IP Rehab (2009/10)	(C) # (%) of TKR Patients Admitted to IP Rehab by Organization	(D) Receiving Hospital	(E) Adjusted Total # (%) of TKR Patients for Transfer to IP Rehab to meet 20% target	(F) # of Patients to Redirect from IP Rehab to meet 20% target (Col C – Col E)
Toronto Central LHIN	Hospital 1	42% (115/273)	10 (9%)	Rehab Hospital 1	5 (9%)	5/273 (2%)
			9 (8%)	Rehab Hospital 2	4 (8%)	5/273 (2%)
			69 (60%)	Rehab Hospital 3	33 (60%)	36/273 (13%)
			12 (10%)	Rehab Hospital 4	5 (10%)	7/273 (3%)
			1 (1%)	Rehab Hospital 5	1 (1%)	0/273 (0%)
			5 (4%)	Rehab Hospital 6	2 (4%)	3/273 (1%)
			1 (1%)	Rehab Hospital 7	1 (1%)	0/273 (0%)
			5 (4%)	General Rehab Hospital ¹²	2 (4%)	2/273 (1%)
			2 (2%)	Rehab Hospital 8	1 (2%)	1/273 (0%)
	1(1%)	Rehab Hospital 9	1 (1%)	1/273 (0)		
	Total	115/273 (39%)	115 (42% of 273)		55 (20% of 273)	60/273 (22%)
	Hospital 2	30% (107/359)	22/107 (20%)	Rehab Hospital 1	14 (20%)	8/359 (2%)
			84/107 (79%)	Rehab Hospital 2	57 (79%)	27/359 (8%)
			1/107 (1%)	Rehab Hospital 3	1 (1%)	0
	Total	107/359 (30%)	107 (30% of 359)		72 (20% of 359)	35/359 (10%)
	Hospital 3	27% (63/232)	23/63 (37%)	Rehab Hospital 1	17 (37%)	6/232 (3%)
			4/63 (6%)	Rehab Hospital 2	3 (6%)	1/232 (0%)
			7/63 (12%)	Rehab Hospital 3	6 (12%)	2/232 (1%)
			4/63 (6%)	Rehab Hospital 4	3 (6%)	1/232 (0%)
			23/63 (37%)	Rehab Hospital 5	17 (37%)	6/232 (3%)
			1/63 (2%)	Rehab Hospital 6	1 (2%)	0/232 (0%)
			1/63 (1%)	Rehab Hospital 7	0 (1%)	1/232 (0%)
	Total	63/232 (27%)	63 (27% of 232)		46 (20% of 232)	17/232 (7%)
	Hospital 4	30% (72/239)	70/72 (97%)	Rehab Hospital 1	47 (97%)	23/239 (10%)
			2/72 (3%)	Rehab Hospital 2	1 (3%)	1/239 (0%)

¹² Name of receiving hospital was not classified in the Discharge Abstract Database.

Volume of Primary, Unilateral, Elective TKR Patients to Inpatient Rehab by Sending/Receiving Hospital

Planning Assumption: These allocations are based on existing referral patterns and based on the assumption that the relative acuity of patients discharged does not change.

LHIN	(A) Sending Hospital	(B) % of Total Primary, Unilateral, Elective TKR Patients Transferred to IP Rehab (2009/10)	(C) # (%) of TKR Patients Admitted to IP Rehab by Organization	(D) Receiving Hospital	(E) Adjusted Total # (%) of TKR Patients for Transfer to IP Rehab to meet 20% target	(F) # of Patients to Redirect from IP Rehab to meet 20% target (Col C – Col E)
	Total	(72/239) (30%)	72 (30% of 239)		48 (20% of 239)	24/239 (10%)
	Hospital 5	36% 177/489	31/177 (18%)	Rehab Hospital 1	18 (18%)	13/489 (2%)
6/177 (3%)			Rehab Hospital 2	3 (3%)	3/489 (1%)	
140/177 (79%)			Rehab Hospital 3	77 (79%)	63/489 (13%)	
	Total	177/489 (36%)	177 (36% of 489)		98 (20% of 489)	79/489 (16%)
	Hospital 6	33% 331/1014	13/331 (4%)	Rehab Hospital 1	8(4%)	5/1014 (1%)
9/331 (3%)			Rehab Hospital 2	6 (3%)	3/1014 (0%)	
10/331 (3%)			Rehab Hospital 3	6 (3%)	4/1014 (1%)	
1/331 (0%)			Rehab Hospital 4	0(0%)	1/1014 (0%)	
1/331 (0%)			Rehab Hospital 5	0 (0%)	1/1014 (0%)	
5/331 (2%)			Rehab Hospital 6	4 (2%)	1/1014 (0%)	
290/331 (88%)			Rehab Hospital 7	179 (88%)	111/1014 (11%)	
1/331 (0%)			Rehab Hospital 8	0 (0%)	1/1014 (0%)	
1/331 (0%)			Rehab Hospital 9	0 (0%)	1/1014 (0%)	
	Total	331/1014 (33%)	331 (33% of 1014)			128/1014 (13%)
Toronto Central LHIN	OVERALL TOTAL FOR KNEES	865/2606 (33%)			522/2606 (20%)	343/2606 (13%)

Current and Adjusted Admission Volumes for Primary, Unilateral, Elective TKR to Inpatient Rehab

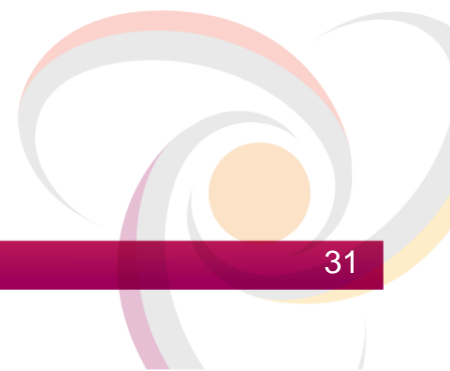
Planning Assumption: These allocations are based on existing referral patterns on the assumption that the relative acuity of patients discharged does not change.

Receiving Hospital	# of Primary, Unilateral, Elective TKR Patients Admitted (09/10)	Sending Hospital	# of Redirected Patients from IP Rehab to meet 20% target (From Column F in tables above)	Adjusted Admission Volume to meet 20% target (From Column E in tables above)
Rehab Hospital/Unit	9	Hospital 1	5	4
	22	Hospital 2	8	14
	9	Hospital 3	3	6
	1	Hospital 4	0	1
	36	Hospital 5	0	36
Total	77		16	61
Rehab Hospital/Unit	69	Hospital 1	36	33
	4	Hospital 2	1	3
	6	Hospital 3	3	3
	10	Hospital 4	4	6
Total	89		44	45
Rehab Hospital/Unit	12	Hospital 1	7	5
	7	Hospital 2	2	5
	1	Hospital 3	1	0
	15	Hospital 4	9	6
	19	Hospital 5	14	5
Total	54		33	21
Rehab Hospital/Unit	5	Hospital 1	3	2
	23	Hospital 2	6	17
	70	Hospital 3	23	47
	140	Hospital 4	63	77
	5	Hospital 5	1	4
	4	Hospital 6	1	3
	4	Hospital 7	2	2
Total	251		99	152
Rehab Hospital/Unit	1	Hospital 1	0	1
	2	Hospital 2	1	1
Total	3		1	2
Rehab Hospital/Unit	1	Hospital 1	0	1
	4	Hospital 2	1	3
	1	Hospital 3	1	0
	5	Hospital 4	2	3
	1	Hospital 5	1	0
Total	12		5	7
Rehab Hospital/Unit	84	Hospital 1	27	57
Total	84		27	57

Current and Adjusted Admission Volumes for Primary, Unilateral, Elective TKR to Inpatient Rehab

Planning Assumption: These allocations are based on existing referral patterns on the assumption that the relative acuity of patients discharged does not change.

Receiving Hospital	# of Primary, Unilateral, Elective TKR Patients Admitted (09/10)	Sending Hospital	# of Redirected Patients from IP Rehab to meet 20% target (From Column F in tables above)	Adjusted Admission Volume to meet 20% target (From Column E in tables above)
Rehab Hospital/Unit	290	Hospital 1	111	179
Total	290		111	179
Rehab Hospital/Unit	5	Hospital 1	3	2
Total	5		3	2
Rehab Hospital/Unit	10	Hospital 1	5	5
	1	Hospital 2	0	1
	23	Hospital 3	6	17
	31	Hospital 4	13	18
	13	Hospital 5	5	8
	170	Hospital 6	98	72
	11	Hospital 7	4	7
	73	Hospital 8	12	61
	7	Hospital 2	4	3
	42	Hospital 10	9	33
	1	Hospital 11	0	1
	7	Hospital 12	0	7
	33	Hospital 13	24	9
	10	Hospital 14	1	9
Total	432		181	251
OVERALL TOTAL	1297		520	777



7.3. Appendix C: Proposed Outpatient Rehab and CCAC Model for Primary, Unilateral, Elective Total Joint Replacement

The following model for post acute rehab following primary, unilateral, elective TJR is based on the Holland Model and consultation with rehab professionals from Sunnybrook Health Sciences Centre; Mount Sinai, St. Joseph's Health Centre, St. Michael's and Toronto Rehab.

CCAC for TKR:

- 10% of patients discharged home will require 8 CCAC visits within first 3 weeks of discharge to home; PT to provide hands-on treatment with a focus on increasing ROM.
- Of these, 50% will require OP rehab following CCAC

OP Rehab TKR:

- 80% of patients discharged home will require:
 - 1 assessment visit (1 hour plus 15 min documentation time)
 - 2 hour class, 2x per week for 6 weeks (documentation time included within class time allowance). Class run by 1 PT and 1 PTA. Class size is 10 patients.
- 10% of patients will require 1 assessment visit plus 1:1 treatments instead of a class format and will need, on average, up to 15 treatment visits (1/2 hour treatment visit plus 15 minute documentation time)
- Of the 10% of patients who first received CCAC, half will require additional treatment in either class format or 1:1. In determining the amount of OP rehab resources required, 3 calculations were done based on: (Scenario 1) if these patients required class format; (Scenario 2) if these patients required 1:1 treatment instead of the class format; and (Scenario 3) if half of the patients will require the class format and half will require 1:1 treatment.

CCAC for THR:

- 100% of patients to be offered, on average, up to 2 CCAC visits between the time of discharge home and first hospital follow-up visit

OP Rehab THR:

- 80% of patients discharged home will require:
 - 1 class. The first 45 min. to provide education and in the second 45 min. patients are seen individually (2 hours including documentation time has been allotted)
 - 6 patients per group
 - Class run by 1 PT and 1 PTA
- 20% of patients will need additional 1:1 treatment, up to 8 visits
- 20% of patients will need 1:1 assessment in lieu of the class to (1 hour plus 15 min documentation time per assessment)

7.4. APPENDIX D: ESTIMATED OUTPATIENT REHAB AND CCAC RESOURCES FOR PATIENTS DISCHARGED HOME POST UNILATERAL, PRIMARY, ELECTIVE TJR

The following information outlines the parameters of Post-Acute Community-Based Rehab assuming an 80% target for discharge to home. The calculations below pertain to the patients who will be discharged home. Information is based on data extracted from the 2009/10 DAD database and projected volumes of patients to be redirected from inpatient rehab to achieve the 80% rate of discharge to home.

Planning Assumptions:

1. The estimated resource requirements below are based on the planning assumption that increased Outpatient rehab resources within the TC LHIN will be accessed by TC LHIN and GTA LHIN residents who were previously referred to inpatient rehab at Baycrest, Bridgepoint Health, Providence Healthcare, St. John's Rehab Hospital, Toronto East General Hospital, Sunnybrook Health Sciences Centre, Toronto Rehab and West Park Healthcare Centre.
2. Separate analyses were conducted for TKR and THR. The therapy model proposed for outpatient rehab and CCAC is based on the Holland Model and consultation with rehab professionals from Sunnybrook Health Sciences Centre; Mount Sinai Hospital, St. Joseph's Health Centre, St. Michael's and Toronto Rehab.
3. One year consists of 44 business weeks (allowing for vacations, statutory holidays, sick time and education)
4. Three possible scenarios have been used for 5% of TKR patients who are discharged home with CCAC services:
Scenario 1: Patients will need further rehab in *class format*
Scenario 2: Patients will need further rehab in *1:1 treatment visits* instead of the class format.
Scenario 3: Half of the patients will need further rehab in *class format* and half of the patients will need *1:1 treatment visits*

TKR CAPACITY REQUIRED (Primary, unilateral, elective)

Total number of TKR patients to be redirected from inpatient rehab = 520. This figure is based on the projected number of patients who would be redirected from acute care if each TC LHIN acute care hospital met the TC LHIN target for an 80% discharge rate to home using 2009/10 data.

CCAC Requirements Per Year for 520 TKR Patients

For TKR patients, up to 10% of 520 patients (52) will need 8 visits within the first 3 weeks of discharge home = 416 CCAC visits

TKR Outpatient Rehab Model for 520 Patients

i) Assessment Sessions

90% (468 patients) will require 1 assessment session each = **468 assessments**
5% (26 patients who will require treatment post CCAC) will each require 1 assessment session = **26 assessments**

494 Assessments
per year
or
11 Assessments
per week

ii) Class Format

80% (416 patients) will attend 12 classes, 2 hours each. (Although documentation for most patients can be completed during this time, an additional 15 minutes has been allocated). Class size is 10 patients.

- 42 groups are needed and each group will attend 12 classes = **504 classes**

*If 5% (26 patients who have received CCAC services) will also attend class format (*instead of 1:1 treatment*)

- 3 groups are needed to attend 12 classes = **36 classes**

504 Classes + 36
for Post CCAC
patients* per
year
or
12 Classes per
week

iii) Treatment Sessions

10% (52 patients) will require 1:1 treatment, up to 15 treatment visits = **780 treatments**

*If 5% (26 patients who have received CCAC services) will need up to 15 1:1 treatment sessions (*instead of class format*)

- 26 patients x 15 treatment sessions = **390 treatment visits**

780 Treatments +
390 for Post
CCAC Patients *
per year
or
18 Treatments or
27* Treatments
per week

Total number of THR patients to be redirected from inpatient rehab = 378. This figure is based on the projected number of patients who would be redirected from acute care if each TC LHIN acute care hospital met the TC LHIN target of 80% discharge to home using 2009/10 data.

CCAC Requirements Per Year for 378 THR Patients

For THR patients, up to 100% of 378 patients will need on average, up to 2 visits between discharge home and first hospital follow-up visits = 756 CCAC visits

THR Outpatient Rehab Model for 378 Patients

i) Class Format

80% (302 patients) will attend 1 class, 2 hours each (includes documentation time). Class size is 6 patients.

- 50 groups would receive 1 class each = **50 classes per year**

50 Classes per year or 1 Class per week

ii) Assessment Sessions

20% (76 patients) will need 1:1 assessment instead of class = **76 assessments**

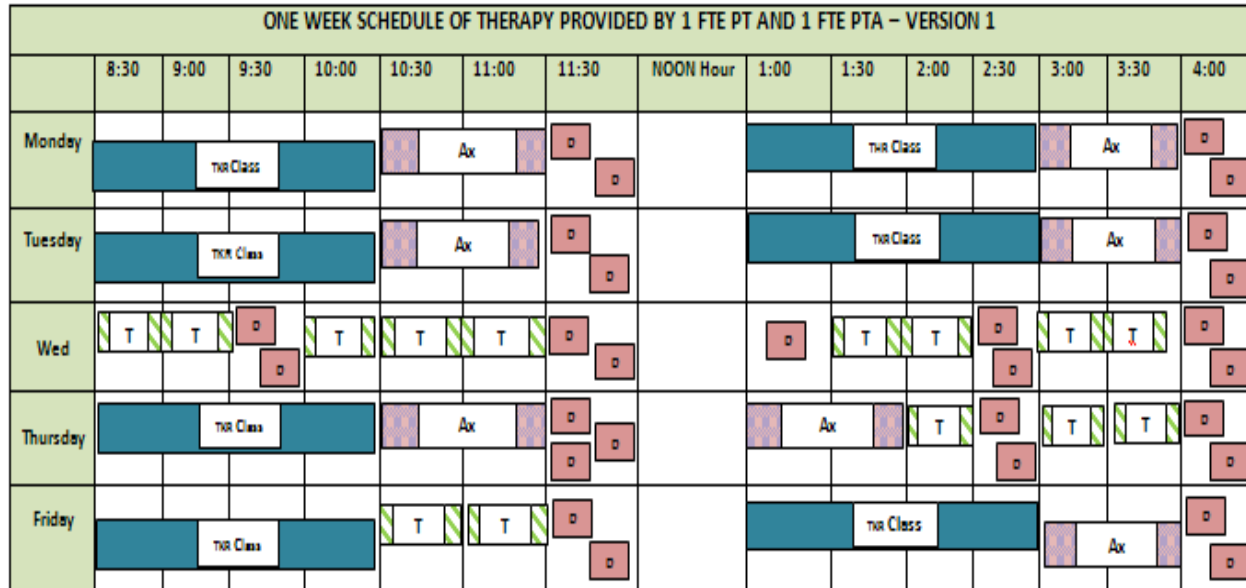
76 Assessments per year or 2 assessments per week

iii) Treatment Sessions

20% (76 patients) will need 1:1 treatments, up to 8 visits = **608 treatment visits**

608 Treatments per year or 14 Treatments per week

Estimated OP Therapy Provided by 1 PT FTE and 1 PTA FTE Using Proposed Generic Model



OP REHAB RESOURCES REQUIRED AND AVAILABLE PER WEEK FOR TKR AND THR PATIENTS FOR 520 TKR & 378 THR PATIENTS – VERSION 1										
	OP Resources Required for TKR Per Week			OP Resources Required for THR Per Week	Combined OP Resources Required for TKR & THR Per Week			Total OP Rehab Resources <i>Provided</i> by 1 PT and 1 PTA Per Week		
	CCAC Scenario 1*	CCAC Scenario 2*	CCAC Scenario 3*		CCAC Scenario 1*	CCAC Scenario 2*	CCAC Scenario 3*	TKR	THR	TKR & THR
Classes	12	12	12	1	13	13	13	6	1	7
Assessment	11	11	11	2	13	13	13	5	2	7
Treatment	18	27	22	14	32	41	36	7	7	14

*Includes 5% of patients post CCAC. CCAC Scenario 1 assumes that the CCAC patients will attend class sessions post CCAC services. Scenario 2 assumes that CCAC patients will need 1:1 treatments post CCAC services instead of the class format. CCAC Scenario 3 assumes that half of the patients will attend a class and half will need 1:1 treatments post CCAC services.

Using the schedule above, 3 PTs and PTAs could meet the needs of 555 TKR patients and 398 THR patients, including each of the CCAC Scenarios.

As the scheduling template for PT and PTA resources in Version 1 utilizes all available time, Version 2 is presented below, which allows for more flexibility in scheduling. To achieve this, 2 TKR classes have been deleted from Version 2. Using the schedule below, 3 PTs could meet the needs of 520 TKR patients and 378 THR patients, including each of the CCAC Scenarios.

ONE WEEK SCHEDULE OF THERAPY PROVIDED BY 1 FTE PT AND 1 FTE PTA – VERSION 2																
	8:30	9:00	9:30	10:00	10:30	11:00	11:30	NOON Hour	1:00	1:30	2:00	2:30	3:00	3:30	4:00	
Monday	TKR Class				Ax		D	D		THR Class			Ax		D	D
Tuesday	Ax	D							TKR Class			Ax		D	D	
Wed	T	T	D	T	T	T	D	D	D	T	T	D	T	T	D	D
Thursday	TKR Class				Ax		D	D	Ax	T	D	T	T	T	D	D
Friday					T	T	D	D	TKR Class			Ax		D	D	

OP REHAB RESOURCES REQUIRED AND AVAILABLE PER WEEK FOR TKR AND THR PATIENTS FOR 520 TKR & 378 THR PATIENTS – VERSION 2										
	OP Resources Required for TKR Per Week			OP Resources Required for THR Per Week	Combined OP Resources Required for TKR & THR Per Week			Total OP Rehab Resources <i>Provided</i> by 1 PT and 1 PTA Per Week		
	CCAC Scenario 1*	CCAC Scenario 2*	CCAC Scenario 3*		CCAC Scenario 1*	CCAC Scenario 2*	CCAC Scenario 3*	TKR	THR	TKR & THR
Classes	12	12	12	1	13	13	13	4	1	5
Assessment	11	11	11	2	13	13	13	5	2	7
Treatment	18	27	22	14	32	41	36	7	7	14

*Includes 5% of patients post CCAC. CCAC Scenario 1 assumes that the CCAC patients will attend class sessions post CCAC services. Scenario 2 assumes that CCAC patients will need 1:1 treatments post CCAC services instead of the class format. CCAC Scenario 3 assumes that half of the patients will attend a class and half will need 1:1 treatments post CCAC services.

Conclusion: Both of the schedules above demonstrate that 3 PTs and 3 PTAs are required to provide the rehab resources needed for the projected volume of TJR patients discharged directly home from acute care (i.e. 520 TKR patients and 378 THR patients).



520 Sutherland Drive,
Toronto, ON M4G 3V9

Tel: 416-597-3057

Fax: 416-597-7021

Email: info@gtarehabnetwork.ca

www.gtarehabnetwork.ca