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A Suite of Programs to Aid in Musculo-Skeletal Injury Management

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A SUITE OF PROGRAMS TO AID IN MUSCULOSKELETAL INJURY MANAGEMENT

By Major R.D. Trudel

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ABSTRACT

Allied health care professionals act as force enablers or multipliers by providing services that decrease the overall burden on primary health care providers (PHCP). This is more necessary now than ever before, with military members waiting at least two weeks to see their PHCP for routine or non-urgent concerns and 120 days to have an initial appointment with an orthopaedic surgeon. These excessive wait times have exacerbated existing issues and created secondary problems such as mental health concerns while also prolonging a return to work.

Three evidence-informed programs have been created that propose using allied health care professionals to work collaboratively with primary care. One program, implemented and studied in Halifax, Nova Scotia, increased the appropriateness of referrals for orthopaedic surgery and decreased the wait for an appointment to 26 days. A second program proposes to give the authority to physiotherapists to order diagnostic imaging, potentially reducing the patient's wait for results by four weeks. The final program leverages the existing return to duty administrative process to aid PHCP in crafting objective, meaningful medical employment limitations to hasten the return to duty of military members.

While all three programs are evidence-based, the organizational culture of healthcare will need to be considered and accounted for to ensure successful support for implementation. If supported, these programs could collectively change the management of musculoskeletal injuries in the Canadian Armed Forces through decreasing wait times for PHCP and specialists while enhancing the patient experience and returning them to duty in an efficient and sustainable manner.

LIST OF ABBREVIATIONS

CAF	Canadian armed forces
CFHS	Canadian forces health services
CT	Computerized tomography
DI	Diagnostic imaging
DIMAP	Diagnostic imaging medical access program
DND	Department of national defence
EMR	Electronic medical record
MEL	Medical employment limitation
MRI	Magnetic resonance imaging
MSK	Musculoskeletal
MSKI	Musculoskeletal injury
NICE	National Institute for health and care excellence
OIR	Orthopaedic intervention rate
OT	Occupational Therapist
PHCP	Primary health care provider
ReMAP (Ortho)	Rehabilitation medical access program for orthopaedic surgery
RTD	Return-to-duty
RtDAP	Return to duty access program
RTW	Return-to-work
SCR	Surgical conversion rate

CHAPTER 1: INTRODUCTION

Allied health care providers such as physiotherapists and occupational therapists have been shown to be an important piece of the overall health care team. They can be viewed as force enablers or force multipliers as they increase efficiencies so that their contributions far outweigh their costs. Unfortunately, in many health care settings, these professions are not employed to their full capability. Like many industry and government organizations, health care tends to work in silos comprised of different subcultures within the system. Primary Health Care Providers (PHCPs) may refer to physiotherapists and occupational therapists, but they rarely work in a genuinely integrated sense where the results are more significant than any profession could produce separately. Part of this disconnect could be attributed to healthcare's organizational culture, where professions naturally fall into subgroups based on their function with primary care, specifically physicians, holding a dominant position. Much research has been conducted on integrating these professions to increase efficiencies while delivering an improved patient experience. Since physiotherapists and occupational therapists are considered experts in the care of musculoskeletal injuries (MSKIs), they could be consulted and included in programs focusing on the burden that MSKIs create on a health care system.

In the Canadian Armed Forces (CAF), the seriousness of MSKIs cannot be overstated. One study found that 51.7% of regular force members reported having suffered an acute or repetitive strain injury serious enough in the previous 12 months to seek medical care.[1] Additionally, 52.4% of regular force members reported having a

[1] Francois Theriault, Karyn Gabler and Kiyuri Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.* (Ottawa, Canada: B.A. Strauss & J. Whitehead (Eds.),[2016]).

chronic condition diagnosed by a health care professional.[2] These data all speak to a significant MSKI issue within the CAF that impacts all members' employability and deployability. Additionally, it highlights the burden that MSKIs put on the Canadian Forces health care system and is reflected in increased wait times to see a PHCP. During a survey, the majority of regular force personnel reported waiting longer than two weeks for a routine, non-urgent, ongoing health problem.[3] This is contrasted with the general public, who wait only two days to see their family physician for a similar appointment.[4] The increased wait for routine appointments leads CAF members to misuse sick parade, the military equivalent of a walk-in clinic, where 22.3% of personnel report that they would seek care at sick parade for routine issues rather than wait for an appointment with their PHCP.[5] Increased wait times compound health issues, and they have been associated with adverse health impacts, including increased or prolonged pain, problems carrying out activities of daily living, mental health issues, and deterioration in overall health.[6]

An additional burden to the military health care system is seen with diagnostic imaging. Although access to diagnostic imaging for military members is usually timelier than in the civilian sector, it still adds to the overall wait time and can consume additional appointments by PHCPs. This issue is compounded by the finding that PHCPs tend to order more diagnostic imaging than other care providers and use it more as an exploratory tool rather than confirmation of a diagnosis or according to established

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[2] Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*

[3] Ibid.

[4] Bacchus Barua and Nadeem Esmail, *Waiting Your Turn: Wait Times for Health Care in Canada: 2012 Report*Fraser Institute, 2012).

[5] Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*

[6] Barua and Esmail, *Waiting Your Turn: Wait Times for Health Care in Canada: 2012 Report*

evidenced-based clinical prediction rules.[7] This has led to the overutilization of diagnostic imaging by PHCPs in the civilian sector and the military health care system, which recently prompted the CFHS to examine overall spending on diagnostic imaging. Specifically, the CFHS explored magnetic resonance imaging utilization for the lumbar spine since it has been demonstrated to be one of the most over-utilized tests, where in an otherwise healthy population without apparent symptoms, it is rarely indicated.[8] The use of additional tests adds to the overall burden on primary care as they are required to meet with the patient to order the tests and then again to interpret the results, even if they are benign. This potentially adds two extraneous appointments to an already overburdened system.

Specialist appointments for MSKIs, specifically with an orthopaedic surgeon, impact multiple healthcare areas and adds to the burden on the system. Many orthopaedic specialists require specific imaging before they meet with the patient or consider surgery, necessitating a diagnostic imaging referral when the specialist referral is completed. If the proper test is not ordered, it leads to an extraneous appointment with the specialist as they request the required tests. These nonessential appointments can add to the wait to see the

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[7] Bacchus Barua and Mackenzie Moir, *Waiting Your Turn: Wait Times for Health Care in Canada - 2019 Report*Fraser Institute,[2019]).; Josef H. Moore et al., "Clinical Diagnostic Accuracy and Magnetic Resonance Imaging of Patients Referred by Physical Therapists, Orthopaedic Surgeons, and Nonorthopaedic Providers," *The Journal of Orthopaedic and Sports Physical Therapy* 35, no. 2 (Feb, 2005), 67-71. doi:10.2519/jospt.2005.35.2.67.; Troy McGill, "Effectiveness of Physical Therapists Serving as Primary Care Musculoskeletal Providers as Compared to Family Practice Providers in a Deployed Combat Location: A Retrospective Medical Chart Review," *Military Medicine* 178, no. 10 (Oct, 2013), 1115-1120. doi:10.7205/MILMED-D-13-00066.

[8] D. Kendrick et al., "The Role of Radiography in Primary Care Patients with Low Back Pain of at Least 6 Weeks Duration: A Randomised (Unblinded) Controlled Trial," *Health Technology Assessment (Winchester, England)* 5, no. 30 (2001), 1-69. doi:10.3310/hta5300.; M. T. Modic et al., "Acute Low Back Pain and Radiculopathy: MR Imaging Findings and their Prognostic Role and Effect on Outcome," *Radiology* 237, no. 2 (Nov, 2005), 597-604. doi:237/2/597 [pii].; L. M. Ash et al., "Effects of Diagnostic Information, Per Se, on Patient Outcomes in Acute Radiculopathy and Low Back Pain," *AJNR.American Journal of Neuroradiology* 29, no. 6 (Jun, 2008), 1098-1103. doi:10.3174/ajnr.A0999 [doi].

orthopaedic specialist, which can add to the length of time until surgery with the run-on effect of increasing recovery and time until the patient can return to work. In 2019, the average wait time nationally to see an orthopaedic surgeon after a referral from a PHCP was 122 days.[9] This is similar to data reported from the military base in Halifax, Nova Scotia, for 2019, where the average wait time for an appointment with an orthopaedic surgeon was 140 days. These numbers are expected to be similar as the CFHS utilizes the respective provincial or territorial health care systems for specialist appointments. Therefore, the Department of National Defence (DND) does not have any control over orthopedic surgeons' availability to see CAF members. In a survey of regular force CAF members, 58.5% of people reported that the wait to see a specialist was a significant barrier to their care,[10] a number that was also reflected in the civilian sector.[11]

While an injured member is waiting for an appointment with a specialist, the CAF is required to protect them from further injury. All positions in the CAF are comprised of specific roles and objectives that require each member to meet a minimum medical category, which is a numeric profile assigned to each individual to inform the chain of command of that member's employability and deployability. This medical category can change if a member is injured and can no longer complete the tasks required of their position. Usually, before a medical category is changed, a member is given medical employment limitations (MELs), which is an administrative constraint on what a CAF member can do in terms of work schedule, roles, or tasks as a result of their medical condition. MELs are assigned as part of a formal medical assessment.

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[9] Barua and Moir, *Waiting Your Turn: Wait Times for Health Care in Canada - 2019 Report*

[10] Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*

[11] Barua and Moir, *Waiting Your Turn: Wait Times for Health Care in Canada - 2019 Report*

If it is anticipated that a CAF member will require MELs for a prolonged period, either while their medical condition stabilizes or waiting to see a specialist and then convalescing, they are put on a temporary medical category for up to six months. This temporary category can be renewed once, to a maximum of 12 months, after which a permanent medical category is assigned, initiating the medical release process. These timelines highlight the importance of decreasing the wait to see PHCPs and any specialists in order to reduce the amount of time someone has MELs.

Research has also shown that the longer an individual is not at work, the less likely they will be able to return to their previous employment.[12] One integral aspect of removing MELs from a CAF member is demonstrating that they can complete all necessary work tasks by participating in an appropriate return to work program. This necessity was recognized by the CAF leadership and led to the development of the Total Health and Wellness strategy after the new defence policy: Strong, Secure, Engaged, was implemented.[13] Included in this strategy was the creation of the Transition Group, whose purpose was to aid ill and injured CAF members return to duty or transition to civilian life. To meet this purpose, the Transition Group created the CAF Return to Duty (RTD) program, a comprehensive reintegration program requiring the collaboration between the injured member, the chain of command, the Transition Center on each respective base, and the CFHS.[14] While there are policies and procedures concerning how the RTD program operates, the CFHS currently does not have any plan outlining how to make the

[12] A. Etuknwa, K. Daniels and C. Eib, "Sustainable Return to Work: A Systematic Review Focusing on Personal and Social Factors," *Journal of Occupational Rehabilitation* 29, no. 4 (Dec, 2019), 679-700. doi:10.1007/s10926-019-09832-7 [doi].

[13] "Strong Secure Engaged : Canada's Defence Policy. " Government of Canada,

[14] "Return to Duty Guide for Canadian Armed Forces Members," last modified April 9,

most efficient use of the program. It is instead left to the individual PHCPs to refer patients to the program. In this manner, the program's utilization could have the unintended consequence of increasing the burden on Primary Care as more detailed and progressive MELs are required to ensure the injured member is advancing with their RTD. A comprehensive functional assessment is necessary to determine the member's capabilities to craft proper MELs. More frequent follow-ups are also required to change the MELs as the member's functional abilities change. This could add significantly more appointments to the PHCP, thereby increasing the wait times beyond their current state. If used properly, the RTD program could decrease the amount of time a CAF member is away from work, which increases their probability of an effective return with an end result of reducing the number of medical appointments and releases.

Issues such as significant MSKIs leading to increased wait times to see PHCPs, specialists, obtain diagnostic imaging, or complicating RTD are not exclusive to the military and are very similar to problems in the provincial health care systems. In fact, much research has examined high wait times to see PHCPs and specialists, overuse of diagnostic imaging in Primary Care exacerbating wait times, and issues with return to work.[15] While this research has identified different possible solutions to some of these

[15] A. B. Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," *Healthcare Quarterly (Toronto, Ont.)* 11, no. 2 (2008), 62-66. doi:10.12927/hcq.2008.19618 [doi].; Vicki L. Kristman et al., "Researching Complex and Multi-Level Workplace Factors Affecting Disability and Prolonged Sickness Absence," *Journal of Occupational Rehabilitation* 26, no. 4 (2016), 399-416. doi:http://dx.doi.org.cfc.idm.oclc.org/10.1007/s10926-016-9660-3.; Carol Cancelliere et al., "Factors Affecting Return to Work After Injury Or Illness: Best Evidence Synthesis of Systematic Reviews," *Chiropractic & Manual Therapies* 24 (2016). doi:http://dx.doi.org.cfc.idm.oclc.org/10.1186/s12998-016-0113-z.; Etuknwa, Daniels and Eib, "Sustainable Return to Work: A Systematic Review Focusing on Personal and Social Factors," , 679-700; Barua and Moir, *Waiting Your Turn: Wait Times for Health Care in Canada - 2019 Report*; "Return to Duty Guide for Canadian Armed Forces Members," ; Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*; A. B. Aiken, M. M. Harrison and J. Hope, "Role of the Advanced Practice Physiotherapist in Decreasing Surgical Wait Times," *Healthcare Quarterly (Toronto, Ont.)* 12, no. 3 (2009), 80-83. doi:10.12927/hcq.2013.20881

issues, neither the civilian sector nor the military has applied them effectively. The failure to fully integrate the research findings could be due in part to the organizational culture in healthcare, leading to the separation of different professions, creating a siloed nature of work. Even though most of the health care system endeavours to work collaboratively, having other professions with varying scopes of practice working in separate departments fosters a siloed way of thinking and feeds into the existing culture. This is also present in the CFHS, where Primary Care, specialty services, and diagnostic imaging are all in different departments. To effectively solve an issue such as this, alternative strategies and solutions that might not be initially apparent need to be sought and considered. One method that can be used to approach complex issues is design thinking. This iterative process aims to challenge assumptions and redefine the problem where a repeated cycle of analysis should converge on the desired result. This is seen in the CFHS, where the primary care renewal initiative was done in the early 2000s to address many issues identified in the military health care system. That analysis has continued after lessons learned from the first iteration were examined. Although improvements have been made, wait times and the management of MSKIs remain problematic.

The civilian sector examined the role that a physiotherapist could play to solve the issues as mentioned earlier.[16] It has been established that physiotherapists are experts in

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[doi].; Jennifer Fournier, Roberta Heale and Lori Rietze, ""I can'T Wait": Advanced Access Decreases Wait Times in Primary Healthcare," *Healthcare Quarterly (Toronto, Ont)* 15 (2012), 64-8. doi:10.12927/hcq.2012.22763.

[16] Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," , 62-66; Andrew O. Frank and M. Anne Chamberlain, "Rehabilitation: An Integral Part of Clinical Practice," *Occupational Medicine (Oxford)* 56, no. 5 (2006), 289-291.; Robyn Saxon, Marion Gray and Florin Oprescu, "Extended Roles for Allied Health Professionals: An Updated Systematic Review of the Evidence," *Journal of Multidisciplinary Healthcare* 7, no. default (2014), 479-488.; K. S. Samsson et al., "Effects on Health and Process Outcomes of Physiotherapist-Led Orthopaedic Triage for Patients with Musculoskeletal Disorders: A Systematic Review of Comparative Studies," *BMC Musculoskeletal Disorders* 21, no. 1 (Oct 10, 2020), 673-9. doi:10.1186/s12891-020-03673-9 [doi].; Aiken,

musculoskeletal assessments, demonstrating diagnostic accuracy above family physicians and on par with orthopaedic specialists.[17] Similar results were found when examining a physiotherapist's ability to utilize clinical practice guidelines and evidence-informed practices to order diagnostic imaging.[18] In fact, compared to family physicians, physiotherapists were found to follow guidelines more closely, resulting in higher accuracy of their referrals[19] resulting in a significantly lower cost due to imaging. These findings led some provinces to create a collaborative clinic where physiotherapists complete a triage for orthopaedic surgeons to determine the most appropriate patients for hip and knee replacements.[20] These clinics have realized decreased wait times to see the surgeons, higher satisfaction with the education and results received, and a larger proportion of patients receiving conservative care, returning them to a functional state

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Harrison and Hope, "Role of the Advanced Practice Physiotherapist in Decreasing Surgical Wait Times," , 80-83

[17] Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," , 62-66; Saxon, Gray and Oprescu, "Extended Roles for Allied Health Professionals: An Updated Systematic Review of the Evidence," , 479-488; Aiken, Harrison and Hope, "Role of the Advanced Practice Physiotherapist in Decreasing Surgical Wait Times," , 80-83

[18] Susan Robarts et al., "Evaluation of an Advanced-Practice Physiotherapist in Triaging Patients with Lumbar Spine Pain: Surgeon–physiotherapist Level of Agreement and Patient Satisfaction," *Canadian Journal of Surgery* 60, no. 4 (Aug, 2017), 266-272. doi:10.1503/cjs.013416.; Moore et al., "Clinical Diagnostic Accuracy and Magnetic Resonance Imaging of Patients Referred by Physical Therapists, Orthopaedic Surgeons, and Nonorthopaedic Providers," , 67-71; McGill, "Effectiveness of Physical Therapists Serving as Primary Care Musculoskeletal Providers as Compared to Family Practice Providers in a Deployed Combat Location: A Retrospective Medical Chart Review," , 1115-1120; Robert E. Boyles et al., "Physical Therapist Practice and the Role of Diagnostic Imaging," *The Journal of Orthopaedic and Sports Physical Therapy* 41, no. 11 (Nov, 2011), 829-837. doi:10.2519/jospt.2011.3556.; Alice B. Aiken and Mary Ann McColl, "Diagnostic and Treatment Concordance between a Physiotherapist and an Orthopedic Surgeon - A Pilot Study," *Journal of Interprofessional Care* 22, no. 3 (2008), 253-261. doi:10.1080/13561820801984134.

[19] McGill, "Effectiveness of Physical Therapists Serving as Primary Care Musculoskeletal Providers as Compared to Family Practice Providers in a Deployed Combat Location: A Retrospective Medical Chart Review," , 1115-1120; Moore et al., "Clinical Diagnostic Accuracy and Magnetic Resonance Imaging of Patients Referred by Physical Therapists, Orthopaedic Surgeons, and Nonorthopaedic Providers," , 67-71

[20] Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," , 62-66; Saxon, Gray and Oprescu, "Extended Roles for Allied Health Professionals: An Updated Systematic Review of the Evidence," , 479-488; Crystal MacKay et al., "Expanding Roles in Orthopaedic Care: A Comparison of Physiotherapist and Orthopaedic Surgeon Recommendations for Triage," *Journal of Evaluation in Clinical Practice* 15, no. 1 (Feb, 2009), 178-183. doi:10.1111/j.1365-2753.2008.00979.x.

negating the requirement for surgery.[21] These physiotherapy advanced practice roles have also demonstrated effectiveness in other military health care systems.[22]

Decreasing wait times for specialists is not sufficient on its own. Throughout the injury process, when to return a patient to work should also be a consideration. The civilian sector has many methods to utilize a worker's compensation board with an advisor to direct the process. The medical system is an integral piece of that process, leveraging physiotherapists' and occupational therapists' expertise to help craft the return-to-work limitations and plans.[23] These allied health professionals work in concert with the family physicians to provide the most comprehensive plan possible. In the CAF, while there is a similar system in place to manage the RTD process with an advisor and connection with the chain of command, equivalent to the civilian employer, CFHS has not yet fully developed their program to feed into the RTD process.

1.1 Purpose

Due to some of the noted gaps in the CFHS management of MSKIs and the burden on primary care, a different approach could be sought to find viable solutions. Therefore, this project aims to explore the research and rationale behind some of the issues with MSKI management and then proposes three distinct yet interrelated programs

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[21] Saxon, Gray and Oprescu, "Extended Roles for Allied Health Professionals: An Updated Systematic Review of the Evidence," , 479-488; Aiken, Harrison and Hope, "Role of the Advanced Practice Physiotherapist in Decreasing Surgical Wait Times," , 80-83

[22] T. McGill, "Effectiveness of Physical Therapists Serving as Primary Care Musculoskeletal Providers as Compared to Family Practice Providers in a Deployed Combat Location: A Retrospective Medical Chart Review," *Military Medicine* 178, no. 10 (Oct, 2013), 1115-1120. doi:10.7205/MILMED-D-13-00066 [doi].

[23] Gordon Waddell, A. Kim Burton and Nicholas A. S. Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*TSO, 2008).; Gerard McFeely, "Health at Work: An Analysis of Black's and Frost's Independent Review of Sickness Absence — what can Occupational Therapists Offer?" *The British Journal of Occupational Therapy* 75, no. 7 (Jul, 2012), 343-345. doi:10.4276/030802212X13418284515956.; Cancelliere et al., "Factors Affecting Return to Work After Injury Or Illness: Best Evidence Synthesis of Systematic Reviews,"

to address these issues. These programs will argue that breaking silos between Primary Care, Physical Rehabilitation, and Specialty Services can result in greater efficiencies.

1.2 Hypothesis

Specifically, this project will contend that breaking the silos of Primary Care and Physical Rehabilitation by implementing these programs results in greater management of MSKIs. Additionally, it will explain how the CFHS can work within the Transition Centers' RTD program to increase successful RTD for military members. This will be achieved by proposing three main actions; first that the Physical Rehabilitation section triage all orthopaedic surgery referrals; second, delegated authority to order diagnostic imaging be given to trained physiotherapists; and third, that the Physical Rehabilitation section will be utilized in the composition of functionally based progressive MELs and be an integral part of the health services process to work with the transition center RTD program.

1.3 Methodology

This paper examined how three programs, developed with a pragmatic approach to address real-world issues, fit within the established body of literature. The literature review for each section entailed using the PubMed and Summons databases and general searches for keywords on the internet to ensure that relevant sources were not missed. Scanning of titles and abstracts was employed to remove articles without a clear link to one of the issues explored in this paper. All the remaining sources were examined for commonalities or opposing views, and these are reported in the literature review section. Each program will be discussed in detail concerning how they address issues identified from the literature. Then each will be scrutinized for the impact they could have on the

CAF medical system. Potential complications are also assessed to complete the pragmatic approach. This allows for recommendations to be made on the implementation of the programs, what data should be collected, and directions for future research.

This paper will review the relevant literature of the three main parts mentioned in the hypothesis to achieve its purpose; physiotherapy-led triage for orthopaedic surgery, physiotherapy receiving delegated authority to order diagnostic imaging, and occupational therapy working collaboratively to increase the return to duty of military members. Each one of these lines of thinking will then be explored separately, including outlining a program structure with suggested metrics and standard operating procedures, where applicable. The paper will conclude by discussing how these programs can improve the efficiency of the CFHS along with recommendations on their implementation.

CHAPTER 2: BACKGROUND LITERATURE

Society as a whole and the healthcare system specifically have been trying to figure out how to deal with musculoskeletal injuries (MSKIs). Whether it is to figure out how to get people back to work or see a doctor faster, there is an urgency to increase efficiencies in managing MSKIs. This is reflected in the extensive body of literature on this topic, this proposal will endeavour to review only those aspects relevant to the objectives. Key elements in this project are the function of physiotherapists working in an advanced practice role and the Physical Rehabilitation section's ability to work collaboratively to execute a Return to Duty (RTD) program. This chapter is a literature review of these concepts and how they have been critically examined. The literature review is divided into four sections, with the first three reflecting the main elements of the argument presented and the fourth section as a counterpoint or exploration of potential challenges. The sections are 1. the utility of a physiotherapist working in conjunction with an orthopaedic surgeon; 2. the ability of a physiotherapist to order diagnostic imaging; 3. an assessment of the role of a health care system participating in a return-to-work program; and 4. the organizational culture of healthcare and how it could hinder the implementation and acceptance of these programs.

A comprehensive search of the literature was conducted to obtain adequate background information. No date limit was put on the search, but preference was given to recent sources and sources with Canadian content. Additionally, when reviewing potential articles, their reference lists were also mined for relevant sources. Both primary articles describing unique studies or research and secondary sources containing reviews for reports, systematic reviews, and meta-analysis were included. Each section will

elaborate on the specifics of the sources contained within. During the review for the first three sections discussed in this chapter, no information was found that conflict with the premises presented. Therefore, to obtain a balanced analysis and understand the challenges that each of these concepts may meet, literature was examined that focused on organizational culture in healthcare and difficulties implementing change in that culture.

2.1 Collaborative Orthopaedic Clinics

This section will explore the literature published between 2005-2020 pertaining to a physiotherapist's involvement with triage systems for orthopaedic surgeons. To accomplish this, literature that details the diagnostic accuracy of physiotherapists and their ability to determine which patients could benefit from the orthopaedic intervention were examined. To discuss the impact of any suggested programs or strategies, a review of wait times for an appointment with an orthopaedic surgeon was also completed with preference given to Canadian studies. Through reviewing available studies and reviews, it was discovered that no research exists explicitly disputing the impact that physiotherapy could have in aiding orthopaedic clinics.

In Canada, the national average wait time to see an orthopaedic surgeon after a referral from a Primary Health Care Provider (PHCP) was 122 days.[24] This wait time is expected to be similar for military members as the Canadian Forces Health Services (CFHS) utilizes provincial and territorial healthcare systems. These long wait times are due in part to the demand for orthopedic services surpassing available resources, with the demand increasing by an average of 17% over the past five years.[25] Long wait times can

[24] Barua and Moir, *Waiting Your Turn: Wait Times for Health Care in Canada - 2019 Report*

[25] "Orthopedic Surgery Profile," last modified Dec, accessed 20 Jan, 2021; Canadian Institute for Health Information, *Hip and Knee Replacements in Canada, 2016–2017: Canadian Joint Replacement Registry Annual Report.* (Ottawa, ON: Canadian Institute for Health Information,[2018]).

adversely impact a patient's outcome, mental health, and quality of life.[26] Another factor contributing to increasing demand and wait times is the high proportion of patients with MSKIs referred to orthopedic surgery, for whom conservative management, defined here as physiotherapy treatment, would be more appropriate.[27] These appointments do not result in orthopedic intervention and, therefore, could be more effectively utilized. In fact, Badley et al. found that 79.3% of patients who visited an orthopaedic surgeon did not require surgery.[28] Recent research also indicates that 37% to 43% of patients referred to an orthopedic surgeon would be better managed with a referral to physiotherapy or injections rather than surgery.[29] All these factors overburden the health care system, increasing the wait times to see specialists and receive surgery. Ensuring that referrals are sent to the proper provider could reduce wait times to see an orthopedic surgeon and increase early access to conservative management.

To aid in the effective management of an overburdened health care system, referrals for orthopaedic services must be appropriate in terms of the likelihood that the patient will benefit from surgery. Utilizing a physiotherapist lead triage has been explored and implemented in different healthcare systems to increase the appropriateness of patients referred to orthopedic surgery.[30] This system creates a collaborative practice

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[26] Barua and Esmail, *Waiting Your Turn: Wait Times for Health Care in Canada: 2012 Report*

[27] Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," , 62-66

[28] Elizabeth M. Badley et al., "Surgery Or Consultation: A Population-Based Cohort Study of use of Orthopaedic Surgeon Services," *PloS One* 8, no. 6 (2013), e65560. doi:10.1371/journal.pone.0065560.

[29] M. O. Roland et al., "Improving Care: A Study of Orthopaedic Outpatient Referrals," *British Medical Journal* 302, no. 6785 (May, 1991), 1124-1128. doi:10.1136/bmj.302.6785.1124.; Leonie B. Oldmeadow et al., "Experienced Physiotherapists as Gatekeepers to Hospital Orthopaedic Outpatient Care," *Medical Journal of Australia* 186, no. 12 (Jun, 2007), 625-628. doi:10.5694/j.1326-5377.2007.tb01079.x.; David P. Gwynne-Jones et al., "The Joint Clinic: Managing Excess Demand for Hip and Knee Osteoarthritis Referrals using a New Physiotherapy-Led Outpatient Service," *The Journal of Arthroplasty* 33, no. 4 (Apr, 2018), 983-987. doi:10.1016/j.arth.2017.11.034.

[30] Ariel Desjardins-Charbonneau et al., "Acceptability of Physiotherapists as Primary Care Practitioners and Advanced Practice Physiotherapists for Care of Patients with Musculoskeletal Disorders:

where physiotherapists assess all patients referred to an orthopedic surgeon for suitability for surgery and provide conservative management and advice while those patients await surgery.[31] This model has been shown to decrease orthopedic surgery referrals by 34%[32] , thereby preserving appointments with the surgeon for those who require surgery. The other impact is patients who require conservative management will receive early access, potentially preventing their condition from deteriorating.

Physiotherapists are widely considered experts in the assessment and diagnosis of MSKIs. Additionally, they demonstrate comparable or greater diagnostic accuracy when compared to other health care providers.[33] Much research over the years has indicated that adverse findings on imaging do not necessarily translate to a requirement for surgery,[34] demonstrating instead that conservative management may be appropriate. These findings position physiotherapy as the ideal profession to provide triage for

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A Survey of a University Community within the Province of Quebec," *BMC Musculoskeletal Disorders* 17, no. 1 (Sep 21, 2016), 400. doi:10.1186/s12891-016-1256-8.; Christopher Napier et al., "A Physiotherapy Triage Service for Orthopaedic Surgery: An Effective Strategy for Reducing Wait Times," *Physiotherapy Canada* 65, no. 4 (2013), 358-363. doi:10.3138/ptc.2012-53.; Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," , 62-66

[31] Aiken, Harrison and Hope, "Role of the Advanced Practice Physiotherapist in Decreasing Surgical Wait Times," , 80-83

[32] Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," , 62-66

[33] Aiken, Harrison and Hope, "Role of the Advanced Practice Physiotherapist in Decreasing Surgical Wait Times," , 80-83; Moore et al., "Clinical Diagnostic Accuracy and Magnetic Resonance Imaging of Patients Referred by Physical Therapists, Orthopaedic Surgeons, and Nonorthopaedic Providers," , 67-71; Aiken and McColl, "Diagnostic and Treatment Concordance between a Physiotherapist and an Orthopedic Surgeon - A Pilot Study," , 253-261; François Desmeules et al., "Advanced Practice Physiotherapy in Patients with Musculoskeletal Disorders: A Systematic Review," *BMC Musculoskeletal Disorders* 13, no. 1 (Jun 21, 2012), 107. doi:10.1186/1471-2474-13-107.

[34] J. Bedson and P. R. Croft, "The Discordance between Clinical and Radiographic Knee Osteoarthritis: A Systematic Search and Summary of the Literature," *BMC Musculoskeletal Disorders* 9 (Sep 2, 2008), 116-116. doi:10.1186/1471-2474-9-116 [doi].; Modic et al., "Acute Low Back Pain and Radiculopathy: MR Imaging Findings and their Prognostic Role and Effect on Outcome," , 597-604; Ash et al., "Effects of Diagnostic Information, Per Se, on Patient Outcomes in Acute Radiculopathy and Low Back Pain," , 1098-1103; J. S. Sher et al., "Abnormal Findings on Magnetic Resonance Images of Asymptomatic Shoulders," *The Journal of Bone and Joint Surgery.American Volume* 77, no. 1 (Jan, 1995), 10-15. doi:10.2106/00004623-199501000-00002 [doi].

orthopedic surgeons as they could offer a conservative plan if the patient is deemed inappropriate for surgery. Multiple studies have examined the agreement between physiotherapists and orthopedic surgeons when recommending surgery, conservative management, or further investigation and have demonstrated from 92% to 93% agreement.[35] The majority of these programs or research employ in-person physiotherapy assessments due to the lack, or inaccessibility, of a complete electronic medical record (EMR). Additionally, most of these studies are for very select conditions such as hip or knee arthritis being considered for joint replacements.

This section reviewed the literature examining physiotherapy involvement in triage for orthopaedic surgery referrals finding that wait times for appointments with an orthopaedic surgeon are excessive and have been increasing year over year. This increase is due partly to the high proportions of referrals sent to the surgeon who did not require surgery or could be better managed conservatively. Increased wait times lead to adverse outcomes in recovery, mental health, and quality of life. Physiotherapists working in triage systems to select appropriate surgical patients have demonstrated high diagnostic accuracy and agreement with surgeons while decreasing inappropriate referrals.

2.2 Physiotherapists Ordering Diagnostic Imaging

This section will explore the literature published between 2000-2020 as it pertains to physiotherapists ordering diagnostic imaging. To accomplish this, literature that details the diagnostic accuracy of physiotherapists as well as referral rates for diagnostic imaging compared to other health care providers was examined. Physiotherapy has been employed

[35] MacKay et al., "Expanding Roles in Orthopaedic Care: A Comparison of Physiotherapist and Orthopaedic Surgeon Recommendations for Triage," , 178-183; Gwynne-Jones et al., "The Joint Clinic: Managing Excess Demand for Hip and Knee Osteoarthritis Referrals using a New Physiotherapy-Led Outpatient Service," , 983-987

in advanced practice roles for some time in many countries. In particular, the United States military has allowed physiotherapists to order diagnostic imaging since the 1970s. This ability was expanded to American civilian physiotherapists later and can also be seen in New Zealand, Australia, and the United Kingdom. In Canada, the authority to delegate the ability or give the right to order diagnostic imaging rests with the individual provinces. Currently, seven provinces have delegated or given some level of authority for physiotherapists to order diagnostic imaging. Due to the relatively widespread adoption of physiotherapists ordering imaging, no articles were found disputing their efficacy or stating that they should not be authorized to complete this activity.

There is no question that the various forms of diagnostic imaging bring enormous value to health care. They serve to confirm a diagnosis of serious pathology or help identify conditions not responding to conventional treatments. However, they have limited value once serious pathologies have been ruled out. Indeed, incidental or trivial findings have proven harmful from a psychological and economic point of view.[36] Patients who have been informed of trivial or incidental findings on imaging have been shown to have more doctor's visits, longer-lasting pain, more disability, and a lower sense of well-being.[37] In conjunction with the apparent costs associated with imaging, these factors impose a significant economic loss to the health care system. Additionally, the extraneous doctor visits caused by incidental findings and those necessary to order and explain the test results in increased wait times. Clinical decision rules were developed to

[36] Kendrick et al., "The Role of Radiography in Primary Care Patients with Low Back Pain of at Least 6 Weeks Duration: A Randomised (Unblinded) Controlled Trial," , 1-69; Modic et al., "Acute Low Back Pain and Radiculopathy: MR Imaging Findings and their Prognostic Role and Effect on Outcome," , 597-604; Ash et al., "Effects of Diagnostic Information, Per Se, on Patient Outcomes in Acute Radiculopathy and Low Back Pain," , 1098-1103

[37] Ibid.

be highly sensitive to avoid missing relevant findings and mitigate the potential of sending a patient for unnecessary imaging while still ruling out inappropriate conditions.[38]

Although physiotherapy has been in a direct access role for many years in Canada, the profession still lacks any authority to order diagnostic imaging in three provinces. Some of the remaining provinces impose limits on what or when physiotherapists can order. Therefore, where not allowed, if a physiotherapist believes a patient requires imaging, it necessitates a referral to the person's primary care provider, or an emergency department, who will then assess and complete the referral for imaging. If these extra steps to see a PHCP to obtain an order for imaging were removed, patients could receive care faster as extraneous appointments and the wait for those appointments would be removed. Additionally, the requirement for a physiotherapist to send patients back to a PHCP for an imaging referral results in a delay in treatment. This delay could result in a range of adverse outcomes, including; a delayed diagnosis of the condition, an increase in complications and the onset of secondary conditions, increased or a prolongation of pain, a delayed return to work, and feelings of frustration for both patients and care providers.[39] The current literature shows that physiotherapists' diagnostic accuracy with respect to referring MSKIs for diagnostic imaging is high and routinely in agreement with that of orthopaedic surgeons and higher than PHCPs.

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[38] Gail Dean Deyle, "The Role of MRI in Musculoskeletal Practice: A Clinical Perspective," *The Journal of Manual & Manipulative Therapy* 19, no. 3 (Aug 1, 2011), 152-161. doi:10.1179/2042618611Y.0000000009.

[39] (OPA) Ontario Physiotherapy Association, "Diagnostics and Education for Physiotherapists" 2011).; Jodie Ng Fuk Chong et al., "Ordering Diagnostic Imaging: A Survey of Ontario Physiotherapists' Opinions on an Expanded Scope of Practice," *Physiotherapy Canada.Physiotherapie Canada* 67, no. 2 (2015), 144-156. doi:10.3138/ptc.2014-09.

Additionally, physiotherapists have been shown to consistently refer less to diagnostic imaging when compared with PHCPs.[40] Boyles et al. found a 50% reduction in radiology use by physiotherapists compared with general practice physicians.[41] At the same time, McGill noted that deployed American military physiotherapists in a primary care role used radiology in 11.1% of cases versus 82.1% of cases for PHCPs, equalling a 71.0% reduction in radiology use.[42] Even though physiotherapists sent fewer referrals, overall patient satisfaction with the care received was equivalent or higher when compared to general practice physicians or orthopaedic surgeons.[43]

This section has reviewed the literature showing that allowing physiotherapists to order imaging can reduce the number of appointments for PHCPs and shorten the time it takes for a patient to receive the results. This reduced time could help prevent the negative consequences of delayed diagnosis. This review also explored the literature demonstrating that physiotherapists are as accurate as orthopaedic surgeons and more accurate than most other PHCPs when ordering diagnostic imaging while referring less than other providers. Additionally, the decrease in overall referrals did not impact patient satisfaction. The accuracy of physiotherapists can be attributed to adherence to clinical decision rules for ordering imaging and a robust physical assessment leading to a high diagnostic accuracy when determining what the injury is. The importance of referring

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[40] Boyles et al., "Physical Therapist Practice and the Role of Diagnostic Imaging," , 829-837; McGill, "Effectiveness of Physical Therapists Serving as Primary Care Musculoskeletal Providers as Compared to Family Practice Providers in a Deployed Combat Location: A Retrospective Medical Chart Review," , 1115-1120

[41] Boyles et al., "Physical Therapist Practice and the Role of Diagnostic Imaging," , 829-837

[42] McGill, "Effectiveness of Physical Therapists Serving as Primary Care Musculoskeletal Providers as Compared to Family Practice Providers in a Deployed Combat Location: A Retrospective Medical Chart Review," , 1115-1120

[43] Robarts et al., "Evaluation of an Advanced-Practice Physiotherapist in Triaging Patients with Lumbar Spine Pain: Surgeon–physiotherapist Level of Agreement and Patient Satisfaction," , 266-272

only those patients who require imaging cannot be understated. It has been found that incidental or trivial findings on imaging can negatively impact a patient's health and recovery while adding unnecessary costs to the healthcare system and increasing wait times.

2.3 Return to Duty

This section will explore the literature published between 2000-2020 as it pertains to the successful aspects of a return-to-work program. To accomplish this, a comprehensive search was conducted for sources examining different programs. The body of literature on this subject is vast. Therefore, this review focused on three secondary sources that completed reviews of the literature: Waddell et al.[44] conducted a review of the literature covering all articles from 2000-2007, Cameron et al.[45] reviewed articles from 2009-2019, and the National Institute for Health and Care Excellence (NICE) guidelines[46] reviewed articles up to 2019 and combined the data similar to a meta-analysis. Although covering different periods, the results show significant overlap demonstrating that the basic principles have not changed over time. With return-to-work programs being almost universally adopted, the question is not if they should be employed but rather what components are most effective. Therefore, no articles were discovered that stated that return-to-work programs are not necessary.

The three comprehensive reviews of the return-to-work literature from Waddell, Cameron, and NICE sought to determine aspects and structures of a successful program

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[44] Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*

[45] Ian Cameron et al., *Best Practice for Vocational Programs*
State Insurance Regulatory Authority,[2020]).

[46] National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*Public Health England,[2019]).

with sustained returns to work. One of the key identified factors with a high level of evidence was a collaborative approach between medical providers, including occupational health, the employer, and a return to work coordinator.[47] Of equal importance is an early return to the workplace.[48] It has been shown that the longer someone is off work, the less likely they will return to that workplace, and they will experience more significant obstacles when returning to work or succeeding with vocational rehabilitation.[49] In fact, workers who are off for more than four weeks have up to a 40% risk of still being off work at one year.[50] Returning a person to work early does not mean their injury is completely resolved. Instead, it means that they are returning to work with known limitations to be accommodated by the workplace. A key factor enabling workers to re-enter the workplace safely is medical employment limitations based on objective findings of what the worker is functionally capable of and what is required of them on the job.[51] This concept is work-focused healthcare, and it has been found that if a worker's limitations are not tailored and specific, it could aggravate their

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[47] Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*; McFeely, "Health at Work: An Analysis of Black's and Frost's Independent Review of Sickness Absence — what can Occupational Therapists Offer?" , 343-345; Cameron et al., *Best Practice for Vocational Programs*
; National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*

[48] Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*; Cameron et al., *Best Practice for Vocational Programs*; National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*

[49] Ibid.

[50] Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*

[51] Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*; McFeely, "Health at Work: An Analysis of Black's and Frost's Independent Review of Sickness Absence — what can Occupational Therapists Offer?" , 343-345; Cameron et al., *Best Practice for Vocational Programs*; National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*

issue and create further barriers to return.[52] Subjective self-reports of a person's functional abilities are not sufficient to develop tailored limitations. Instead, objective assessments are required to adequately determine someone's functional limitations. Unfortunately, it has also been demonstrated that the collaboration required to produce these limitations is rarely done due to a lack of time and resources in primary care.[53]

Reviews by Waddell, Cameron, and NICE suggested that injured workers require early access to a work-focused vocational rehabilitation program to facilitate primary care.[54] This program must be tailored to the individual's functional level and what is required of them at the workplace.[55] Its goal is to help someone with a health problem stay at or return and remain at work. It is an idea and an approach as much as an intervention or a service. While programs are typically organized and executed by an occupational therapist, effective vocational rehabilitation depends on communication and coordination between key players.[56] This communication is particularly true between the individual, the workplace, and healthcare, and a lack of communication has been identified as a significant barrier.[57] While vocational rehabilitation programs have shown to be most effective for workers who have been off work for less than six weeks, they are

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[52] Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*

[53] Ibid.

[54] Cameron et al., *Best Practice for Vocational Programs*; Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*; National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*

[55] Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*; Cameron et al., *Best Practice for Vocational Programs*; National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*

[56] Cameron et al., *Best Practice for Vocational Programs*; Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*

[57] Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*; Cameron et al., *Best Practice for Vocational Programs*

still valid for those who have been on sick leave longer and those still at work but with limitations.[58]

This section reviewed literature finding that once an injured worker presents to a PHCP, they could immediately be referred to an occupational therapist as part of a multidisciplinary return-to-work team. There, the worker will be objectively assessed for their functional limitations, determine their employment requirements, and provide recommendations to the PHCP for medical employment limitations. If the person is limited, they will enter a vocational rehabilitation program, which will provide the PHCP with a regular reassessment to aid in creating progressive medical employment limitations. This process could be facilitated by a return-to-work coordinator who relays information between the health care team, the employer, and the individual. The coordinator will ensure to communicate if there are barriers with the employer for the individual to return to work. Additionally, they are responsible for ensuring adherence by all involved to the return-to-work plan.

2.4 Organizational Culture and Difficulties with Implementing Change

This section will explore the literature pertaining to the difficulty organizational culture can pose to implementing change in healthcare. To achieve this, literature was sought that discussed how organizational culture impacts implementing change. Preference was given to sources that included healthcare in their examination. The conversation on the importance of organizational culture and change spans the last 30

[58] Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*

years. Specifically, in healthcare, organizational culture has been found to impede changes to policies and processes that could significantly improve patient care.[59]

As discussed previously, after a thorough literature search, no articles were found disputing the impact that physiotherapy can have on improving referrals to orthopaedic surgery or a physiotherapist's ability to refer for diagnostic imaging. Likewise, no contrary evidence was found to using occupational therapy in a multidisciplinary group to increase successful return-to-work. Although this lack of contradictory evidence could lead to the assumption that implementing these processes into a healthcare setting would be simplistic, this is likely not the reality as organizational culture has been shown to hinder process changes, even when presented with overwhelming evidence.[60] A deeper understanding of what constitutes culture is required to explain why an organization's culture hinders change. An analysis of the organizational culture in healthcare by Mannion, based on the seminal work of Edgar Schein, suggests that the shared aspects of organizational culture can be described as three increasingly complex levels.[61] The first level is characterized by the visible manifestations or what you see and hear when you enter an organization and is the healthcare system's basic structure. This includes the distribution of roles between the different professions, the established pathways to

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[59] Mid Staffordshire NHS Foundation Trust Public Inquiry., *Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry : Executive Summary*, ed. Robert (Robert Anthony) Francis (London: London : The Stationery Office, 2013).; Dominic Simpson et al., *Measuring and Assessing Healthcare Organisational Culture in the England's National Health Service: A Snapshot of Current Tools and Tool Use*, Vol. 7, 2019). doi:10.3390/healthcare7040127.

[60] Tim Scott et al., "Implementing Culture Change in Health Care: Theory and Practice," *International Journal for Quality in Health Care* 15, no. 2 (2003), 111-118. doi:10.1093/intqhc/mzg021.; Russell Mannion and Huw Davies, "Understanding Organisational Culture for Healthcare Quality Improvement," *Bmj* 363 (2018), k4907. doi:10.1136/bmj.k4907.; Mid Staffordshire NHS Foundation Trust Public Inquiry., *Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry : Executive Summary*

[61] Edgar H. Schein and Peter A. Schein, *Organizational Culture and Leadership* (New York: John Wiley & Sons, Incorporated, 2016).

provide care, and the clinical practices.[62] This level can be referred to in broad terms as how things are done in a healthcare setting. Mannion specifically mentions the divide between primary care, which includes the doctors, and secondary care, which in the military system includes physiotherapy and occupational therapy as part of the visible culture in healthcare.[63] Schein noted that an important point about this level is that it is easy to observe but difficult to understand.[64] For example, the division of labour between two different professions is easily observed, but it could be more challenging to explain why it is divided as such.

The second level is the shared way of thinking within the culture to justify the organization and distribution of roles seen in the first level. This includes values, belief systems, and arguments used to maintain the existing setup and pathways.[65] If the first level is seen as how things are done, this level is how those things are discussed and justified. Schein notes that there can be a disconnect between the beliefs and values that provide meaning to the group and those that correlate with effective performance. When this occurs, espoused values could reflect the desired behaviours but are not reflected in the observed behaviours.[66] This represents the abstract and potentially contradictory values that an organization can hold, such as when a company states they want the highest quality while still offering the lowest cost.

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[62] Mannion and Davies, "Understanding Organisational Culture for Healthcare Quality Improvement," , k4907; Schein and Schein, *Organizational Culture and Leadership*

[63] Mannion and Davies, "Understanding Organisational Culture for Healthcare Quality Improvement," , k4907

[64] Schein and Schein, *Organizational Culture and Leadership*

[65] Schein and Schein, *Organizational Culture and Leadership*; Mannion and Davies, "Understanding Organisational Culture for Healthcare Quality Improvement," , k4907

[66] Schein and Schein, *Organizational Culture and Leadership*

The third level is explained as the organization's unconscious foundation or, as Schein describes, the essence or the basic assumptions that define the culture. It is at this level where ideas concerning appropriate professional roles and delineations reside.[67] The premises at this level are part of the specific professional subculture and can unconsciously be taught during formal education and reinforced during practice.[68] This level denotes the taken-for-granted assumptions that determine a person's behaviour or thought process. If a basic assumption is firmly held in a group, then members will find behaviours based on other premises implausible.

It is recognized that the subcultures within healthcare can be organized in many different ways. The most obvious is by profession, but other departments could also be seen as a distinct subculture. The divisions between these groups become more apparent when competing for resources or status.[69] In the context of this paper, the subculture of primary care in general and physicians more specifically may see the proposed programs as an erosion of their power or status as the hegemony in healthcare. This perception could produce unwarranted resistance as the changes could be seen to run counter to their values and beliefs at all three levels of organizational culture. When this occurs, the change can have an initial destabilizing effect that can cause anxiety and, therefore, resistance.

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[67] Schein and Schein, *Organizational Culture and Leadership*; Mannion and Davies, "Understanding Organisational Culture for Healthcare Quality Improvement," , k4907

[68] Mannion and Davies, "Understanding Organisational Culture for Healthcare Quality Improvement," , k4907

[69] Ibid.

To effect any lasting change to improve services, an understanding of the social dynamics and shared thinking that is the foundation for existing practices is required.[70] This understanding can be further complicated as shared thinking may not be consistent across subgroups; this is where the healthcare system's hierarchy comes into play. The organization of the culture can have a profound impact on how change can be enacted. This is especially true when taking subculture diversity and professional allegiances into consideration.[71] Additionally, it has been found that doctors, as part of their rationalizations to their beliefs, tend to be risk averse.[72] This aversion can make change imposed from a source external to their profession, such as physiotherapy, challenging to accept.

The successful implementation of any change in healthcare is dependent on achieving acceptance of the different subgroups, especially physicians. The approval by doctors is necessary due to the medical dominance of healthcare, which has traditionally been part of the healthcare system's basic organization.[73] This medical dominance is manifested through the professional autonomy of doctors who hold power over allied health occupational groups such as physiotherapy and occupational therapy. This hegemony of the physician does not allow for questioning of the system or processes by

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[70] Mannion and Davies, "Understanding Organisational Culture for Healthcare Quality Improvement," , k4907; Mid Staffordshire NHS Foundation Trust Public Inquiry., *Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry : Executive Summary*

[71] National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*

[72] Roy Smythe, "Why Changing Health Care is Hard," *Forbes Magazine,* Feb 24, 2014, .

[73] John Øvretveit, "Medical Dominance and the Development of Professional Autonomy in Physiotherapy," *Sociology of Health & Illness* 7, no. 1 (Mar, 1985), 76-93. doi:10.1111/1467-9566.ep10831370.

non-doctors; therefore, any change being introduced into the system requires approval from the doctors within that system, further solidifying the hegemony.[74]

The concept of the primacy of the physician is part of the basic assumptions in healthcare, specifically in primary care. It is held that physicians should be the leader of all patient care activities and ultimately responsible for all care delivered. Even with other professions gaining the designation as primary access providers, many processes revert to the physician. It is this basic assumption that influences responses to suggestions or programs which could be perceived as running counter to that assumption. It seems that the concept of the physician hegemony takes precedent over other tenants, such as more efficient patient care. It is not that doctors do not want efficient patient care; rather, it could be that, in their minds, the risks of achieving that efficiency without doctors at the helm would exceed the benefits.

Scott et al.[75] provided suggestions for implementing change in healthcare. Specifically, they identify several strategies that could aid in overcoming resistance to planed culture change. The first strategy concerns ownership of the change. Unless a critical mass of employees accepts and agrees that the change is beneficial, implementation would be difficult, if not impossible.[76] To achieve buy-in, appropriate leadership is vital. Scott suggests a melding of transactional and transformational leadership styles.[77] Rewards could be given to acknowledge behaviours patterns reinforcing the proposed change. Simultaneously, the transformational style could inspire

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[74] Øvretveit, "Medical Dominance and the Development of Professional Autonomy in Physiotherapy," , 76-93

[75] Tim Scott et al., "Implementing Culture Change in Health Care: Theory and Practice," *International Journal for Quality in Health Care* 15, no. 2 (2003), 111-118. doi:10.1093/intqhc/mzg021.

[76] Ibid.

[77] Ibid.

change to reduce apprehension to the evolving roles the different positions would have. The choice of the leader is also important. While they need to employ the proper leadership styles, they need to be perceived as part of the culture.[78] External influence can work against internal reform. While Scott mentioned this concerning influence external to the healthcare system, the same could be valid for a source external to a subculture or profession, attempting to impose change on that subculture. Finally, cultural diversity within an organization can be problematic. Separate work from Child[79] and Scott [80] suggests that one way to accommodate the subculture diversity seen between doctors and physiotherapists is to ensure the programs and policies acknowledge the differences between the professions and create a synergy amongst the two such that the whole is greater than the sum of its parts. The key to success with this strategy is not to challenge physicians' underlying values or beliefs that they hold as true. Another solution is to create programs such that doctors retain the position of the dominant subculture. This recognizes that full integration of both subcultures may be implausible or too significant a change and therefore accepts the right of the dominance of one profession over the other. While this could achieve quicker acceptance of the program, it would lack proper integration of the professions. In the context of this paper, both solutions could be employed with the different programs.

This section reviewed literature finding that the dominance of the healthcare system by a physician hegemony can pose an impediment to policy or program implementation championed by non-physicians. This represents the organizational

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[78] Scott et al., "Implementing Culture Change in Health Care: Theory and Practice," , 111-118; John Child and David Faulkner, *Strategies of Cooperation* (New York [u.a.]: Oxford Univ. Press, 1998).

[79] Child and Faulkner, *Strategies of Cooperation*

[80] Scott et al., "Implementing Culture Change in Health Care: Theory and Practice," , 111-118

culture in healthcare, and physician acceptance will be imperative if any change can be implemented either through a synergistic relationship in the program or maintenance of the physician-dominant scheme.

CHAPTER 3: REHABILITATION MEDICAL ACCESS PROGRAM

3.1 Introduction

The prevalence of musculoskeletal (MSK) conditions in Canadian society has steadily risen over the past 27 years, with 27.8% of the population reporting some sort of MSK disorder in 2017, ranking Canada among the top 10 counties for MSK conditions.[81] When considering the total disease burden (both deaths and years lived with the disease), MSK conditions posed the third largest burden on Canadian society.[82] These trends are disturbing and are potentially worse in the military health care system, where 51.7% of regular force members reported having suffered an acute or repetitive strain injury in the last 12 months, and 52.4% have a diagnosed chronic condition.[83] While some categories of injuries increased with increasing age, there was no difference in the categories of sex, rank, or service element of all of those reporting injuries.[84] The increasing number of conditions will continue to place additional strain on the health care system, resulting in increased wait times, which has been identified as a common barrier to accessing health care.[85] In the military system, the majority of people waited longer than two weeks to see a primary care provider for a routine issue,[86] significantly longer than the two days in the provincial health care system.[87] The wait times are worse when considering appointments

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[81] Justin J. Lang et al., "Global Burden of Disease Study Trends for Canada from 1990 to 2016," *CMAJ : Canadian Medical Association Journal = Journal De L'Association Medicale Canadienne* 190, no. 44 (2018), E1296-E1304. doi:10.1503/cmaj.180698.

[82] Ibid.

[83] Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*

[84] Cameron et al., *Best Practice for Vocational Programs*; Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*

[85] Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*; Barua and Moir, *Waiting Your Turn: Wait Times for Health Care in Canada - 2019 Report*

[86] Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*

[87] Barua and Moir, *Waiting Your Turn: Wait Times for Health Care in Canada - 2019 Report*

with orthopaedic specialists, with a national average of 122 days from referral to an appointment with a surgeon.[88] Prolonged wait times have been shown to have adverse impacts on a person's recovery, mental health, and activities of daily living.[89] Since the Canadian Forces Health Services (CFHS) utilizes the provincial health care system for the majority of specialist appointments, wait times to see an orthopaedic surgeon are similar for a military member and a civilian. Even contracting an orthopaedic surgeon to work in a military health care setting part-time without a triage system has not resulted in a significant decrease in wait times. For the purposes of this section, we will consider a reduction in wait times significant if they realize a 50% decrease.

These wait times are extended when referrals sent to the orthopaedic surgeon do not result in surgery or are found to be more appropriately managed with conservative care. In fact, a large body of literature showed that conservative management had similar or better results when compared to surgery for 70% to 78% of spinal pain issues,[90] 34% to 69% of knee and hip conditions,[91] and 53% of shoulder issues.[92] Due to these findings, triage systems utilizing a physiotherapist to screen all referrals for orthopaedic surgery have been trialled with success. These systems have decreased the number of patients

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[88] Ibid.

[89] Tracey Carr et al., "Waiting for Surgery from the Patient Perspective," *Psychology Research and Behavior Management* 2 (2009), 107-119. doi:10.2147/PRBM.S7652.; Barua and Moir, *Waiting Your Turn: Wait Times for Health Care in Canada - 2019 Report*

[90] Robarts et al., "Evaluation of an Advanced-Practice Physiotherapist in Triaging Patients with Lumbar Spine Pain: Surgeon–physiotherapist Level of Agreement and Patient Satisfaction," , 266-272; J. W. Heywood, "Specialist Physiotherapists in Orthopaedic Triage - the Results of A Military Spinal Triage Clinic," *Journal of the Royal Army Medical Corps* 151, no. 3 (Sep, 2005), 152-156. doi:10.1136/jramc-151-03-04.

[91] Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," , 62-66; Desmeules et al., "Validation of an Advanced Practice Physiotherapy Model of Care in an Orthopaedic Outpatient Clinic," , 162

[92] Helen Razmjou et al., "Evaluation of an Advanced-Practice Physical Therapist in a Specialty Shoulder Clinic: Diagnostic Agreement and Effect on Wait Times," *Physiotherapy Canada* 65, no. 1 (2013), 46-55. doi:10.3138/ptc.2011-56.

seen by the orthopaedic surgeon to only those most likely to benefit from surgery.[93] Reducing the volume of patients seen by the surgeon also reduced the cost and wait time until an orthopaedic consult.

Physiotherapy-led triage for orthopaedic referrals has shown strong agreement with surgeons when selecting surgery or conservative management.[94] Additionally, physiotherapy screening increased the percentage of patients receiving surgery from 30% to 80% for low back issues,[95] from 22% to 91% for knee or shoulder issues,[96] and from 38% to 78% for chronic hip and knee pain.[97] This literature represents a significant increase in efficiency with physiotherapy screening compared to referrals from a general practitioner or an emergency room physician.

While efficiencies were noted with civilian physiotherapy-led triage systems, they did require in-person assessments. Currently, the CFHS employs a comprehensive Electronic Medical Record (EMR), which includes the entirety of a military member's medical file and could serve as a better avenue to complete screening. A collaborative program called the Rehabilitation Medical Access Program for Orthopaedic Surgery

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[93] Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," , 62-66

[94] Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," , 62-66; Brenna Bath, Stacey Lovo Grona and Bonnie Janzen, "A Spinal Triage Programme Delivered by Physiotherapists in Collaboration with Orthopaedic Surgeons," *Physiotherapy Canada* 64, no. 4 (2012), 356-366. doi:10.3138/ptc.2011-29.; Desmeules et al., "Validation of an Advanced Practice Physiotherapy Model of Care in an Orthopaedic Outpatient Clinic," , 162; Razmjou et al., "Evaluation of an Advanced-Practice Physical Therapist in a Specialty Shoulder Clinic: Diagnostic Agreement and Effect on Wait Times," , 46-55; Napier et al., "A Physiotherapy Triage Service for Orthopaedic Surgery: An Effective Strategy for Reducing Wait Times," , 358-363

[95] Bath, Grona and Janzen, "A Spinal Triage Programme Delivered by Physiotherapists in Collaboration with Orthopaedic Surgeons," , 356-366

[96] Napier et al., "A Physiotherapy Triage Service for Orthopaedic Surgery: An Effective Strategy for Reducing Wait Times," , 358-363

[97] Kyla Ashmore et al., "Triage of Knee Pain by an Extended Scope Physiotherapist (ESP) in an Orthopaedic Clinic: A Clinical Audit," *Physiotherapy Practice and Research* 35, no. 1 (2014), 25-32. doi:10.3233/PPR-130034.

(ReMAP (Ortho)) was created and studied to find similar efficiencies in the military by decreasing the number of referrals not resulting in an orthopaedic intervention.

This chapter will describe the creation and implementation of ReMAP (Ortho), preliminary results that have been collected and published, and how it could be one aspect of improving Musculoskeletal Injury (MSKI) management in the CFHS.

3.2 Program Creation and Description

The ReMAP (Ortho) program was developed and implemented at the Canadian Forces Health Services Centre (Atlantic) in Halifax, Nova Scotia, in 2019 as part of a quality improvement strategy to decrease the percentage of referrals not resulting in orthopaedic surgery and thereby decrease the wait time to see the surgeon. The impetus to develop this program was long wait times for surgery, causing extended treatment periods in the Physical Rehabilitation section, including physiotherapy and occupational therapy. Second-order effects to increased convalescence were an extended period in which the military member had medical employment limitations and, therefore, an extended time until they could fully return to work, if at all. This program is based on another similar program utilized to manage wait times for physiatry, the Rehabilitation Medical Access Program for Physiatry (ReMAP (physiatry)). At the time, the group creating the program decided to study the ReMAP (Ortho) program as the referral numbers were more significant. Therefore, the results could be generalized to a larger population.

In 2019, the research group completed a thorough literature review, which demonstrated positive outcomes in some Canadian provincial systems and some international health care and military systems when utilizing physiotherapists to screen

orthopaedic referrals. The research group hypothesized that the CFHS could build on those results by screening through the EMR instead of in-person assessments. This could save clinical time as conducting a file review requires less time than a complete physiotherapy assessment. A screening tool to identify orthopedic referrals that need orthopedic intervention was developed by a collaborative team including physiotherapists, Primary Health Care Providers (PHCPs), and an orthopaedic surgeon using recent evidence and clinical experience. The screening tool consisted of: (1) inclusion and exclusion criteria for referrals, (2) conditions appropriate for a surgical consult, and (3) appropriate diagnostic imaging required for each condition before the consult. Physiotherapists, as the screeners, received training and familiarization with the tool. A referral algorithm was created (Figure 3.1) to help PHCPs decide when to refer to ReMAP (Ortho) or consider a referral for conservative therapy, diagnostic imaging, or another professional. The algorithm included the inclusion and exclusion criteria from the screening tool and a table listing specific conditions appropriate for a surgical consult with the required diagnostic imaging (Appendix A).

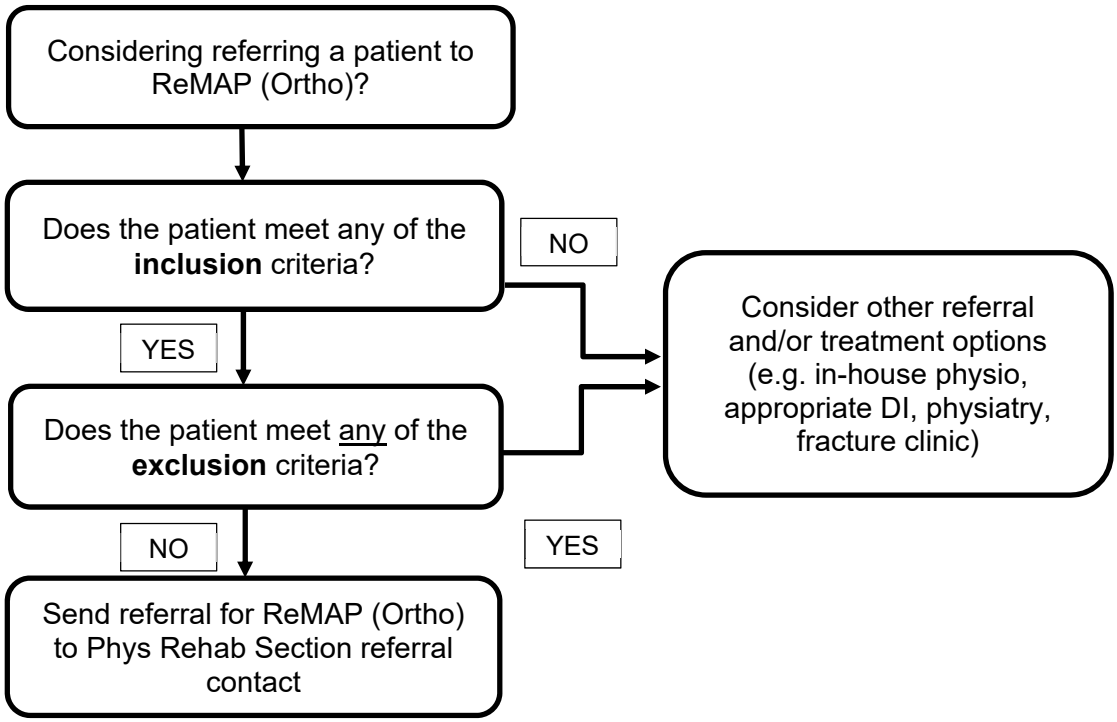

Figure 3.1 Referral Algorithm to ReMAP (Ortho)

Providing this information allowed the referral source to understand the process and ensure they were following the guidelines. For patients referred to ReMAP (Ortho) to be screened as requiring an orthopaedic consult, they must meet at least one of the inclusion criteria while not meeting any of the exclusion criteria, see Figure 3.2.

Screening tool inclusion criteria included:

1. Patient's condition is not improving with rehabilitation, including an appropriate active treatment protocol that the patient has been compliant with; when treated by in-house Physical Rehabilitation services in the past six months;
2. Patient's condition is listed in the *Specific conditions appropriate for surgical consult by orthopaedic surgeon by body part* (Appendix A); and/or
3. Evidence of complete rupture of a structure as per diagnostic imaging;

Screening tool exclusion criteria included:

1. Patient has not received appropriate diagnostic imaging - refer to *Specific conditions appropriate for a surgical consult by an orthopaedic surgeon by body part* (Appendix A) for specific imaging requirements;
2. Patient has a fracture; and/or

3. Patient's condition is more suited for an in-house physiatry referral (e.g. requires procedures such as prolotherapy or corticosteroid injection).

Figure 3.2: Inclusion and Exclusion criteria for ReMAP (Ortho)

Source: Pike, et al. Pilot Study: The effectiveness of physiotherapy-led screening for patients requiring an orthopaedic intervention

Due to the novelty of the screening tool and the processes, two studies were conducted. The first one explored the tool's validity and reliability, while the second examined the program's implementation and if it had a positive impact on the proportion of referrals considered as surgically appropriate. The following section will discuss these studies in detail.

3.3 Results from Studies Conducted on the Rehabilitation Medical Access Program

3.3.1 Validation and Reliability of the Rehabilitation Medical Access Program Screening

Reliability and validity are two key metrics to consider when utilizing a clinical tool. While there is a large body of evidence demonstrating the effectiveness of physiotherapy-led triage programs for managing orthopaedic surgery referrals, all of the research includes physical assessments. Before implementing the ReMAP (Ortho) program, it was imperative to determine the psychometric properties of the new screening tool. To quote directly from the study:

> [T]he primary purpose of this study is to investigate the effectiveness of physiotherapy-led screening using a locally developed orthopaedic screening tool and EMR review to identify patients appropriate for orthopaedic consult. The specific aims were to determine: (1) inter-rater agreement among physiotherapists in triage recommendations using a locally developed screening tool; (2) validity of the screening tool by measuring its sensitivity, specificity, positive predictive values (PPV), and

> negative predictive values (NPV); and; (3) demographic statistics for patients in the study population.[98]

A tool must have sufficient inter-rater reliability to ensure that it will produce similar results regardless of the individual using it. The files of 41 patients were randomly assigned to two physiotherapists for the triage recommendation to measure inter-rater reliability. Two metrics were reported, the percent agreement between the raters and the Fleiss' kappa. The kappa value ranges from -1 to +1. A kappa score of 0 corresponds to agreement occurring by random chance, while a score of +1 represents a perfect agreement between raters.[99] The screening tool's reliability was found to have a moderate agreement with 78% agreement between raters and a kappa of 0.617.[100] Interestingly, this analysis exposed a minor flaw in the tool. When the cases with disagreements resulting from diagnostic imaging recommendations were removed, the percent agreement rose to 93.9%, with a kappa of 0.878 indicating strong agreement.[101] The rationale behind that difference stemmed from conditions included in Appendix A, for which no clear instructions were provided on the necessary imaging. The solution for that problem is to allow Appendix A to be a living document and modified to include diagnostic imaging recommendations when it is found to be lacking. These changes will only serve to strengthen the tool moving forward. Additionally, diagnostic imaging recommendations could be partially based on the orthopedic surgeon's personal

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[98] Mallory Pike et al., "Pilot Study: The Effectiveness of Physiotherapy-Led Screening for Patients Requiring an Orthopaedic Intervention," *Journal of Military, Veteran and Family Health*, no. 7.2 (Forthcoming May, 2021).

[99] Mary L. Mchugh, "Interrater Reliability: The Kappa Statistic," *Biochemia Medica* 22, no. 3 (Oct 1, 2012), 276-282.

[100] Pike et al., "Pilot Study: The Effectiveness of Physiotherapy-Led Screening for Patients Requiring an Orthopaedic Intervention,"

[101] Ibid.

preference, therefore allowing the document to be modified for imaging will account for differences based on the surgeon.

The other metric essential to ensure the integrity of the screening tool is construct validity. That is the degree to which the tool can measure what it claims to measure,[102] which in this case is to identify patients who do not require surgery. To determine the construct validity, 41 patient files were screened by a physiotherapist but also saw the orthopaedic surgeon regardless of the triage result. The recommendation from the surgeon was compared to that of the physiotherapist. The physiotherapist and surgeon's results were categorized as either orthopaedic intervention (encompassing surgery, injection, referral to another specialist, or specialized brace prescription) or conservative management (including physiotherapy, physiatry, diagnostic investigations, or other interventions.)[103] These results allowed for the calculation of the sensitivity, specificity, positive predictive value, and negative predictive value.

The tool was found to have a specificity of 87.5%,[104] indicating it can correctly identify 87.5% of the people who do not require surgery. To state it a different way, the tool will identify 12.5% of the people it screens as requiring surgery when they do not. This is known as a false positive, and in the case of triage for an orthopaedic surgeon, it represents low risk and high efficiency as the surgeon will clarify that 12.5% who do not require intervention. The tool's sensitivity was found to be lower at 64.0%,[105] indicating that it will correctly identify 64.0% of the people who need surgery. The remaining

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[102] L. J. CRONBACH and P. E. MEEHL, "Construct Validity in Psychological Tests," *Psychological Bulletin* 52, no. 4 (Jul, 1955), 281-302. doi:10.1037/h0040957 [doi].

[103] Pike et al., "Pilot Study: The Effectiveness of Physiotherapy-Led Screening for Patients Requiring an Orthopaedic Intervention,"

[104] Ibid.

[105] Ibid.

36.0% of patients would be screened as not requiring orthopaedic intervention and therefore may not receive the most appropriate care. While that result is not ideal, the screening tool is intended to indicate those patients who do not have the proper diagnostic investigations, who have not completed an active, conservative treatment plan, or who would benefit from other conservative management. Therefore, patients screened as not requiring orthopaedic intervention will be redirected to one of those different treatments. If unsuccessful, the patient will receive a direct booking with the orthopaedic surgeon once the investigations are completed, or the conservative management reaches a plateau.

The positive and negative predictive values are used to indicate the tool's practical usefulness in a clinical setting. The positive predictive value was found to be 88.9%[106] representing a high probability that a patient triaged by a physiotherapist as requiring orthopaedic intervention would actually require intervention. The negative predictive value was found to be 60.9%,[107] representing a moderate probability that a patient triaged by a physiotherapist as not requiring orthopaedic intervention indeed does not require intervention. For the care of non-urgent, non-serious conditions, or if the issue to be treated is not expected to progress quickly, a moderate negative predictive value is acceptable.[108] This is true for most orthopaedic conditions seen in military clinics as all urgent cases are sent immediately to provincial hospitals for management.

The results from this study bolster the existing literature on physiotherapy-led triage systems for orthopaedic surgeons by supporting the use of EMRs for triage where

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[106] Pike et al., "Pilot Study: The Effectiveness of Physiotherapy-Led Screening for Patients Requiring an Orthopaedic Intervention,"

[107] Ibid.

[108] Robert Trevethan, "Sensitivity, Specificity, and Predictive Values: Foundations, Pliabilities, and Pitfalls in Research and Practice," *Frontiers in Public Health* 5 (Nov 20, 2017), 307. doi:10.3389/fpubh.2017.00307.

only in-person assessments were completed previously. This tool has demonstrated to have a low probability of producing false positives, in this case, inappropriate orthopaedic consults and interventions, which have been shown to potentially reduce overtreatment, unnecessary costs, and wait times. Allowing modifications to the required diagnostic imaging could further improve this tool. Overall, the ReMAP (Ortho) screening tool has proved to be both reliable and valid.[109]

3.3.2 Effectiveness of the Rehabilitation Medical Access Program

Once a tool has been proven reliable and valid, the next logical step is to determine the impact that tool or program has. In the context of ReMAP (Ortho), that would be to see if the program can positively impact the number of patients receiving an intervention by the surgeon and the wait time to see the surgeon. Physiotherapy-led screening has been shown to increase the surgical conversion rate (SCR) of referrals by an average of 55% compared to those from a PHCP or emergency doctor.[110] All the reviewed studies looked at the SCR. They were not explicit if that included non-surgical treatments that the orthopaedic surgeon can offer, such as injections or specialized brace prescription. For that reason, this study examined the SCR and the orthopaedic intervention rate (OIR), which included all treatment options from the surgeon. Additionally, since all current literature explored programs with in-person assessments, this study sought to add to that body of literature. The primary purpose of this study was

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[109] Pike et al., "Pilot Study: The Effectiveness of Physiotherapy-Led Screening for Patients Requiring an Orthopaedic Intervention,"

[110] Bath, Grona and Janzen, "A Spinal Triage Programme Delivered by Physiotherapists in Collaboration with Orthopaedic Surgeons," , 356-366; Napier et al., "A Physiotherapy Triage Service for Orthopaedic Surgery: An Effective Strategy for Reducing Wait Times," , 358-363; Dave Jovic et al., "Diagnosis and Management of Chronic Hip and Knee Pain in a Tasmanian Orthopaedic Clinic: A Study Assessing the Diagnostic and Treatment Planning Decisions of an Advanced Scope Physiotherapist," *Australian Journal of Primary Health* 25, no. 1 (Mar, 2019), 60-65. doi:10.1071/PY18076.

"to determine the effectiveness of a physiotherapy-led screening program that uses EMR screening to triage patients requiring orthopaedic intervention or conservative management."[111] Specifically, this study compared the SCR and OIR between pre- and post-ReMAP (Ortho) implementation groups.

A retrospective file review was conducted of the two groups to achieve the aims of the study. The pre-implementation group consisted of 119 referrals sent to the orthopaedic surgeon from primary care in the seven months before starting ReMAP (Ortho) in November 2019.[112] The surgeon saw all patients in this group. The post-implementation group consisted of 102 referrals sent to the ReMAP (Ortho) in the eight months after the program was put in place.[113] The physiotherapist screened all files, and only those passing the ReMAP (Ortho) criteria were sent to the surgeon. The records for both groups were reviewed for the surgeon's recommendations. The SCR was calculated by determining what percentage of patients required surgery. The OIR included those who received any surgical intervention, including surgery, injections, or specialized brace prescription.

The SCR increased from 30.6% to 43.1% or 12.8% total from the pre to post-implementation groups.[114] The SCR value for the post-ReMAP (Ortho) implementation is still lower than that found in the literature for other physiotherapist-led triage programs. This difference could be for two reasons. The first difference noted between the programs, as mentioned previously, was ReMAP (Ortho) utilizes the EMR while the

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[111] Lucie Campagna-Wilson et al., "Improving the Referral Process for Orthopaedic Services– Results of the Rehabilitation Medicine Access Program (Orthopaedics)" 2021).

[112] Ibid.

[113] Ibid.

[114] Ibid.

other programs conduct in-person assessments. While screening the EMR is more efficient, it does not allow the physiotherapist to selectively examine specific findings in greater detail or determine, through questioning or assessing the patient, their current state of functioning. The second difference between the programs is that all those reviewed in the literature only screen for a limited number of MSKIs, usually only including one or two joints. ReMAP (Ortho) is a program for any MSKI involving any body part that could be referred to the orthopaedic surgeon. This increased variability in conditions required greater latitude of the screening tool, possibly leading to a lower SCR.

The ORI increased from 47.9% to 63.7% or 15.8% total from the pre to post-implementation groups.[115] This measure could represent a more useful number than the SCR that better reflects the tool's utility. Since orthopaedic surgeons provide more services than just surgery, the OIR will determine the instrument's overall effectiveness and the efficiency of the referrals for the surgeon.

The results from this study also adds to the current body of literature and supports the use of a physiotherapy-led screening to triage orthopaedic referrals. ReMAP (Ortho) has been shown to increase both the SCR and the OIR while drastically decreasing the wait time to see the orthopaedic surgeon. These results support the primary purpose of the study and demonstrate the effectiveness and efficiency of the program.

3.3.3 Preliminary Wait Time Results from the Rehabilitation Medical Access Program

Additional metrics were deemed necessary during program creation. These included the time to screen a referral, the length of time from receipt of a referral to

[115] Campagna-Wilson et al., "Improving the Referral Process for Orthopaedic Services– Results of the Rehabilitation Medicine Access Program (Orthopaedics)"

screening, and the time interval from receipt of the referral to the appointment with the surgeon. The time until surgery was not measured since ReMAP (Ortho) cannot impact the availability of surgical suites, and therefore it is anticipated that the time interval will be the same as in the civilian sector.

The average time for a physiotherapist to screen a referral via the EMR was 15.1 minutes, demonstrating that EMR screening is, in fact, more efficient than a regular in-person physiotherapy assessment is 60 minutes. During the program creation phase, primary care indicated that they wanted the screening completed within one week from receiving the referral. To ensure these timelines were met, a specific time was scheduled in the clinical schedule for screening. Since ReMAP (Ortho) was implemented, screening occurs, on average, 5.6 days from receiving the referral. Finally, using data from the study detailed in section 3.3.2, the average wait for the 119 patients from the pre-implementation group was 140.3 days.[116] The average wait time for all patients seen since implementation was 26.8 days, and this time includes the interval to complete the screening.[117] This change represents a 113.5-day or 81% reduction in the wait for an appointment with an orthopaedic surgeon. These metrics show that using physiotherapists to screen orthopaedic referrals as part of ReMAP (Ortho) is more efficient than in-person assessments seen in the literature while still significantly decreasing wait times to see a surgeon.

[116] Campagna-Wilson et al., "Improving the Referral Process for Orthopaedic Services– Results of the Rehabilitation Medicine Access Program (Orthopaedics)"

[117] Ibid.

3.4 Discussion and Impact on the Canadian Forces Health Services

ReMAP (Ortho) is a valid and reliable way to increase the orthopedic referrals' relevance and, therefore, decrease the wait to see the surgeon. These studies have added to the current literature on physiotherapy-led screening to triage orthopaedic referrals in a couple of meaningful ways. First, it strengthened what has already been reported with the addition that it is effective for a broader range of conditions and body parts and not just for a specialized condition such as programs for knee and hip arthritis.[118] Second, it demonstrated that screening using an EMR is still more efficient and effective than no screening. Even though most provincial or territorial health care systems are not employing comprehensive EMRs at this time, it has been examined as a pan-Canada initiative joining the federal and provincial governments, and it is reasonable to expect EMR utilization to materialize in the future. If and when it becomes a reality, the Canadian Armed Forces (CAF) can be the example with programs such as ReMAP (Ortho) to aid in correcting similar issues.

In the meantime, the CAF could leverage this program into a national strategy to decrease the wait times to see a surgeon and the resulting time off work necessary for that injury. By reducing the recovery time, the CAF will realize increased employability and deployability. Although the results from the program and both studies are promising, further research would only serve to strengthen the model and improve collaboration to break the silos between the Physical Rehabilitation section and the Primary Care department. This future research should focus on the impact of strengthening the diagnostic imaging recommendation in the tool and determine if that will increase the

[118] Aiken et al., "Easing the Burden for Joint Replacement Wait Times: The Role of the Expanded Practice Physiotherapist," , 62-66

specificity, sensitivity, positive predictive value, and negative predictive value. Additionally, as the table and process are refined, it could increase the OIR as the number of patients that the orthopaedic surgeon sends for further diagnostic imaging is further reduced.

A potential challenge to the national implementation of ReMAP (Ortho) could be with the healthcare's organizational culture described in chapter two. ReMAP (Ortho) primarily represents a change to the established pathways to provide care, but it could also run counter to the basic assumptions that define the culture. How the program is perceived will depend on the presentation to the PHCPs. If it is marketed as a program run for and by orthopaedic surgeons, it will only represent a change in the existing clinical pathways. On the other hand, if the PHCPs believe that physiotherapists are the gatekeepers preventing them from referring directly to an orthopaedic surgeon, then it will not fit in with the basic assumptions and values that physicians hold as true. To ensure minimal resistance to the program, educating the PHCPs on civilian equivalents and the studies' results on ReMAP (Ortho) will be necessary. Additionally, framing the program explanation to fit with the organizational culture in healthcare is essential. The following two chapters will discuss two separate programs with similar aims: increasing collaboration, decreasing wait times, and improving the patient experience.

CHAPTER 4: DIAGNOSTIC IMAGING MEDICAL ACCESS PROGRAM

4.1 Introduction

Over the years, physiotherapy has progressed in the CAF with inclusion on sick parade, being considered direct access, and deploying on more operations. These changes are in line with healthcare evolution in general, which has moved to a more value-based and patient-centred system. A vital function of direct access care in this evolved system is the ability to refer promptly to other professionals or services for optimal patient management. Traditionally the authority to order diagnostic imaging has rested with physicians. Continuing with that model does not represent efficiency or a patient-centred system as it would require a physiotherapist to send the patient back to the doctor for a diagnostic imaging referral. This would add appointments to the doctor and additional wait for the patient to receive a diagnosis. Part of the rationale for physiotherapy as a direct access provider was to reduce the burden on primary care. The authority to order diagnostic imaging has been given to physiotherapists in different health systems to achieve this goal. Military physiotherapists in the United States were given this ability over 40 years ago,[119] with the civilian sector following later. The move to increase physiotherapists' capabilities also occurred in New Zealand, Australia, and the United Kingdom. Canada has also started to experience this change in authorities, with seven provinces delegating some level of autonomy for diagnostic imaging. Although the majority of provinces have given this authority to physiotherapists, currently in the

[119] McGill, "Effectiveness of Physical Therapists Serving as Primary Care Musculoskeletal Providers as Compared to Family Practice Providers in a Deployed Combat Location: A Retrospective Medical Chart Review," , 1115-1120

Canadian Armed Forces (CAF) system, physiotherapists are still not authorized to refer for diagnostic imaging despite being considered a direct access provider. A program called the Diagnostic Imaging Medical Access Program (DIMAP) was created to address the lack of referral authority in the CAF and mirror what most provinces have already put in place with tracking, quality assurance, and a governance structure. This chapter will describe why there is a reluctance to readily give referral authority, the creation of DIMAP, and how it could answer the reasons behind the hesitation while working in the CAF medical system.

Part of the trepidation behind expanding the number of professionals with authority to order diagnostic imaging could be in response to issues the system is experiencing concerning over referral for imaging resulting in excessive healthcare costs and detrimental effects to the patient. This section will explore what some of these issues are and how physiotherapists also ordering diagnostic imaging, according to the literature, do not exacerbate the problems; rather, it could aid in resolving them.

The Canadian Institute for Health Information released a report in 2017 describing unnecessary care in Canada. They found that up to 30% of diagnostic imaging performed in Canada was done against the recommendation of expert guidelines or clinical prediction rules.[120] More specifically, in Alberta, 30% of patients with low back pain had at least one unnecessary x-ray, magnetic resonance imaging (MRI), or computerized tomography (CT) scan despite not having any red flags or indications for imaging.[121] Finally, they reported that up to 81% of ordered CT scans were not

[120] Wendy Levinson, *Unnecessary Care in Canada* Canadian Institute for Health Information, 2017).
[121] Ibid.

justified.[122] These inappropriate tests not only increase costs to the health care system, but they have no added value to the patient and do not improve outcomes. Additionally, completing testing when not indicated can be harmful to the patient by exposure to radiation or directing treatment towards a trivial finding which may include further avoidable tests or even surgery.[123] All these factors distract health care providers from providing treatment for the actual cause of the patients' issue as they would have to address a patient's expectations to manage the trivial findings.

Adverse results to over imaging are not limited to the patient. Aside from the apparent costs borne by the health care system, this issue adds extraneous appointments both into primary care and for imaging, increasing wait times which are already reported as excessive.[124] This issue is of particular concern for the CAF, where the majority of patients report waiting more than two weeks for a routine, non-urgent appointment,[125] far exceeding the two days reported in the civilian sector.[126] While it is logical to expect that the level of inappropriate imaging in the CAF is similar to the civilian sector, as most of the Primary Health Care Providers (PHCPs) are civilian, the true extent is unknown due to the lack of measurement or tracking as identified in an evaluation of Military Health care.[127] Nevertheless, solutions already exist to increase the efficiency of the system to

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[122] Levinson, *Unnecessary Care in Canada*

[123] Kendrick et al., "The Role of Radiography in Primary Care Patients with Low Back Pain of at Least 6 Weeks Duration: A Randomised (Unblinded) Controlled Trial," , 1-69; Modic et al., "Acute Low Back Pain and Radiculopathy: MR Imaging Findings and their Prognostic Role and Effect on Outcome," , 597-604; Ash et al., "Effects of Diagnostic Information, Per Se, on Patient Outcomes in Acute Radiculopathy and Low Back Pain," , 1098-1103

[124] Barua and Moir, *Waiting Your Turn: Wait Times for Health Care in Canada - 2019 Report*

[125] Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*

[126] Barua and Moir, *Waiting Your Turn: Wait Times for Health Care in Canada - 2019 Report*

[127] Performance Measurement and Evaluation Committee, "Evaluation of Military Health Care," , no. 1258-3-010 (Nov, 2018).

reduce costs, decrease wait times, and provide patients with the best, evidenced-informed care possible. Clinical practice guidelines were developed partly for that purpose. They were designed to be highly sensitive to ensure that only those who require the test are sent for it.[128] One drawback of these guidelines is that they are primarily for more serious pathology. For less serious conditions, conservative management is typically recommended before imaging. If the patient is not improving with conservative treatment or they have plateaued, imaging may be indicated; this line of rationale positions physiotherapists as a logical referral source for those patients. Physiotherapists have been found to have high diagnostic accuracy, exceeding that of general practice physicians or emergency room doctors.[129] Additionally, when used as a referral source for imaging, physiotherapists refer significantly less than doctors,[130] probably due to their ability to complete more detailed physical assessments. This reduced referral rate translates to decreased health care costs and has been associated with high patient satisfaction.[131]

Even with these findings, not all Canadian provinces have delegated the authority to physiotherapists to order imaging (see Appendix B for the status by provinces

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[128] Dean Deyle, "The Role of MRI in Musculoskeletal Practice: A Clinical Perspective," , 152-161

[129] Aiken, Harrison and Hope, "Role of the Advanced Practice Physiotherapist in Decreasing Surgical Wait Times," , 80-83; Aiken and McColl, "Diagnostic and Treatment Concordance between a Physiotherapist and an Orthopedic Surgeon - A Pilot Study," , 253-261; Moore et al., "Clinical Diagnostic Accuracy and Magnetic Resonance Imaging of Patients Referred by Physical Therapists, Orthopaedic Surgeons, and Nonorthopaedic Providers," , 67-71; Desmeules et al., "Advanced Practice Physiotherapy in Patients with Musculoskeletal Disorders: A Systematic Review," , 107; Desmeules et al., "Validation of an Advanced Practice Physiotherapy Model of Care in an Orthopaedic Outpatient Clinic," , 162; Deyle, "Direct Access Physical Therapy and Diagnostic Responsibility: The Risk-to-Benefit Ratio," , 632-634; Robarts et al., "Evaluation of an Advanced-Practice Physiotherapist in Triaging Patients with Lumbar Spine Pain: Surgeon–physiotherapist Level of Agreement and Patient Satisfaction," , 266-272; Greathouse, Schreck and Benson, "The United States Army Physical Therapy Experience: Evaluation and Treatment of Patients with Neuromusculoskeletal Disorders," , 261-266

[130] Boyles et al., "Physical Therapist Practice and the Role of Diagnostic Imaging," , 829-837; McGill, "Effectiveness of Physical Therapists Serving as Primary Care Musculoskeletal Providers as Compared to Family Practice Providers in a Deployed Combat Location: A Retrospective Medical Chart Review," , 1115-1120

[131] Robarts et al., "Evaluation of an Advanced-Practice Physiotherapist in Triaging Patients with Lumbar Spine Pain: Surgeon–physiotherapist Level of Agreement and Patient Satisfaction," , 266-272

concerning a physiotherapist's ability to order diagnostic imaging). This lack of delegation also holds true for the CAF. In the current system, if a physiotherapist sees a patient on sick parade or during an initial assessment, and the patient is positive for one of the clinical prediction guidelines, the physiotherapist is required to send that patient to a PHCP for a diagnostic imaging referral. This process is also necessary if a patient's treatment plateaus or is not improving with physiotherapy treatment; the physiotherapist must send that patient to book an appointment with their PHCP and could wait longer than two weeks for that appointment.[132] This process could delay the patient's diagnosis and potential treatment, and it could increase complications, increase and prolong their pain or delay return to work.[133] A program such as DIMAP could address the concerns that adding another provider to the list of referral sources for diagnostic imaging may add to the issue. This could be achieved through a proper governance structure and metrics for quality assurance. Therefore, this chapter will describe the creation of DIMAP, how some of the hurdles such as governance and regulation could be overcome and what metrics should be collected to ensure quality assurance.

4.2 Program Creation and Description

The DIMAP program was developed at the Canadian Forces Health Services Centre (Atlantic) in Halifax, Nova Scotia, in 2018. The program was created primarily to bring CAF physiotherapists in line with several provinces that had already delegated authority to physiotherapists for diagnostic imaging and to increase efficiency for the

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[132] Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*

[133] Ontario Physiotherapy Association, "Diagnostics and Education for Physiotherapists" ; Chong et al., "Ordering Diagnostic Imaging: A Survey of Ontario Physiotherapists' Opinions on an Expanded Scope of Practice," , 144-156

system and the patient. At the basic level, DIMAP is about delegating the authority to order diagnostic imaging to select physiotherapists, the goal of which is to increase the appropriateness and speed of referrals while decreasing the burden on primary care and, consequently, their wait times.

During the program's conceptualization, one hurdle to be addressed was for referrals for imaging outside of a military clinic. While receiving delegated authority from the military could work for any imaging completed in a military diagnostic imaging section, the province controls any imaging conducted in the civilian sector. Those provinces that do not have physiotherapy as a referral source would require a doctor as a co-signatory. Additionally, since physiotherapists are provincially regulated, a method to govern and regulate the ordering of diagnostic imaging for bases in those select provinces would be required. Therefore, with those considerations, to ensure that a program is appropriately created and meet the goals mentioned above, specific requirements were outlined. The first requirement is to determine the minimal amount of experience that a physiotherapist should have before being delegated this authority. Through consultation with the physiotherapy trade advisor and examining the provincial requirements, it was determined that for a physiotherapist to be considered for DIMAP, they must have at least five years of clinical experience. Another critical aspect of ensuring quality assurance and that the program goals are maintained is to establish baseline post-graduate training in diagnostic imaging referral and medical screening that should be required to order imaging. This recommendation is again based on what provinces are using and consultation with the physiotherapy trade advisor. Baseline training options are listed in Appendix C.

Since not all provinces have approved physiotherapists as referral sources for diagnostic imaging, a delegation from the Canadian Forces Health Services (CFHS) would be required. While this can be requested through the CAF Surgeon General, it is suggested that a local Senior Medical Authority, such as the base surgeon, be the point of contact as they will be required to co-sign the referrals for imaging not conducted in a military clinic. This delegation could include the authority to order the following types of imaging; x-ray, CT scan, MRI, and ultrasound for Musculoskeletal Injuries (MSKIs). To ensure liability is covered as the authorities differ across Canada, it is suggested at a group be assigned to govern and regulate the program to ensure that physiotherapists who are given the responsibility to order diagnostic imaging are adhering to guidelines and policies. This group could include members from the physiotherapy Professional Technical Network and the CFHS standards cell. All physiotherapists completing referrals for imaging would be required to be rostered with this governance group.

Performance measurement is an essential part of any program to ensure its goals are met and quality maintained. The suggested metrics for DIMAP are listed in Table 4.2. These data will capture the total referral numbers, the length of time and number of appointments to obtain results and the accuracy of the referrals. Additionally, a comparison between clinicians could be conducted, or the information could focus on the accuracy of the physiotherapists in DIMAP.

Table 4.2—Metrics for DIMAP

Outcome Measures	Data collection plan
The number of patients referred for MSK diagnostic imaging, by type and body part, and clinician.	Collected by diagnostic imaging section.
Number of appointments to obtain diagnostic imaging results separated by the clinician type.	EMR review by physiotherapy (would require ethics approval)
The time required for a patient to obtain diagnostic imaging results separated by the clinician type.	EMR and Scheduler review by physiotherapy (would require ethics approval)
Number of significant results, in line with expected diagnosis (true positive)	EMR review by physiotherapy (would require ethics approval)
Number of negative results (i.e. results do not support expected diagnosis)	EMR review by physiotherapy (would require ethics approval)

The conscious selection of these metrics was to gain as much granularity as possible on the effectiveness of the program while not putting any of the burden of collection on primary care. Additionally, the collection points were selected to minimize the administrative load on all clinicians. Once the results of the referral are received, the physiotherapist would be able to complete the statistics spreadsheet while completing their regular patient charting. These metrics should determine if DIMAP is reflective of the current literature by showing the number of positive and negative results while also

reflecting the patient experience by tracking the number of appointments and the time required to receive the imaging results.

Ideally, all physiotherapists in military clinics would have the necessary training and experience to order imaging. In the rare case where a physiotherapist does not meet these requirements, they would consult with a designated physiotherapist on any patients they feel are appropriate for imaging. The designated DIMAP physiotherapist would affirm the patient meets the criteria and then complete the referral to ensure that all data points are collected, and clinicians informed.

A key aspect of DIMAP is the process for how a referral is completed for diagnostic imaging, ensuring all necessary parties are notified. During development, a consultation was conducted with primary care; one identified area for concern was PHCPs not being aware that their patient was having imaging, or worse, that a significant finding was discovered and not transmitted back to the clinician. To rectify that issue, whenever a physiotherapist's referral is sent to the diagnostic imaging section, they would include the PHCP on the referral for information only. This could avoid the requirement for the PHCP to sign all referrals, adding to their workload. The same would occur with the results; they could be sent to the ordering physiotherapist with the PHCP included on the distribution list. In the case of significant findings, the physiotherapist would contact the PHCP directly to discuss treatment options and, if necessary, would direct the patient to book an appointment with that clinician. In the event where the referral for imaging is to be conducted outside of the military clinic, the referral could be sent to the senior medical authority to co-sign. It would then proceed along the same process discussed above to ensure all parties are informed of the referral and the results.

Another concern noted by primary care was physiotherapists' ability to identify presentations that are not Musculoskeletal (MSK) in nature or are beyond the scope of physiotherapy. Even though physiotherapy is a direct access health care provider in all provinces and therefore has proven the ability to adequately screen for serious pathology, DIMAP put several additional factors in place to mitigate this concern. First, all patients seen by a physiotherapist, even through a sick parade, have been triaged to some degree by primary care. Second, as part of their initial degree, physiotherapists receive training in screening for red flags and conditions outside of the physiotherapy scope of practice for which they would refer the patient back to primary care. Finally, selected DIMAP physiotherapists would be required to complete additional training in medical screening (Appendix C). These three mitigation strategies could assure PHCPs that any red flags or serious pathology would be identified and managed appropriately.

Allowing Physiotherapists to order imaging could eliminate the need to send the patient to primary care for a referral removing two appointments in primary care, one to create the imaging referral and one to go over the results with the patient. Additionally, this process would not add appointments to the physiotherapist as they would follow the patient for ongoing treatment. Since the majority of patients in the CAF wait at least two weeks to see a PHCP,[134] DIMAP could potentially reduce the patients' wait time for results by four weeks when comparing the existing process to obtain diagnostic imaging and results to DIMAP (see Figure 4.1).

[134] Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*

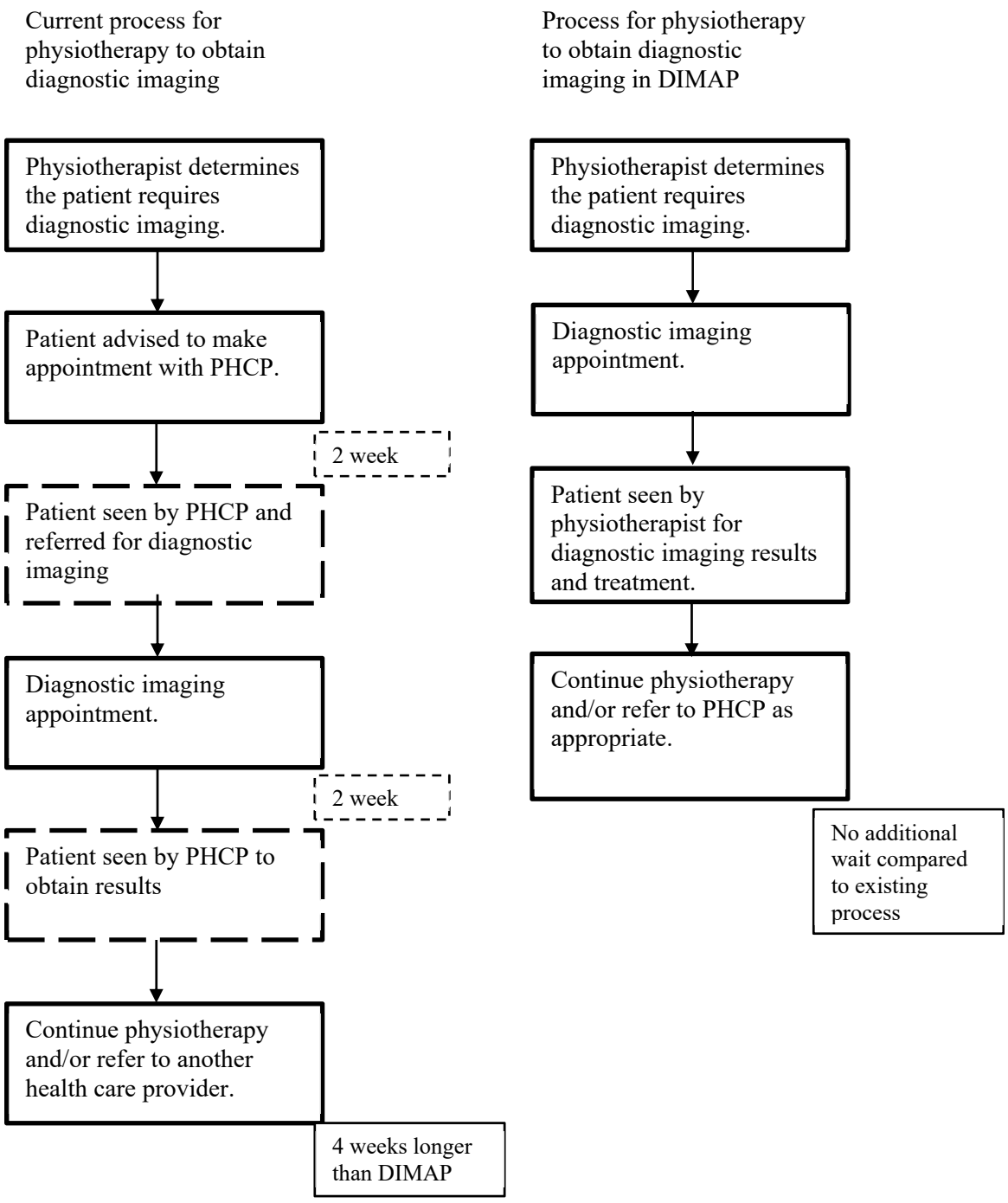

Figure 4.1 Comparison of the process to obtain diagnostic imaging and results

Figure 4.1 compares the proposed process to order diagnostic imaging and obtain the results through DIMAP to the current process. In DIMAP, since physiotherapists could complete the imaging referral, it could eliminate the two appointments required in

primary care represented by the dashed boxes. Each of those boxes represents the two-week wait to see a PHCP cumulating in an additional four-week delay in the current process over what could be realized with DIMAP.

4.3 Discussion and Impact on the Canadian Forces Health Services

The analysis presented in this chapter suggests that DIMAP could consolidate what many provinces have already implemented and create a context that could work in a CAF setting. DIMAP has the added benefit of working as a quality improvement or assurance strategy to decrease unnecessary referrals and improve access so patients could wait approximately four weeks less to receive imaging results. This process could not only decrease the time to diagnosis and ensure that treatment is started promptly, but it could also aid in reducing recovery times and returning the patients to work quicker while increasing the overall employability and deployability of the member. This process also represents increasing efficiency in primary care by removing the two extraneous appointments.

The literature supports the process suggested through DIMAP. As discussed in the literature review presented in Chapter Two, physiotherapists are effective and accurate when ordering diagnostic imaging, completing fewer referrals than other health care providers while adhering to clinical practice guidelines. The review also demonstrated that no adverse events occurred, and patient satisfaction was high when physiotherapists ordered imaging. These facts support the integration of imaging into the authorities and abilities that physiotherapists have at their disposal to aid with patient care.

While the literature supports the precepts behind DIMAP, they could run counter to some of the basic assumptions or values and beliefs from within the healthcare

organizational culture. Historically, doctors were the only health care providers authorized to order diagnostic imaging. Over the years, other professions such as nurse practitioners and physician assistants have been added to that list. Even though they are all in primary care, they were also met with resistance during the process. Adding physiotherapy as yet another profession while falling outside of primary care could further challenge that culture. During the consultation process with primary care, while developing DIMAP, this resistance was apparent. Although informal, some of the responses received revolved around the erosion of the power of the physician as more professions gain access to tools that used to be exclusive to physicians.

It was determined that keeping the doctors informed during the entire process was paramount to address these concerns. This could ensure that they would be aware of when any shared patients were sent for imaging and their results. Another critical factor to focus on for acceptance was the value added to the PHCPs. In the case of DIMAP, that value is removing the two extraneous appointments, which could decrease the workload and, therefore, the wait times on the PHCP. Finally, highlighting the impact on the patient could draw parallels to other values and beliefs of PHCPs, which is putting the patients' health first. Stating that DIMAP could shorten the interval to diagnosis could decrease the time that patient is in pain and could limit secondary conditions.

DIMAP could facilitate other programs such as the Rehabilitation Medical Access Program for Orthopaedic Surgery (ReMAP (Ortho)) but was made separate as there is a specific delegation of authorities and governance issues that must be addressed. Additionally, the functioning of ReMAP (Ortho) is not contingent on a physiotherapist having the ability to order diagnostic imaging. A key tenant of both DIMAP and ReMAP

(Ortho) is to decrease the workload on PHCPs while improving the patient experience by reducing their wait time for specialists, PHCPs, or diagnostic imaging. The next chapter will discuss a final program with similar goals to decrease the workload on PHCPs, increase collaboration, and hasten the return to duty of military members.

CHAPTER 5: RETURN TO DUTY ACCESS PROGRAM

5.1 Introduction

What dictates if a person can successfully return-to-work (RTW) after an injury? Is there one factor that can guarantee success? Unfortunately no, returning an injured person to work is understood to be a complex issue. To address this complexity, collaborative RTW programs comprised of medical, the employer, the employee, and a coordinator from a benefit program are commonplace outside of the Canadian Armed Forces (CAF) but are currently lacking inside the system. These programs have also been extensively researched, and reviews of this literature have identified commonalities that determine the success of these programs.[135] The Return to Duty Access Program (RtDAP) was created to address the lack of an embedded RTW process in the CFHS. This chapter will describe the creation of RtDAP and how it can work within a CAF-created RTW framework.

A key component of success in an RTW program is to have as early a return as possible. It has been found that the longer a worker is away from their place of employment, the lower the chance they will ever experience a successful return.[136] One review of the literature by Waddell found that workers who were off for more than four weeks had up to a 40% chance of still being off at one year.[137] This finding does not suggest that an injured person must be sent back to work without support. Instead, it suggests that they partake in a program with a collaborative approach that involves the

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[135] National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*; Cameron et al., *Best Practice for Vocational Programs*; Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*

[136] Ibid.

[137] Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*

employee, the employer, the medical system, and a coordinator who can organize the various aspects of this complex system.[138] The collaboration between the multiple players has been identified as probably the most crucial aspect of a successful RTW program.[139]

When any part of the system tries to work in isolation or in separate silos, it impedes the ability of the other players to be effective. Therefore, communication is vital to prevent this from occurring. The importance of communication highlights the central role that the RTW coordinator has. They take the information from the medical system and ensure that the employee and employer understand how that impacts the person's ability to work. Additionally, suppose there are issues with the person's return to the workplace or the limitations imposed by the medical system. In that case, the coordinator can organize a case conference to clear up any issues before they seriously impede progress.

The final key element identified in successful programs was that the program and the return to the workplace need to be tailored to each individual and should be work-focused.[140] Specifically, this means that the medical limitations must be informed by what the employee is functionally able to do and what is required of them on the job. Both of these factors need to be objectively measured as subjective self-report of one's abilities is inaccurate.[141] This factor ties back to a collaborative approach where occupational therapists can complete an objective functional assessment of a patient and

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[138] National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*

[139] Ibid.

[140] National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*; Cameron et al., *Best Practice for Vocational Programs*; Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*

[141] E. Innes and M. Hardwick, "Actual Versus Perceived Lifting Ability in Healthy Young Men (18-25 Years)," *Work (Reading, Mass.)* 36, no. 2 (2010), 157-166. doi:10.3233/WOR-2010-1017 [doi].

conduct a job site analysis to determine what is required. They can then recommend tailored medical limitations to the Primary Health Care Provider (PHCP) while providing ongoing reassessment and treatment, changing the recommendations as the patient's function improves. This aspect is important as the National Institute for Health and Care Excellence (NICE) guidelines found that the medical limitations should be provided by the clinician with the most recent information as well as the one who can objectively assess the patient.[142] In most cases, that clinician is the occupational therapist since they see the patient on an ongoing basis for treatment and have the time and expertise to functionally assess the patient.

In recent years the CAF has attempted to use these principles to create a return-to-duty (RTD) program.[143] The CAF RTD program is run through the Transition Group, and its goal is to retain injured and ill members in the CAF.[144] As with the civilian programs, they have identified early referral, modified work plans, and collaboration as the critical tenants of the program.[145] Collaboration is achieved through the RTD coordinator in the Transition Centres located on the CAF bases. These positions ensure smooth and timely communication between the employee, employer (the member's unit), and the medical system. Part of this communication is ensuring that the unit understands the impacts of the MELs and any modifications necessary to the workplace. The RTD program relies on referrals from the medical system to be successful. Unfortunately, the J3 Services for the Transition Group has noted that inconsistencies in the number of referrals have been

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[142] National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*

[143] "Return to Duty Guide for Canadian Armed Forces Members,"

[144] Ibid.

[145] Ibid.

recognized by CAF Transition Group headquarters staff and numerous CAF Transition Centres. It is thought this could be based on a local misunderstanding of the program or a lack of a standard approach from the CAF health services group. To put this in context, since 2018 the J3 services noted that the Transition Centres nationwide have received an average of 1090 referrals per year for the entire CAF; of those, only 37.9% returned to work. A possible explanation for the low RTD numbers within the program could be attributed to Medical Employment Limitations (MELs) that are not progressive or do not match the member's functional abilities. This was alluded to when a recent evaluation of the CAF medical system found that MELs lack standardization, are not timely, and are perceived by the chain of command as inappropriate and imposing too many restrictions to aid with RTD.[146]

To address some of the deficiencies that the CAF medical system has when interacting with the RTD program, the Return to Duty Access Program (RtDAP) was created. This chapter has two additional sections. The first will describe the creation of RtDAP, including what metrics could be collected to ensure quality assurance and how it could work with the Transition Groups RTD program. The second will discuss the impact RtDAP could have on the Canadian Forces Health Services (CFHS) and the CAF, concluding that it could fit in the existing framework and be a value-added resource. This could be realized by providing PHCPs with objective recommendations for MELs, facilitating the successful RTD of CAF members.

[146] "Return to Duty Guide for Canadian Armed Forces Members," ; Performance Measurement and Evaluation Committee, "Evaluation of Military Health Care,"

5.2 Program Creation and Description

The Transition Group developed and implemented its RTD program in 2018. It is recommended that any military member who will have a prolonged course of recovery beyond 30 days should be placed on RTD.[147] The RTD plan includes an agreement with the member and their commanding officer that incorporates the RTD medical recommendations into a plan to reintegrate that member into the workplace, including limitations on the member's function or modifications to the workplace.

The Transition Group's RTD guide identifies that each plan must be tailored to the member with realistic and achievable goals. Additionally, the member's success must be measured with benchmarks that have been established and can be assessed and progressed as necessary. This guide explains that while the RTD plan will vary and be tailored to the individual, the process itself is set and must not change.[148] That process, included in Appendix D, identifies the requirement for a recommendation of MELs and a referral from the PHCP to start the process. A collaborative plan is developed with all stakeholders, and then it enters into a cycle of monitoring and adjusting the plan, and the MELs, as required until the member achieves a successful return. The RTD process is recognized to be multidisciplinary by necessity. This emphasizes that any attempt to return an injured member to duty is bound to fail or be met with difficulty if the stakeholders continue to work in silos and do not fully embrace this process.[149] This

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147 "Return to Duty Guide for Canadian Armed Forces Members,"

148 Ibid.

149 Cancelliere et al., "Factors Affecting Return to Work After Injury Or Illness: Best Evidence Synthesis of Systematic Reviews," ; National Institute for Health and Care Excellence, *Workplace Health: Long-Term Sickness Absence and Capability to Work*; Cameron et al., *Best Practice for Vocational Programs*
; Waddell, Burton and Kendall, *Vocational Rehabilitation – what Works, for Whom, and when? (Report for the Vocational Rehabilitation Task Group)*

siloed work can be seen in the relatively low referral numbers into the RTD program across Canada, suggesting that the CFHS is assigning MELs to a member and leaving the reintegration to the member and their unit without the ongoing communication, monitoring, and adjustment. The RTD guide highlights that "while the RTD recommendation should be guided by what the patient is restricted from doing, it should be further designed with the intent of establishing what duties the member can do and is motivated to do."[150] To achieve this, an objective assessment is required of what the member can do functionally and what their job requires of them. Then goals can be developed, which will lead to a progressive action-orientated plan.

It is understood that the PHCPs are already required to perform more duties than their schedules can accommodate. This is reflected in the increasing wait time for routine, non-urgent appointments, which currently stands at greater than two weeks.[151] Additionally, it is not expected that a PHCP would complete an objective functional assessment of the member and a job site analysis to determine the work requirements. These assessments are suited for an occupational therapist whose focus is to determine a person's ability to increase function, identify actual or potential barriers, and achieve a successful return to work or duty. It is for these reasons that RtDAP was created. The RtDAP program was developed at the Canadian Forces Health Services Centre (Atlantic) in Halifax, Nova Scotia, in 2019 through a collaborative effort with Primary Care. This was precipitated by the Transition Group introduced their RTD program and after an occupational therapist was brought on staff in the Physical Rehabilitation Section.

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[150] "Return to Duty Guide for Canadian Armed Forces Members,"

[151] Theriault, Gabler and Naicker, *Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – Regular Force Report.*

The basic premise of RtDAP is to create a process within the CFHS that will meet the needs of the Transition Group's RTD program and ultimately increase successful RTD numbers. This could be achieved by enabling Primary Care to access the expertise and support of the Physical Rehabilitation Section with regards to customized RTD planning while decreasing the overall burden on Primary Care. Three key positions were identified as essential to achieving this in the medical system:

a. The PHCP is the person ultimately responsible for the patient and therefore is required to approve all recommendations;
b. The primary care nurse will assume the duties of an RTD nurse and be the point of contact in the clinic for the Transition Centre. Additionally, they will ensure open communication is maintained between the PHCP and the occupational therapist; and
c. The occupational therapist is the clinician with the expertise to provide the PHCP with the recommendations for MELs. This will be achieved through functional assessments, job site analysis, and regular updates as work conditioning treatments are completed. Additionally, they can provide advice addressing actual or potential barriers to RTD.

The original iteration of RtDAP attempted to employ a set of inclusion and exclusion criteria, which would generate automatic referrals into the program. After consultation with primary care, it was determined that the assigning of MELs was more nuanced, and it could overwhelm the system if everyone with MELs lasting greater than 30 days that limited their ability to work was referred to RtDAP. Therefore, it was agreed that the PHCP would be the ultimate decider on who entered RtDAP, understanding that they could follow the guidelines of early access and the requirement for tailored MELs. Two tables were created in lieu of inclusion and exclusion criteria and to facilitate primary care's decision-making process. Appendix E contains the first table, which describes the type of evaluations occupational therapists can compete to aid with RTD. Appendix F has the second table and provides examples of patient presentations and their associated occupational therapy interventions to assist with RTD or preclude them from

participating in the RTD program. The proposed interaction for RtDAP within the medical system and also with the Transition Centre is depicted in Figure 5.1

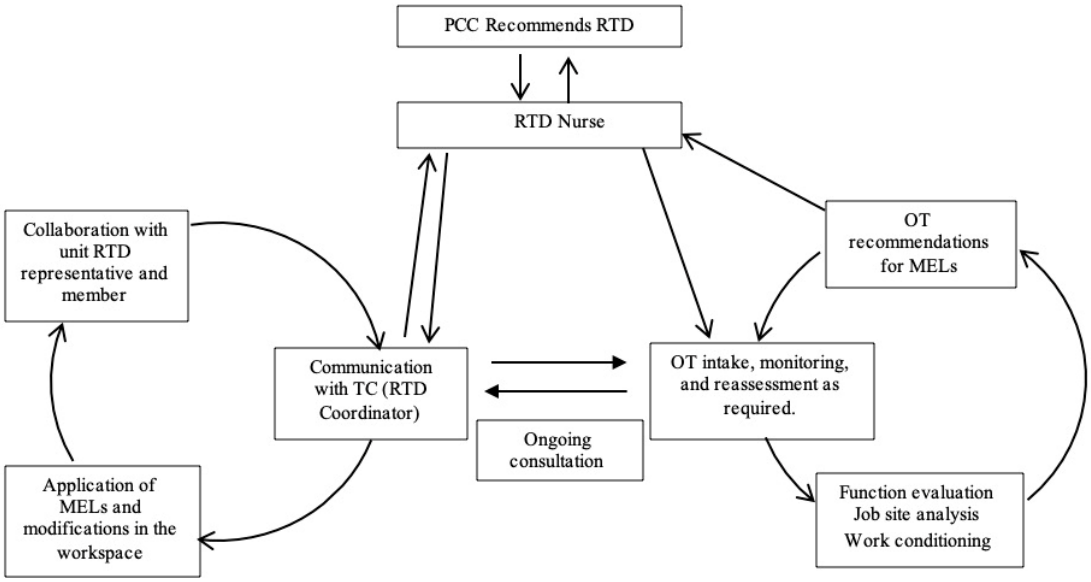

Figure 5.1 Process flow for RtDAP.

This figure depicts the RTD nurse as the central node in the program. They are the liaison between the different actors both within and outside of the clinic. Inside the clinic, they could relay any information to the occupational therapist from the PHCP and work with the occupational therapist to ensure the MEL recommendations and paperwork are appropriate. The RTD nurse also coordinates with the Transition Centre to send all MELs and recommendations. The Transition Centre side of the figure represents their RTD program. The occupational therapist process on the right of Figure 5.1 illustrates the cycle of objective assessment of the patient and possibly workplace while providing recommendations back to primary care based on those assessments. It also depicts the occupational therapist's ongoing treatment and reassessment until the patient has a successful RTD.

RtDAP is accessed at the request of the PHCP and could be a consideration once that clinician determines that their patient will require extended MELs greater than 30 days, a temporary medical category, or a permanent medical category that will impact the patient's ability to work. When this occurs, the PHCP could provide short-term, generic MELs to cover the interval until the occupational therapist can complete their assessment and recommendations. The PHCP will place a note on the MEL form requesting RtDAP, and that form will be sent to the RTD nurse. This part of the process ensures that there is no additional burden to the PHCP. Once the RTD nurse receives the MELs with the request for RtDAP, they will complete the occupational therapy referral form. Upon receipt of the referral and before an appointment is scheduled with the patient, the occupational therapist will screen the EMR to determine the most appropriate assessment and schedule the patient appropriately according to Appendix E. Once the evaluation is complete, the occupational therapist will provide their recommendations for MELs as well as progressions, treatment options, and barriers to the RTD nurse. The RTD nurse will confer with the PHCP and, if they agree, the patient's MELs will be amended. The RTD nurse will then send a referral for the RTD program to the Transition Centre RTD coordinator. From that point forward, the RTD nurse acts as the liaison between the health care team and the Transition Centre. The option remains open for the Transition Centre or the unit RTD representative to contact the occupational therapist to help select modified work duties or ensure that the patient's duties are meaningful and in line with the MELs. The occupational therapist will continue to reassess the member as necessary and provide progress reports and updated recommendations to the RTD nurse as needed, who will ensure they are sent to both the Transition Centre and the PHCP.

Metrics were selected to demonstrate the effectiveness of RtDAP and to ensure quality assurance. Basic workload measures for the occupational therapist will show if RtDAP is being utilized by primary care. These will include the number of referrals into RtDAP and how these are stratified across the different assessment and treatment options available to the occupational therapist. Additionally, the Transition Group will continue to track how many referrals they receive from the CFHS and how many of those referrals result in successful RTD or medical release.

5.3 Discussion and Impact on the Canadian Forces Health Services

The analysis presented in this chapter suggests that RtDAP could be a collaborative program in the CFHS to work with the pre-existing RTD program from the Transition Group. RtDAP could aid PHCPs by providing objective assessments of the patient and the worksite to craft functional, specific MELs that will progress with their abilities. This process could facilitate safe early return to the workplace while decreasing the burden on the PHCPs in crafting meaningful MELs and collaborating with the local Transition Centres.

The literature supports the process suggested through RtDAP. As discussed in the literature review presented in Chapter Two, the collaboration between the medical system, the Transition Centre, the military member, and the unit are crucial. The process suggested in this chapter streamlines that communication and collaboration by utilizing an RTD nurse and an occupational therapist to break the traditional silos. The occupational therapist could also help with crafting specific, measurable, functional, and time-sensitive MELs that change with the patient's functional status providing a significant value-added to the PHCP.

While the literature supports a structure like RtDAP and the basic principles that it is based on, it could pose a problem when considering the organizational culture in healthcare. RtDAP may encounter issues similar to that with Rehabilitation Medical Access Program for Orthopaedic Surgery (ReMAP (Ortho)) but not as significant as the Diagnostic Imaging Medical Access Program (DIMAP), and therefore should be met with less resistance. While DIMAP could challenge the values and beliefs of the culture, RtDAP, since it is not suggesting an expansion of authorities of non-physicians, would probably only run counter to the visible manifestations represented by the existing clinical pathways.

Having PHCPs in key clinical roles of RtDAP with maximum influence over the process is important to overcoming the identified organizational challenges. This was highlighted through the initial consultation process where primary care identified that strict inclusion and exclusion criteria would not be useful to the PHCPs, and they were, therefore, less likely to accept the program with those built-in. Collaborating with primary care and changing the process to give them more control could increase the program's overall acceptance.

The RtDAP process described in this chapter is purpose-built to function with the Transition Group's RTD program with the intent of retaining ill and injured members in the CAF. It has the added benefit of working as a quality improvement or assurance strategy to increase referrals to the Transition Centres and increase the number and proportion of military members achieving a successful RTD. This fits in line with the CAFs goals of increasing the retention of trained members while ensuring they are fully employed.

CHAPTER 6: CONCLUSION

6.1 Programs Summary and the Canadian Forces Health Services

The programs presented in this paper represent an innovative approach to already existing programs in the civilian sector. They attempt to break silos seen in healthcare to create collaborative practice between different professions. The organizational culture in healthcare could potentially be an impediment to program acceptance if it is not considered in the development and implementation plan. The purpose of this paper was met by exploring the literature and rationale behind some of the issues with Musculoskeletal Injury (MSKI) management in the Canadian Forces Health Services (CFHS) while presenting these collaborative programs to address these issues. This chapter will summarize how the different programs could fit into the CFHS while discussing limitation, providing recommendations, and potential future lines of study.

6.1.1 Rehabilitation Medical Access Program for Orthopaedic Surgery

The Rehabilitation Medical Access Program for Orthopaedic Surgery (ReMAP (Ortho)) is a physiotherapy-led triage of the electronic medical record (EMR) designed to decrease wait times and improve the orthopaedic intervention rates (OIRs) of referrals for an orthopaedic surgeon. Two articles written on this program found that the process to screen the EMR takes a quarter of the time of an in-person physiotherapy assessment and has high interrater reliability. Additionally, it has high specificity and positive predictive values with moderate sensitivity and negative predictive values, indicating that the tool is valid and can predict when someone requires conservative therapy, such as physiotherapy, instead of surgery.

As predicted from the literature, the second study found that the physiotherapy-led triage for ReMAP (Ortho) significantly increased the OIRs of the patients assessed by the orthopaedic surgeon while drastically decreasing the wait times by 81%. This resulted in a 26.8-day average wait from referral to an appointment with an orthopaedic surgeon.

Even though the preliminary studies on ReMAP (Ortho) are promising and in line with the literature, the program represents a change to the established pathways to provide care and could run against the cultural values and beliefs. To successfully integrate this program into the culture, ongoing consultation with all stakeholders over a realistic timeline while utilizing appropriate leadership techniques will be essential. It may be necessary to realize that one subculture, namely physicians, will retain dominance over the process in order to obtain sufficient acceptance.

While this program represents a substantial shift in how orthopaedic surgery referrals are processed in the CFHS, it could significantly decrease the wait to see a surgeon with the run-on impact of reducing the time until surgery. Suppose a patient has their appointment and surgery quicker. In that case, the time until their return to duty could also be reduced, which is beneficial to the patient's mental health and maintaining the Canadian Armed Forces' employability and deployability.

6.1.2 Diagnostic Imaging Medical Access Program

The Diagnostic Imaging Medical Access Program (DIMAP) is the delegation of authority to order diagnostic imaging to physiotherapists with specific training. This program is based on decades of research from within Canada, internationally, and from other militaries. The reviewed research found that the detailed physical assessment that physiotherapists complete makes them highly accurate when ordering imaging. Total

referral numbers were found to be lower for physiotherapists when compared to other health care professionals, possibly due to following clinical prediction rules or by having alternative therapies to provide. Finally, there was no increased risk or adverse events reported when physiotherapists ordered imaging.

The addition of this program in the Canadian Armed Forces (CAF) could result in up to four weeks saved, over current processes, for a patient in physiotherapy to receive their results. The concern that this program could put additional liability on primary care clinicians could be tempered by the creation of a regulatory and governance board so that any liability rests with the physiotherapist. Even with a reduced liability for the physicians and a regulatory framework, the current organizational culture in healthcare is anticipated to pose issues for acceptance and integration. Delegating this responsibility to physiotherapists could be perceived as a degradation of power or the scope of responsibility of physicians. Despite the abundance of evidence demonstrating the utility of this process, only seven out of 10 provinces have been able to implement this process, albeit to differing degrees. Jurisdictions, where physicians support physiotherapists ordering imaging, have realized greater implementation, where physiotherapists can order a broader range of imaging, while the opposite is also true. These results speak to the physician hegemony in healthcare organizations where physicians can dictate what rights other professions may have regardless of the impact on physicians.

6.1.3 Return to Duty Access Program

The civilian literature on Return to Work (RTW) programs is expansive and indicates that early access, collaboration, and tailoring the program to the worker are necessary for success. While the CAF Transition Group created a Return to Duty (RTD)

program in 2018 that employs an RTD coordinator to work with the units, the CAF medical system continues to manage RTD in a siloed manner. This means crafting Medical Employment Limitations (MELs) without objective functional assessment of the patient or the workplace and not working collaboratively with allied health care professionals. Additionally, referrals into the RTD program remain low and seem to have regional differences, demonstrating a lack of uniform usage across the CAF.

The Return to Duty Access Program (RtDAP) program proposes a process that could work with the Transition Group's RTD program. RtDAP would use an occupational therapist to work collaboratively with primary health care providers to deliver a functional assessment of the patient and the workspace if indicated. These assessments and progressive MEL recommendations from the occupational therapist could allow the member to return to the workplace earlier, with managed limitations, while being productive and progressively working towards a full return.

The addition of RtDAP into CAF clinics could not only utilize a program already in place but could match the CFHS with what the evidence says is effective for RTD. This could result in more successful and sustained returns to duty, which would increase the retention of trained military personnel. As with the other programs, RtDAP seeks to work synergistically with the primary health care providers while leaving all the power with the physicians to overcome issues in the organizational culture that has not allowed full utilization of the existing RTD program.

6.1.4 The Physician Acceptance Imperative

Although all three programs are heavily supported by evidence, the organizational culture in healthcare could prove to be a severe impediment to implementation. Research

has shown that ideas are less likely to be adopted or entirely rejected if they are developed exclusively outside of primary care. For that reason, collaboration was sought on all programs, but additional support from the senior levels of the CFHS could aid in the implementation in all CAF clinics. This support could address concerns at the different levels of organizational culture described by Edgar Schein. Since the Surgeon General, as the clinical lead for the CFHS, determines how things are done in the clinics, amplifying direction from that level to primary care to adopt these programs could be considered consistent with the current organizational culture.

Additionally, seeking support and approval from the leadership would also address the second level of organizational culture, which is how current clinical pathways are justified. It was noted in Chapter Two that at this level, there could be a disconnect between the beliefs and values that provide meaning to the group and those that correlate with effective performance. Acceptance of these programs by the Surgeon General could aid in closing any gap between effective performance and beliefs. It would provide an explanation, from a doctor's perspective, of why these programs are important to the military healthcare system. Securing acceptance from the highest-ranking physician in the military and having them request the implementation of the programs in the clinic could aid in dispelling the fear of an erosion of power by other physicians or the perception that a profession outside of primary care is telling physicians how to manage patients. This speaks to the third level of organizational culture and would address the hegemony of the physician. This method could also meet the suggestions by Scott to overcome resistance to planned cultural change, namely strong leadership that is part of

the physician culture that could assure everyone involved that primary care would retain priority in decision making.

These programs could increase the evidence-informed care that the CAF provides its members while also increasing collaboration between different sections, thereby breaking the silos of care and maximizing the healthcare system's potential. The results of these programs would not only help the CFHS, but it could enable the entire CAF by increasing the employability and deployability of its injured members

6.2 Limitations

Neither DIMAP nor RtDAP have been explored to the level of ReMAP (Ortho), which has published results proving its efficacy. Therefore, the benefits from those programs are theoretical at this point. The plan is for research to commence on these programs, but the data will not be available for this project.

Even though the results from ReMAP (Ortho) are promising, they represent only one clinic from one base, which decreases the generalizability of the results to the CAF as a whole. These preliminary results could be used as justification to implement the program in other clinics to increase the generalizability and determine if ReMAP (Ortho) is viable across the CAF.

While collaboration and consultation were sought with primary care for all three programs, they were all still conceptualized and created by the Physical Rehabilitation section. These programs are at a disadvantage for acceptance and implementation by Primary Health Care Providers (PHCPs) when considering healthcare's organizational culture. It is anticipated that DIMAP will be met with the most resistance as it is looking to change the authorities and responsibilities of physiotherapists, which could challenge

the culture's values and beliefs. Both RtDAP and ReMAP (Ortho) represent a reorganization to the existing clinical pathways, which could still present challenges but should be more manageable. Leadership and adopting realistic timelines will be crucial factors in overcoming potential obstacles and allowing for assimilation of the programs and new clinical pathways.

6.3 Potential Future Research

Even though ReMAP (Ortho) has been studied for reliability, validity, and preliminary implementation results, there remain potential lines of research that could aid in refining and strengthening the program. Specifically, wait times should be compared before and after implementation of ReMAP (Ortho) on a base to control any confounding variables encountered if doing a between base comparison. Another interesting area to examine would be comparing results between a base with an orthopod on staff against one who outsources to a surgeon. Finally, a qualitative study could look at the impact ReMAP (Ortho) has in a COVID environment. In areas that allow for elective surgeries, reducing in-person contact is essential to reducing the spread of the virus. The virtual nature of screening for ReMAP (Ortho) provides for retention of the benefits found with in-person triage while removing the patient contact. Additionally, increasing the orthopaedic intervention rate ensures that only those who require an appointment with the orthopaedic surgeon have one, therefore reducing unnecessary patient contacts.

Since neither DIMAP nor RtDAP have been studied to this point, they would benefit from an initial examination of their utility. Ideally, this would include a multi-centre trial to maximize the generalizability to the CAF while identifying limitations in the program design. Specifically, for RtDAP, while examining the metrics discussed in

Chapter Five would be important, how the program impacts the Transition Centre could also provide valuable information.

6.4 Recommendations

For ease of use and reference, a point form list of recommendations is included in Appendix G.

6.4.1 Canadian Armed Forces Base Implementation:

Due to the study results conducted on ReMAP (Ortho) and the preponderance of the evidence, it is suggested that this program be considered for implementation on all bases with integral physiotherapy to begin by 2022. Implementation should be split to aid with data collection and quality assurance. Some bases could move to full implementation, while other select bases could start with data collection on wait times and orthopaedic referral outcomes. This data collection could continue for 12 months, after which ReMAP (Ortho) would begin with the same metrics being collected for 12 months after implementation for comparison. Even though the program was studied with an in-house orthopaedic surgeon, it is structured to also function with an offsite surgeon. So that should not impede implementation, in-fact bases without an orthopaedic surgeon on staff may benefit more from this program and could therefore be prioritized for integration into existing clinical practices. All necessary standard operating procedures and data collection sheets are already created and could be disseminated.

It is established that evidence from existing literature backing a program is not sufficient for acceptance and implementation; therefore, it is suggested that a trial be conducted on both DIMAP and RtDAP. These trials could provide valuable information on how these specific programs, based on the evidence, could function with the particular

constraints and enablers in a military environment. Additionally, the trials would set the groundwork for ongoing quality assurance programs by identifying important metrics and limitations in the program design. Support from the CAF Surgeon General could aid in overcoming some of the organizational cultural issues that might hinder progress. Additionally, collaboration could be sought with the Transition Group for RtDAP to ensure all stakeholders are involved in improving the process. A business case for a trial has been created for DIMAP, and quality improvement charters for both programs are in the process of completion.

Due to the potential regulation and governance issues mentioned in Chapter Four with DIMAP, it is suggested that the program be first implemented for a trial at bases in Ontario or Alberta. This could occur by 2022 since physiotherapists already have the authority, under their provincial licenses, to order diagnostic imaging, which would negate the requirement for a local senior medical authority to sign off on referrals. Other bases could be included by 2023, which would allow for a CFHS governance and regulations board to be created.

The lack of a requirement for a governance and regulations board for RtDAP means the timeline for implementation could be shorter than DIMAP. It is recommended that before implementation, consultation be completed with the Transition Group and local Transition Centers to determine which bases have already established a network of RTD unit representatives. These unit members could facilitate the integration of RtDAP on the bases as the framework for the RTD program would already be in place. The program could be started on these bases by 2022 while simultaneously work could be done in collaboration with local Transition Centres on other bases to encourage units to

assign RTD representatives. Follow-on implementation on the remaining bases could occur by 2023.

6.4.2 Data Collection and Metrics

The following data collection and metrics are suggested for ReMAP (Ortho)

- A comparison between a base with an orthopaedic surgeon on staff versus a base that outsources all orthopaedic surgery referrals;
- Ongoing data collection should continue for quality assurance and to strengthen the results found in the previous two articles. This could include wait times until an appointment with an orthopaedic surgeon, the time interval from referral to screening, and the length of screening. That final metric will give an idea of the time required by a physiotherapist to complete the screening and therefore the impact that screening could have on the physiotherapy section as a balance measure; and
- Recommendations from the orthopaedic surgeon, stratified by body part, should be collected to aid in tailoring programs and services to the needs of that base or element.

Implementing DIMAP into clinics could have the added benefit of collecting data on different referral sources and patterns to gain some granularity on the rationale behind high referral rates and costs. The following data collection and metrics are suggested for DIMAP

- The number of physiotherapists who have completed the suggested training to order diagnostic imaging;
- The number of patients referred for MSK diagnostic imaging, stratified by body type and the clinician type;
- The number of appointments as well as the time required to obtain the diagnostic imaging results, separated by clinician type, would indicate if the program is meeting its aims; and
- The number of referrals resulting in a positive or negative finding could indicate the accuracy of the referral source. This could be captured for all clinician types to give overall accuracy or just physiotherapists to not question the organizational culture and competence of primary care clinicians.

The RTD program from the Transition Centre is already collecting meaningful metrics on the number of people returning to work and in the program. The CFHS could add to that dataset by collecting the following metrics:

- Basic workload measures for the occupational therapist can describe program utilization. Ideally, this would be stratified across the different assessment and treatment options from the occupational therapist to act as a quality assurance measure. Additionally, the referrals to RtDAP could be separated into long term MELs, temporary categories, and permanent categories to determine when patients are entering the program and address early access and see if it changes over time;
- The overall number of referrals from the CFHS to the RTD program;
- Length of time a patient is in RtDAP and the RTD program;
- The number of patients in RtDAP who successfully RTD;
- The number of patients on a temporary or permanent category should be tracked for each base as well as the number of patients that come off of category; and
- The proportion of medical releases related to MSKIs should continue to be tracked to determine if there is a long-term change. This metric could also be separated by base, and bases running RtDAP could be compared to those that are not.

6.4.3 Support Required

Support from the leadership of the CFHS, specifically from the Surgeon General through primary care, would help with overcoming any obstacles presented by the organizational culture. Also, as seen in the literature review, consistent messaging is essential for acceptance by everyone involved. A program team could help achieve consistency in messaging and decrease challenges for the implementation with regional champions. This team should be appointed by a senior authority in primary care consisting of a primary care lead and a physiotherapy lead. This team could also work with the Transition Group and the individual bases to ensure consistency with the overall program intent while also problem-solving and addressing specific local needs or differences.

6.4.4 Program Impact on COVID

Although not implicit in the original intent, these programs function exceptionally well with the added protection required during COVID. The added benefit of not requiring patients to report to primary care for a diagnostic imaging referral, as seen in

DIMAP, is to reduce in-person appointments. Additionally, the virtual screening of the electronic medical record in ReMAP (Ortho) is preferable when COVID is a consideration. It increases the likelihood that the patients seeing the orthopaedic surgeon will require an intervention. Even RtDAP reduces appointments needed in primary care since the occupational therapist can complete the functional assessments and draft recommendations for MELs for review by the PHCP.

6.5 Conclusion

This paper has detailed three different but interrelated programs that could change how the CFHS manages MSKIs. These changes could increase efficiency, seen in more relevant referrals and decreased wait times for surgical appointments from ReMAP (Ortho). The efficiencies realized through DIMAP could help the physiotherapists screening for ReMAP (Ortho) expedite missed diagnostic imaging in the orthopaedic referral while also decreasing wait times for any imaging required for a patient in physiotherapy. Finally, the occupational therapist in RtDAP could work with the Transition Group's RTD program to help all patients, those going through surgery or any other MSKI with significant MELs, to successfully return to duty. This could be achieved by allowing the collaborative team to tailor the return to the workplace, and the associated limitations, to each patient. These three programs cover the spectrum from the investigation of injuries, DIMAP, through specific treatments, ReMAP (Ortho), to a full return to duty, RtDAP.

An essential consideration to aid with overcoming these organizational cultural challenges is to obtain support from the Surgeon General as the clinical lead for the CAF and the Commander of the CFHS as the administrative arm. Once that support is secured,

to maintain accountability and gain buy-in, clinics should be sought that want to attempt this project and act as champions for ReMAP (Ortho). While that is occurring, approval and support for DIMAP and RtDAP could be given for a trial and data collection to start on one base at a minimum. This data collection could be done in conjunction with the Quality Improvement cell and the Surgeon General's Health Research Program to increase legitimacy. Once sufficient data has been collected, if the results are favourable, the programs could follow the staged rollout as with ReMAP (Ortho), seeking champions on several bases to increase the programs' generalizability. If issues are noted with the programs, they could be adjusted ad a second data collection conducted.

If the leadership does not support these actions, they can expect the wait times for orthopaedic surgery to continue to increase as they have for the last five years. Additionally, patients will continue to wait unnecessarily for diagnostic imaging, further increasing the wait time to see a PHCP and the patient's recovery, meaning they will be on MELs longer. Finally, RtDAP will allow primary care to avail themselves of occupational therapists' specific skill set to provide objective assessments for MEL creation. The program will also maximize the collaboration with the Transition Group's RTD program. By utilizing accurate functional information to craft MELs and working with the RTD program, RTD rates could increase, decreasing patients with long-term MELs and the number of medical releases.

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Appendix A: Specific Conditions Appropriate for Surgical Consult by Orthopaedic Surgeon by Body Part

Shoulder	
Basic DI required: X-ray AP, axillary, and Y views	
Condition	**Additional Diagnostic Imaging Required.**
GH dislocation	
First dislocation for overhead athlete or patient with overhead work requirements	MRA required, if bone loss CT with 3D reconstruction required
Recurrent dislocation with prior repair	MRA required, if bone loss CT with 3D reconstruction required
Supraspinatus/general rotator cuff	
Calcific tendonitis, bursitis/tendonitis, chronic tendinopathy without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months, NSAIDs ± injection	
Acute injury, patient over 35 y/o and presence of mechanism of injury (urgent referral)	MRI required
Grade 1 or 2 tear with limited function and without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months	MRI required
Grade 3 tear	MRI required
OA	
Moderate to severe OA with limited ROM	
OA with adequate ROM but unresponsive to active rehabilitation protocol after 3-6 months, NSAIDs ± injection	
Other	
AC joint injury without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months, NSAIDs ± injection	X-ray AC joint view required
Labral tear without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	MRA required
Frozen shoulder: • In frozen and thawing phases without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	

• In freezing phase consider urgent referral for cortisone injection	
Elbow	
Basic DI required: X-ray AP, lateral, and oblique views	
Condition	**Additional Diagnostic Imaging Required.**
Tendinopathy or grade 1 or 2 tear without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months, NSAIDs ± injection	MRI required
Instability (dislocation or recurrent subluxation)	MRI required for recurrent injury
Loose body with limited function and ROM	
Olecranon bursitis or spur without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	
OA with limited function and ROM without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	
Wrist and Hand	
Basic DI required: X-ray AP, lateral, and oblique views	
Condition	**Additional Diagnostic Imaging Required.**
Scaphoid fracture not healing properly after 4 months	Scaphoid and fist views required
Tendinopathy or grade 1 or 2 tears (ECU, De Quervain) without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs ± injection	
OA with limited function and ROM without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	
Conditions to refer directly to plastic surgeon	
Chronic carpal tunnel syndrome without significant change to recorded outcome measures with conservative management after 3 months	
Trigger finger affecting function	
Dupuytren's contracture affecting function	
Hip and pelvis	
Basic DI required: X-ray AP pelvis, frog leg, and Dunn views	
Condition	**Additional Diagnostic Imaging Required.**
Intraarticular:	MRA required

femoro-acetabular impingement (FAI) or labral tear without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	
Periarticular: • trochanteric bursitis, muscle strain, tendinopathy or grade 1 or 2 tendon tear (adductor, hamstring, RF, sartorius) without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs • acute hamstring tear from ischium (urgent referral)	MRI required
SI joint injury without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	X-ray Lx spine and SI jt required no frog leg or Dunn views required
OA with limited function and ROM without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	no frog leg or Dunn views required
Knee	
Basic DI required: X-ray standing AP and lateral views	
Condition	**Additional Diagnostic Imaging Required.**
Tendinopathy or grade 1 or 2 tendon tear (patellar tendon, quadriceps, ITB) or PFS without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	X-ray skyline view required if PFS
Grade 1 or 2 ACL, PCL, LCL, MCL sprain or meniscus tear without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	MRI required
Grade 3 ACL, LCL, MCL sprain	MRI required
Acute meniscus tear causing knee locking, catching, spasm and/or major effusion (urgent referral)	MRI required (if possible)
Patella dislocation or recurrent subluxation without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	X-ray skyline view required
OA with limited function and ROM without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	X-ray flexed knee view required X-ray skyline view required if patellofemoral OA
Ankle and Foot	
Basic DI required: X-ray ankle AP, lateral, and oblique views	

Condition	**Additional Diagnostic Imaging Required.**
Tendinopathy or grade 1 or 2 tendon tear (tibialis posterior, tibialis anterior, peroneal tendons) without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	
Grade 3 tear of tendon or ligament with instability (ATFL, CFL, deltoid ligaments)	MRI required
OA with limited function and ROM without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	
Arch problems, Morton's neuroma, metatarsalgia without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	X-ray foot required
Bony deformity not managed by 3-6 month trial of orthotics	X-ray foot required
Spine - cervical and lumbar	
Basic DI required: X-ray AP, lateral, and oblique views	
Condition	**Additional Diagnostic Imaging Required.**
Pain and likely partial/full disc herniation with radiculopathy (including weakness and numbness)	MRI or CT required
Radiating pain to extremities without significant change to recorded outcome measures with active rehabilitation protocol after 3-6 months and NSAIDs	

Appendix B: Status by Province of Physiotherapists' Ability to Order DI

Province	Status	Link
Newfoundland & Labrador	- No reference to support PT can order any DI	https://nlcpt.com/wp-content/uploads/2013/09/NLCP-Standards-of-Practice-for-Physiotherapists.pdf
Prince Edward Island	- No reference to support physiotherapists can order any DI	https://www.peicpt.com/content/page/about_policies
Nova Scotia	- Can order x-rays if approved by District Health Authority in specific instances - Not clearly regulated or standardized	https://nsphysio.com/for-members/member-faqs
New Brunswick	- 2012: can order MRI and US – onus on physio to ensure trg; - Link is from an article – no info on College site	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4407136/#:~:text=In%20New%20Brunswick%2C%20professional%20legislation,practitioners%20to%20ensure%20competency%3B%20R.
Quebec	- Can order x-rays if they have certificate from the College (may require extra trg), patient presents with traumatic MSK injury that occurred less than 72hrs prior	https://oppq.qc.ca/membres/faq/#/16705
Ontario	- Can order x-ray/US/CT/MRI when the authority has been delegated to them - Awaiting final approval from province to be able to perform independently	https://www.collegept.org/registrants/practice-advice/physiotherapy-scope-faqs
Manitoba	- Order x-ray MSK only	https://physiotherapy.ca/sites/default/files/8648_role-of-physiotherapy_rpt.pdf
Saskatchewan	- Cannot currently - Scope of Physiotherapy Practice Committee indicated that this could be a role for physios but would require lobbying and support from other professions (2013)	https://www.scpt.org/document/3526/Scope_of_PT_Practice_Task_Force_Report_-_with_Appendices.pdf

Alberta	- Can order MRI/x-ray/US – require U of A course and 5 yrs practice - Recently suspended by provincial government for both chiros and physios (not covered by insurance)	https://www.physiotherapyalberta.ca/employers/rules_for_physiotherapists
British Columbia	- Ministry of Long Term Care announced intent to expand physio scope to include ordering x-ray, US and lab tests in 2017	Broken link – google search link to Policy Option page, unable to open page

Appendix C: Baseline training options for DIMAP

Training for Diagnostic Imaging
2. University of Alberta – REHAB 570 Diagnostic Imaging for Physical Therapists; 3. Key Clinical Skills – Medical Diagnostic Imaging Course; or 4. Evidence in Motion – Radiology / Essentials of Musculoskeletal Imaging.
Training for Medical Screening
1. Key Clinical Skills – Medical Screening Course; 2. Evidence in Motion – Essentials of Medical Screening in Physical Therapy Practice; or 3. Previous completion of a course of study certifying the participating PT as a Fellow of the Canadian Academy of Manipulative Physiotherapy (FCAMPT).

Appendix D: The RTD Process

RTD plans will vary in accordance with the member's MELs, the goals established and support and resources available to the member. However, the RTD Process cannot vary and must be followed to ensure RTD plans can be implemented efficiently and effectively. The RTD Process follows a series of steps that are essential:

a. Recommendation. The member's PHCP assigns MELs and recommends member be placed on RTD;

b. Referral. The member will be referred to the local TC RTD Coordinator or directly to their Unit RTD Representative to receive an information briefing on the RTD Program and familiarization with the support services available to them;

c. Intake. The TC RTD Coordinator or Unit RTD Representative explains the RTD Process and the purpose of the RTD Plan to the member, including the member's roles and responsibilities, as well as the services provided by the TC;

d. Consult. The TC RTD Coordinator, the member and the member's Unit RTD Representative discuss the member's RTD recommendation with a view to creating an RTD Plan that respects MELs but focuses on building capacity to eventually remove those limitations;

e. Plan. The plan is developed collaboratively with the member, the professional clinical team, the chain of command, and the TC RTD Coordinator and/or the Unit RTD Representative. The plan incorporates the recommendations, goals and objectives of the identified stakeholders. The RTD Plan is submitted to the member's chain of command for approval;

f. Placement. Most members are normally placed within a few weeks of receiving a RTD recommendation. The above steps take time and must be done with the principles of RTD in mind. Placements can be in unit, out of unit, or within a civilian work environment;

g. Monitor. The TC RTD Coordinator or the Unit RTD Representative on behalf of the Chain of Command will conduct regular follow-up with the member and his/her duty placement employer or supervisor to assess the member's progress;

h. Adjust. The RTD plan will be reviewed and adjusted accordingly, especially with any changes in the member's MELs or the RTD recommendation from the PHCP;

i. Monitor. Follow-up continues and progress is evaluated for potential to be returned fit full duties. The TC RTD coordinator or the Unit RTD Representative also assists the member in preparing for the member's actual reintegration into the unit; and,

j. Return or Transition. Member is to be considered on RTD until such time as they are declared fit full duties or a decision is made to transition from the CAF in which case they should be referred to the TC RTD Coordinator to begin transition planning.

Appendix E: Types of Evaluations Offered by the Occupational Therapist

Type of Evaluation	Description
Functional Evaluation (FE) ** CAF OTs will not conduct or provide FEs for releasing members to establish suitability for civilian employment. This is available through Veterans Affairs Canada (VAC) or Vocational Rehabilitation.	A FE is a comprehensive objective assessment of a person's functional abilities (physical, cognitive, or both). The purpose of a FE is to objectively identify impairments or disabilities and how they might affect a member's ability to return to full duties. Trade-specific simulated work tasks and graded universality of service (UoS) tasks are used to identify a member's current ability to meet job demands. FEs are used to provide objective information for: • Baseline assessment for a rehabilitation program • Planning for RTD • Identifying and modifying MELs to allow for progressive RTD and to minimize risk of re-injury <u>Example:</u> A member presents with concerns about their ability meeting trade-specific job demands, particularly their ability to wear firefighting equipment on ship. Members can be referred and assessed for ability to don/doff Dräger, ascend/descend stairs in full gear, and simulate hose handling. Specific MELs will then be recommended based on performance in the assessment. <u>Contraindications:</u> • Pregnancy • Non-weight bearing or other post-op restrictions • Awaiting further investigations
Work Site Evaluation	Work site evaluations provide a more accurate assessment of functional abilities in real work environment. Work site evaluations may be recommended if a work simulation is not sufficient or if trade-specific task statements differ significantly from the actual tasks performed at work. Details of a work site evaluation could include: 1. Job Site Analysis (JSA): Used to determine the most accurate demands of the position and job a person is in. 2. Ergonomic Assessment: Used to identify ergonomic hazards and make recommendations on adapting a member's work equipment and environment IOT minimize the risk of repetitive strain injuries or re-injury. 3. Job coaching: Provide on-site education on proper body mechanics, alternative strategies, and behavioural

	modifications. This allows members to practice skills and improve confidence. Job coaching may also provide education to the member's chain of command (CoC) regarding strategies to reduce work related injuries. Example: A member presents with restricted range of motion and it is interfering with their ability to perform their job. As a result of the complex environment they work in, the work environment cannot be simulated in a clinic. A work site visit allows for assessment of true functional abilities/restrictions and helps the OT find alternate strategies for the patient.
RTD Planning and Scheduling	A RTD plan allows objectives to be met gradually (based on hours and duties) until the member can return to full duties. RTD plans are unique to each member. The RTD plan will take into consideration a member's functional abilities and is reassessed throughout rehabilitation. As a result, progressive modifications can be made to MELs as a member develops work tolerance. An OT will meet with the member regularly to review the plan and monitor symptoms. Example: A member is working towards returning to duty. They do not have a plan and as a result have not made any progressions in their participation at work. This has led to CoC discord and may result in a posting to the TC. An OT RTD planning and scheduling session could lead to meaningful MELs that allow the member to stay employed within unit lines.
Work Hardening and Simulation	Work hardening is a trade-specific treatment plan designed to increase work tolerance. Treatment includes progressive physical and/or cognitive re-conditioning and work simulation exercises that are trade and environment specific. Work hardening and simulation is indicated when a member cannot be in their typical work environment. Example: If a patient has an injury that precludes them from being on ship, they are given clerical duties off-ship. Throughout the time they are on MELs work hardening affords members the opportunity to increase their tolerance to work specific tasks therefore decreasing the required time on clerical MELs and hastening their return to ship.
RTD Transitioning	RTD transitioning involves assisting members who have been identified as breaching the UoS with an impending release but who

	have not had the opportunity to participate in a gradual return to work program. The goal of RTD transitioning is to maximize a member's work hours and work tolerance IOT facilitate vocational rehabilitation and civilian employment upon release from the CAF. Example: A member who now uses a wheelchair is discharged from hospital with poor sitting tolerance. A gradual RTD plan of increasing seated work hours will facilitate eligibility for vocational rehabilitation and prepare the member for success in a civilian workplace.
Collaboration with the TC	For all interventions listed in the table above, the OT can provide consultation with the TC and clarification for unit RTD Representatives IOT best guide decision making regarding the patients' participation in the workplace.

Appendix F: Examples of Patient Presentation and Occupational Therapist Interventions

Patient Presentation	Possible OT Interventions	Advantages of RtDAP
Non-complex post-operative (post-op) / no significant barriers	• RTD scheduling and planning • Collaboration with physiotherapist • Progressive MELs taking post-op protocol into consideration	Build confidence in abilities to RTD Addressing barriers leads to better outcomes Regular monitoring of symptoms and progression Gradual exposure to duties decreases injury risk Address patient concerns prior to RTD Improved understanding of job requirements Referrals to PSP staff when appropriate to prepare for FORCE evaluation OT support to unit RTD Representatives and TC
Non-complex post-op with barriers	• Assess and address barriers • Functional Evaluation • Work site evaluation	
Complex post-op with a significant list of restrictions and/or long recovery period (with or without barriers)	• Assess and address barriers • Functional Evaluation • RTD scheduling and planning • Progressive MELs taking post-op protocol into consideration	
Multiple diagnoses +/- mental health concerns/diagnoses (example: chronic pain, post-concussion)	• Assess and address barriers • Functional Evaluation • Collaboration with MH team • RTD scheduling and planning • Progressive MELs as tolerated • Work site evaluation • Work hardening/simulation	
Primary mental health diagnosis	• Assess and address barriers • Collaboration with mental health regarding goals and functional abilities • Reactivation of ADL's, IADL's, leisure and re-establishment of routines • Preparation for RTD • Functional Evaluation • Progressive RTD scheduling • Work site evaluation	Early discussion and preparation for RTD (if appropriate) OT support to unit RTD representatives and TC Graduated exposure to work hours and duties
Progressive illness (examples: ALS, MS)	• Not appropriate for RtDAP.	N/A

	• However, can assist with ADL's/IADL's, RTD transitioning and collaboration with Transition Center.	
Severe disability/PCAT with potential for RTW outside the CAF (example: spinal cord injury)	• Assess and address barriers to RTW • Specific progressive RTD scheduling in appropriate job environment until release	Progressive increase in work hours Prepare member for success outside the CAF (E.g.: sitting tolerance in wheelchair)

Appendix G: Recommendations

Implementation:

ReMAP (Ortho)

- Implementation to begin of bases with integral physiotherapy sections in 2022; and
- Select 4 bases, 2 with large CFHS clinics and 2 with medium CFHS clinics to conduct an analysis per and post implementation.

DIMAP

- Implementation to begin in 2022 with bases in Ontario and Alberta;
- Establish a regulatory and governance board in 2022; and
- Implement in remaining bases in 2023.

RtDAP

- Consultation should begin with the Transition Group and Centres in 2021 to determine the most appropriate bases for RtDAP;
- Implementation could begin in 2022 on select bases; and
- Ongoing work to establish unit RTD representatives allowing for full implementation of RtDAP by 2023.

Data collection and Metrics:

ReMAP (Ortho)

- A comparison between a base with an orthopaedic surgeon on staff versus a base that outsources all orthopaedic surgery referrals;
- Ongoing data collection should continue for quality assurance and to strengthen the results found in the previous two articles. This could include wait times until

an appointment with an orthopaedic surgeon, the time interval from referral to screening, and the length of screening. That final metric will give an idea of the time required by a physiotherapist to complete the screening and therefore the impact that screening could have on the physiotherapy section as a balance measure; and
- Recommendations from the orthopaedic surgeon, stratified by body part, should be collected to aid in tailoring programs and services to the needs of that base or element.

DIMAP

- The number of physiotherapists who have completed the suggested training to order diagnostic imaging;
- The number of patients referred for MSK diagnostic imaging, stratified by body type and the clinician type;
- The number of appointments as well as the time required to obtain the diagnostic imaging results, separated by clinician type, would indicate if the program is meeting its aims; and
- The number of referrals resulting in a positive or negative finding could indicate the accuracy of the referral source. This could be captured for all clinician types to give overall accuracy or just physiotherapists to not question the organizational culture and competence of primary care clinicians.

RtDAP

- Basic workload measures for the occupational therapist can describe program utilization. Ideally, this would be stratified across the different assessment and treatment options from the occupational therapist to act as a quality assurance measure. Additionally, the referrals to RtDAP could be separated into long term MELs, temporary categories, and permanent categories to determine when patients are entering the program and address early access and see if it changes over time;
- The overall number of referrals from the CFHS to the RTD program;
- Length of time a patient is in RtDAP and the RTD program;
- The number of patients in RtDAP who successfully RTD;
- The number of patients on a temporary or permanent category should be tracked for each base as well as the number of patients that come off of category; and
- The proportion of medical releases related to MSKIs should continue to be tracked to determine if there is a long-term change. This metric could also be separated by base, and bases running RtDAP could be compared to those that are not.