REPORT OF THE
TOTAL HIP AND KNEE JOINT
REPLACEMENT
EXPERT PANEL

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Expert Panel Chair

September 2005

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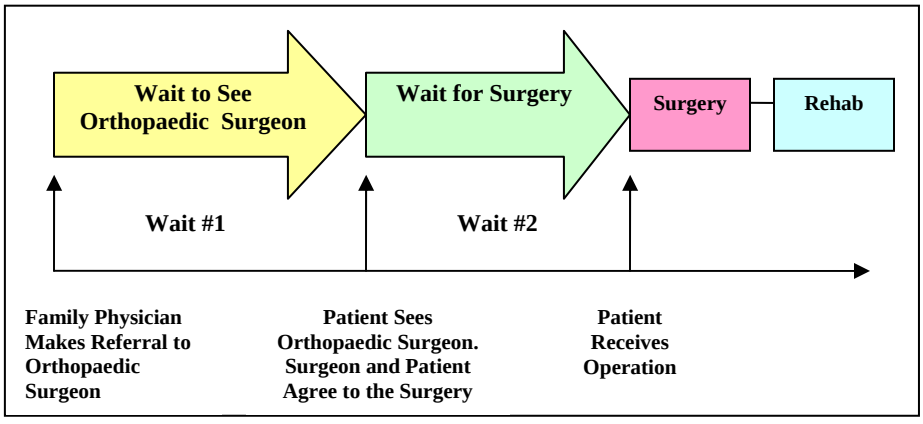
EXECUTIVE SUMMARY

Surgery to replace a hip or knee joint occurs when disease or injury degenerates the cartilage and/or bones of the hip or knee to the point where non-surgical treatments do not adequately reduce a person's pain or disability. Hip and knee joint replacement surgery is a highly effective and cost effective treatment for reducing pain, improving quality of life, and restoring the ability of a person to function and be mobile. The demand for hip and knee joint replacements is increasing largely due to an aging population that has age-related musculoskeletal diseases. New technologies are also making joint surgery a more viable option for both young and older people.

Total hip and knee joint replacement surgery is one of the five priority services in Ontario's Wait Time Strategy. In June 2005, the Ministry of Health and Long-Term Care (Ministry) established the Total Hip and Knee Joint Replacement Expert Panel to recommend a plan that provides Ontarians with equitable access to total hip and knee joint replacements in a timely and appropriate manner. Chaired by Dr. Allan Gross (Ghert Family Foundation Chair of Lower Extremity Reconstructive Surgery at Mount Sinai Hospital and Professor of Surgery at the University of Toronto), the Panel is providing its advice to the Minister of Health and Long-Term Care, George Smitherman, through Dr. Alan Hudson, Lead of Access to Services and Wait Times, who is charged with leading the implementation of the Strategy. The Panel's work builds on the excellent advice provided in the first phase of the Strategy by Dr. Robert Bourne and his team of advisors. This advice was instrumental in the success of the first phase of allocations for hip and knee joint replacements.

THE PANEL'S DEFINITION OF WAIT FOR A TOTAL HIP AND KNEE JOINT REPLACEMENT

A patient's wait for a total joint replacement may begin long before the orthopaedic surgeon and patient agree that surgery is necessary. For the purposes of the Wait Time Strategy – which is looking at surgical wait times – the Panel identified the wait for a total hip and knee joint replacement as being from the time the patient sees the orthopaedic surgeon and both the surgeon and patient agree to the surgery, to the date the patient receives the operation (Wait #2).



THE PANEL'S ASSESSMENT OF THE MINISTRY'S SHORT-TERM SOLUTIONS TO REDUCE WAIT TIMES FOR JOINT REPLACEMENTS

The Ministry's solutions to reduce waits for joint replacements included funding 1,680 more hip and knee total joint replacements from December 2004 to March 31, 2005, and 6,700 hip and knee joint replacements in fiscal 2005/06. Although funding additional volumes is necessary to help address the backlog of joint replacement surgeries, this funding does not address factors such as insufficient numbers of orthopaedic surgeons and other staff, and insufficient operating room time and resources. In addition, there is concern that incremental funding for joints may impact negatively on other hospital services and orthopaedic areas, and that focusing on the surgical wait ignores other important times such as waiting for a surgical consultation and for services along the full continuum of care (e.g., primary care, supports while people are waiting for surgery, in- and out-patient rehabilitation in specialised facilities and at home, and home care). The Panel suggests that the Ministry invite clusters of hospitals in Local Health Integration Networks (LHINs) to submit requests for future volumes, and that communications to orthopaedic surgeons about the Wait Time Strategy be improved.

THE PANEL'S DELIBERATIONS AND RECOMMENDATIONS ON A PROVINCIAL PLAN TO PROVIDE EQUITABLE ACCESS TO TOTAL JOINT REPLACEMENTS IN A TIMELY AND APPROPRIATE MANNER

The Panel identified six elements of a provincial joint replacement plan.

1. Best Practice Targets and Approaches to Support Standardisation

The Panel supports the need to develop Ontario-specific ***population-based planning targets*** for total hip and knee joint replacements to help identify inequities, reduce variations in service and support quality. These targets cannot arbitrarily use current rates which do not reflect disease burden of the population, patient preferences or unmet need. The Panel recommends that the Ministry, in partnership with the orthopaedic community, develop population-based planning targets for the number of hip and knee replacements per 100,000 population in Ontario, adjusted by age. Research, the experience of other jurisdictions and the expert opinion of clinicians should be considered. These targets should be regularly assessed and adjustments made, where appropriate.

There are opportunities to ***improve efficiencies and safety through standardisation***. The Panel recommends that the Ministry, in partnership with the orthopaedic community and other stakeholders, support the development of standardised provincial benchmark targets for hip and knee joint replacements including the number of joints that should be performed in a day, processes that support more effective delivery of anaesthesia and the optimal use of operating room resources, provincial best practice targets, and standardised care pathways that include best practices for immediate and longer-term post-operative care.

The Panel concluded that joint surgeries appear to be performed appropriately in Ontario, at this time. The importance of ***appropriateness targets*** for joint surgery will become more apparent when the backlog of patients who need joints is reduced. The Panel further concluded that research findings on the relationship between volume of surgery and outcomes do not support setting specific mandatory volume limits in Ontario, at this time. The Panel recommends that the orthopaedic community, hospitals and LHINs support the provincial use of best practice guidelines, actively monitor quality and safety outcomes, and focus on improving outcomes. The orthopaedic community would bring its clinical expertise to bear on the development of best practice guidelines; hospitals would monitor and improve performance and ensure access to safe quality care within their organisations; LHINs would be responsible for these functions in their networks. It is further recommended that complex joint revisions only be performed in hospitals with sufficient volumes to support the specialised staff, expertise and equipment needed for this surgery. LHINs would ensure that these volume targets are met.

Ontario does not have a uniform ***patient priority rating tool and wait time targets*** for joint replacement surgery. The Panel recommends a priority rating scale for total hip and knee joint replacements. The scale – measuring the time from the decision to operate to the operation – reflects four priority ratings (with target time frames for each):

- 0: Emergent such as peri-prosthetic fracture, uncontrolled deep infection of a joint replacement, acute irreducible dislocation of a total hip joint replacement (Immediate, next available).
- I: Urgent hip or knee joint conditions/complications that actively affect an individual's role and independence such as bed ridden, impending fracture, recurrent dislocation of a total hip joint replacement (6 weeks).
- II: Some pain and disability because of a hip or knee joint condition that is an imminent threat to role and independence (12 weeks).
- III: Minimal pain and disability because of a hip or knee joint condition with role and independence not threatened (26 weeks).

2. Information and Information Management

A broad range of providers, organisations and associations provide ***public and patient information*** on joint health and disabilities. These efforts need to be part of a comprehensive education approach that includes consistent information on what causes joint problems, ways to avoid joint damage, when to see a health provider, viable options to address joint problems, and what to do if surgery is warranted. There are opportunities to capitalise on current infrastructure and efforts. The Panel recommends that the Ministry support efforts to promote public and patient education on joint health and disabilities, including the benefits and risks of joint replacement surgery.

Provider information can enable primary care providers to play a more active role in assessing and diagnosing joint problems, and supporting patients who have musculoskeletal problems. Continuing education programs – such as The Arthritis Society's primary healthcare community initiative *Getting a Grip on Arthritis* – equips providers with valuable information to help patients. Such programs would be especially

valuable to primary care providers practising in remote areas where there are no orthopaedic surgeons.

Boards and management need simple ***information systems to monitor performance and support ongoing improvements***. Currently, hospitals are required to submit minimum data elements on their joint replacements and demonstrate compliance with surgical efficiency conditions. The Panel believes that hospitals should be required to submit quality and safety indicators that include, but are not limited to, length of stay, complication and death rates and post-operative outcomes (ideally at three, six and 12 months). This information should be on the Wait Times website by hospital. The Panel also supports the goals and objectives of the Canadian Joint Replacement Registry that relate to outcomes.

3. Human Resources

Of the 220 orthopaedic surgeons trained in Ontario between 1993 and 2002, only 58% were practising in Ontario two years after completing their post-MD training. The Panel recommends that the Ministry, in partnership with the orthopaedic community, focus efforts on recruiting and retaining Ontario-trained surgeons in Ontario. This includes increasing operating room time and supports, improving the working conditions of surgeons, and supporting the innovative use of other healthcare professionals and innovative models of care. In addition, more orthopaedic surgeons should be trained in the long term to help meet the increasing demand for joint replacement surgery.

A shortage of anaesthesiologists, nurses and rehabilitation professionals – such as physiotherapists and occupational therapists in hospitals and the community sector – is impacting on wait times for joint surgery. The Wait Time Strategy's *Surgical Process Analysis and Improvement Expert Panel* identified strategies to expand anaesthesia resources. In addition, the Ministry's provincial human resource planning is focused on attracting people to the healthcare professions and retaining these professionals.

4. Technology

Currently, individual surgeons and hospitals make the decisions about which new technologies to adopt. The Panel recommends that LHINs work with the orthopaedic community and hospitals to develop a comprehensive approach to guide the introduction of new joint implant technologies based on evidence. The evaluations done by organisations such as the Ontario Health Technology Advisory Committee should be used to inform the adoption, diffusion and withdrawal of joint replacement technologies. Furthermore, the orthopaedic community should proactively identify emerging technologies to be assessed by existing evaluation groups.

5. Funding

In its review of ***operational funding***, the Panel recommends that the Ministry implement full case funding for all hip and knee joint replacement surgery. In the longer term, case

funding should reflect the full continuum of care from surgery to rehabilitation. There is also a need to increase the purchasing power of hospitals for joint replacements. It is recommended that LHINs work with the orthopaedic community and hospitals to develop strategies to increase the purchasing power of organisations in the area of joint replacements (e.g., group purchasing, group service agreements). It is noted that the lack of sufficient capacity such as operating rooms and beds (intensive care, ward and rehabilitation) can contribute to long waits for joint replacements. The Ministry needs to assess whether current capacity is adequate to meet the increasing demands of the future, and provide funding to support increased capacity, where necessary.

The Panel notes that current funding arrangements can discourage ***surgical efficiencies and innovation.*** It is recommended that the Ministry review how surgical services are funded and how staff are compensated with the goal of aligning incentives to support the efficient and effective use of surgical resources.

6. The Organisation of Services to Meet Future Needs

The increasing demand for total hip and knee joint replacements highlights the importance of implementing more effective and efficient ways of organising services to meet the future needs of Ontario's aging population. The Panel assessed a number of initiatives and research studies that focus on improving access to joint replacements. These incorporate common elements and use a network approach to improve access.

The Panel recommends that a LHIN approach to joint replacements be adopted in Ontario. This approach should include: i) common care pathways along the continuum of care from primary care to rehabilitation; ii) assessment and screening clinic(s) that use standardised criteria to determine whether a person needs to be considered for surgery by an orthopaedic surgeon and the urgency of their condition; iii) education and support services for those not needing surgery; iv) a referral process to a surgeon for a final surgical assessment; and v) standardised comprehensive education packages that include information on joint health and self-management, and pre-and post-operative joint care.

The Panel also recommends that LHINs be accountable for monitoring and ensuring access to joint services in their networks. LHIN-based networks should: i) establish joint replacement goals within and across LHINs; ii) determine joint replacement requirements for each site in the LHIN, so that needs can be coordinated in the network; iii) ensure quality and safety by promoting standards and best practices for orthopaedic services; iv) ensure that surgeons, rehabilitation providers, hospitals, community care access centres and agencies work together to provide a standardised approach to pre-operative care, surgery and post-operative care; and v) monitor and improve performance.

The Panel will continue its deliberations on the organisation of services to meet future needs with the intention of providing ongoing advice to the Wait Time Strategy on total hip and knee joint replacement surgery.

SECTION A: INTRODUCTION

1. BACKGROUND

Surgery to replace a hip or knee joint occurs when disease or injury degenerates the cartilage and/or bones of the hip or knee, to the point where non-surgical treatments do not adequately reduce a person's pain or disability. Hip and knee joint replacement surgery is a highly effective treatment for reducing pain, improving quality of life, and restoring the ability of a person to function and be mobile. Total joint replacements also appear to be highly cost effective compared to other surgical and medical interventions.[1]

A hip or knee joint that is replaced for the first time is known as a "primary" replacement. A joint replacement that is redone is known as a "revision." Revisions can occur because of infection or problems with the implant (e.g., the implant is loose or has failed due to implant wear or fracture). Joint replacements can last at least 10 years, after which patients need a revision.[2] Joint replacements can be planned (i.e., done as an elective procedure) or unplanned (i.e., done as an urgent or emergency procedure for trauma, fractures, dislocation, infection or cancer).

The demand for hip and knee joint replacements is increasing largely due to an aging population that has age-related musculoskeletal diseases. In addition, new technologies are making joint surgery a more viable option for both young and older people. The Canadian Joint Replacement Registry (CJRR) reported that degenerative (i.e., wear and tear) osteoarthritis was the most common diagnosis resulting in the need for 81% of primary total hip replacements and 92% of primary total knee replacements.[3] Other common diagnoses for primary replacements included inflammatory arthritis (rheumatoid arthritis) and posttraumatic osteoarthritis. The CJRR's report also highlighted the correlation between weight and joint replacement. A high proportion of knee replacement patients were overweight (33%) or obese (54%); similarly, a high proportion of hip replacement patients were overweight (37%) or obese (35%).

The 2005 CJRR reported that the most common reasons for joint revisions were:

- Aseptic loosening, which is a loosening of the implant, resulting in 57% of hip revisions and 49% of total knee revisions;
- Osteolysis, which is loss of bone due to a reaction to the implant, resulting in 30% of hip revisions and 22% of knee revisions;

[1] See Ethgen O et al. (2004), Bozic KJ et al. (2004) and Rorabeck CH et al. (1994) as referenced in Bourne RB, DeBoer D, Hawker G, Kreder H, Mahomed N, Paterson JM, Warner S, Williams J. "Total Hip and Knee Replacement." In: Tu JV. Pinfold SP, McColgan P, Laupacis A, editors. *Access to Health Services in Ontario: ICES Atlas*. Toronto: Institute for Clinical Evaluative Sciences; 2005.
[2] Bourne RB, DeBoer D, Hawker G, Kreder H, Mahomed N, Paterson JM, Warner S, Williams J. "Total Hip and Knee Replacement." In: Tu JV. Pinfold SP, McColgan P, Laupacis A, editors. *Access to Health Services in Ontario: ICES Atlas*. Toronto: Institute for Clinical Evaluative Sciences; 2005.
[3] Canadian Joint Replacement Registry *2005 Report: Total Hip and Total Knee Replacements in Canada.* Ottawa: Canadian Institute for Health Information, 2005.

- Polyethylene wear, which is wear of the plastic surface, resulting in 24% of hip revisions and 36% of knee revisions; and
- Instability, which is a dislocation of the implant, resulting in 15% of hip revisions and 13% of knee revisions.

The focus of this report is to present a plan that provides Ontarians with equitable access – regardless of where one lives – to total hip and knee total joint replacements in a timely and appropriate manner. The Ministry of Health and Long-Term Care (Ministry) has focused on total joint replacements as part of Ontario's Wait Time Strategy. The Strategy is one of Ontario's top priorities within a broader agenda to transform Ontario's health system. On September 9, 2004, George Smitherman – the Minister of Health and Long-Term Care – established the Health Results Team to lead a number of major healthcare transformation initiatives.[4] Dr. Alan Hudson was appointed as Lead of Access to Services and Wait Times, charged with leading the implementation of the Strategy.

The goal of the Strategy is to achieve a comprehensive, patient-centred care system that monitors and manages wait times, improves how efficiently and effectively care is delivered, and makes wait time information available to the public and providers. The Strategy is designed to improve access to healthcare services by reducing the time that adult Ontarians wait for services in five key areas by December 2006: total hip and knee joint replacements, MRI and CT scans, cancer surgery, selected cardiac surgery procedures and cataract surgery. The five areas of focus are associated with a high degree of disease and disability, and are the beginning of an ongoing process to improve access to, and reduce wait times for, a broad range of healthcare services.

The Ministry selected total hip and knee joint replacements for a number of reasons:

- In various opinion polls, the public and healthcare providers in Ontario have expressed concerns about access to hip and knee joint replacement surgery.
- The demand for hip and knee joint replacements is growing. From 1993-94 to 2003-2004 for Ontarians 20 years of age and older, the number of total hip replacements increased 51%, and 114% for total knee replacements.[5]
- At the 2004 Annual Conference of the Federal-Provincial-Territorial Ministers of Health, the First Ministers agreed to achieve meaningful reductions in wait times in at least five key areas by March 31, 2007: cancer, cardiac, joint replacements, sight restoration, and diagnostic imaging.[6] Ontario set December 2006 as its target date for results, and specifically earmarked total hip and knee replacements as the joint procedures on which the province would focus.

[4] In addition to the Wait Time Strategy, other initiatives include creating Family Health Teams for primary care, building information systems, developing Local Health Integration Networks (LHINs), and encouraging greater community involvement in planning.
[5] Bourne RB et al., *Ibid*, 2005.
[6] *National Waiting Times Reduction Strategy*. 2004 Annual Conference of Federal-Provincial-Territorial Ministers of Health.

The focus on access to joint replacements supports the global Bone and Joint Decade. The United Nations, the World Health Organisation and 37 countries – including Canada – proclaimed 2000-2010 as the Bone and Joint Decade.[7] The goal of this initiative is to improve the health-related quality of life for people with musculoskeletal disorders throughout the world by raising awareness of the growing burden of musculoskeletal disorders on society, empowering patients to participate in decisions on their care, promoting cost-effective prevention and treatment, and advancing the understanding of musculoskeletal disorders through research to improve prevention and treatment.

The length of time that Ontarians wait for joint replacements is gradually becoming evident. In April 2005, the Minister of Health and Long-Term Care received, Access to Health Services in Ontario, an Institute for Clinical Evaluative Sciences' Atlas commissioned by the Wait Time Strategy.[8] The report presents an objective overview of wait times for the province and for each of the 14 Local Health Integration Networks (LHINs) using various data sources. (See Appendix 1 for a map of the LHINs.) The data has already been used to identify the LHINs that are facing wait time challenges and to inform the allocation of additional cases. Beginning in September 2005, wait times by hospital will be reported publicly on the Wait Times website.[9] The ability of hospitals to meet the growing need for joint replacement surgery is being impacted by increasing demands from many other priorities on a hospital's resources.

2. THE TOTAL HIP AND KNEE JOINT REPLACEMENT EXPERT PANEL

In June 2005, the Ministry established the Total Hip and Knee Joint Replacement Expert Panel, under the leadership of Dr. Allan Gross – Ghert Family Foundation Chair of Lower Extremity Reconstructive Surgery at Mount Sinai Hospital and Professor of Surgery at the University of Toronto – to advise the Ministry on its next phase of the Wait Time Strategy. The members of the Expert Panel reflect a broad range of experience in orthopaedic surgery, specialised rehabilitation and community care that is provided in many practice settings including teaching and community hospitals, community-based organisations, and large city and smaller northern communities. The Panel members include: Dr. Maurice Bent, William Bloor, Dr. Robert Bourne, Will Caccia, Rob Devitt, Dr. John Flannery, Dr. Jeffrey Golish, Dr. David Healey, Dr. Hans Kreder, Dr. Nizar Mahomed, Dr. John Porter, Jo-Anne Sobie, Dr. Rajca Soric, Dr. James Waddell and Ken White (see Appendix 2 for the list of Panel members and their affiliations).

The Panel will make recommendations on the provision of total joint replacement services to promote efficient management practices in the healthcare system. In addition, the Panel will recommend a plan to provide Ontarians with equitable access to total joint replacements – regardless of where one lives – in a timely and appropriate manner. The

[7] www.boneandjointdecade.org. Also see www.bjdcanada.org for Bone and Joint Decade Canada.
[8] Tu JV. Pinfold SP, McColgan P, Laupacis A, editors. *Access to Health Services in Ontario: ICES Atlas*. Toronto: Institute for Clinical Evaluative Sciences; 2005 (www.ices.on.ca).
[9] www.health.gov.on.ca/transformation/wait_times.

Panel will draw from the expertise and experience of other jurisdictions in fulfilling its role.

The Panel will provide advice on:

- Volume capacity including the capacity at which facilities should be performing and the impact of the increase in volumes on facilities.
- A protocol to prioritise patients waiting for total joint replacement surgery including a standard definition of "wait time" for total joint replacement surgery (i.e., when the waiting time begins and ends), and wait time targets.
- A model of access to high quality total joint replacements for Ontario including but not limited to:
  - Best practice targets and standardisation;
  - Information management;
  - Human resources;
  - Technology;
  - Funding issues; and
  - The organisation of services to meet future need.

The Panel is advising the Minister of Health and Long-Term Care, through Dr. Hudson, Chief Advisor to the government on Ontario's Wait Time Strategy.

The Panel's work builds on the excellent advice provided in the first phase of the Wait Time Strategy by Dr. Robert Bourne – in his capacity as Medical Director of the Ontario Joint Replacement Registry – and his team of advisors. This advice was instrumental in the success of the first phase of allocations for hip and knee joint replacements.

3. METHODS USED TO GATHER INFORMATION

A number of methods was used to inform the Panel's deliberations and recommendations including:

- A review of published reports on joint replacements;
- A report on ways to improve the patient's journey by the Access to Care Task Team, a subcommittee of the Ontario Joint Replacement Registry; and
- The expert opinions of Panel members.

4. OVERVIEW OF THE REPORT

The report begins with a profile of total hip and knee joint replacement activity in Ontario including a description of hip and knee joint replacement surgery and a profile of activity in Ontario (Section B: Chapters 5-6).

Section C presents the Panel's deliberations and recommendations on total joint replacements, including:

- The definition of wait for joint replacement surgery within the Wait Time Strategy (Chapter 7);
- An assessment of the Ministry's short-term solutions to reduce waits for total joint replacements (Chapter 8); and
- The elements of a provincial plan to provide equitable access to total joint replacement surgery in a timely and appropriate manner (Chapter 9). These elements include best practice targets and approaches to support standardisation, information and information management, human resources, technology, funding, and the organisation of services to meet future needs.

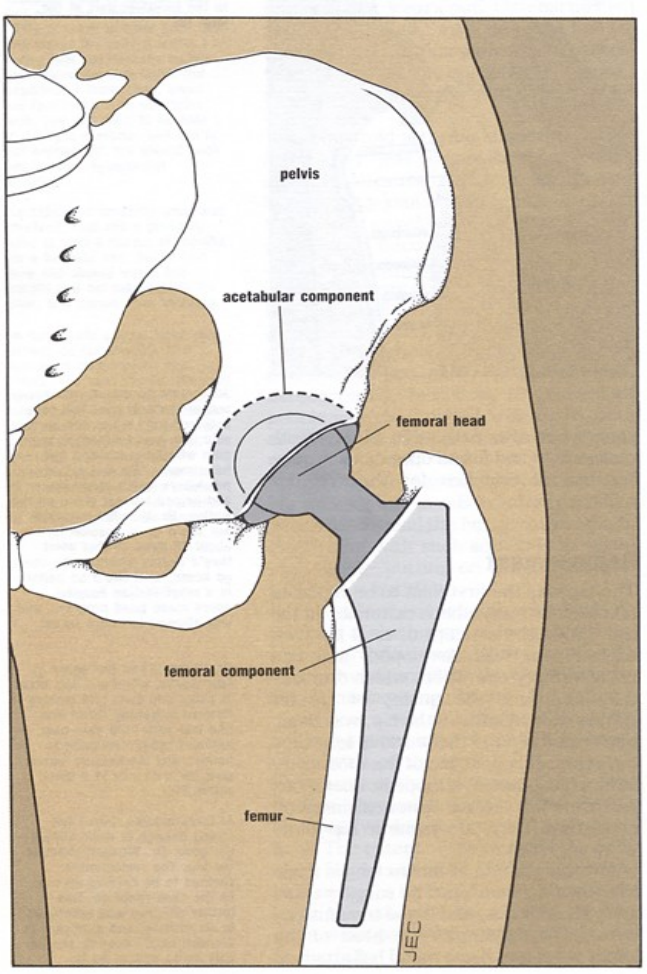
Section D presents the consolidated list of recommendations.

SECTION B: A PROFILE OF TOTAL HIP AND KNEE JOINT REPLACEMENTS IN ONTARIO

5. TOTAL HIP AND KNEE JOINT REPLACEMENT SURGERY

All the mobile joints of the body – such as the hip, knee and shoulder – consist of two bones capped by a layer of articular cartilage, that is nourished and lubricated by a thin layer of fluid. The layer of cartilage is smooth, shiny and slippery like ice, allowing the joint to move easily. In arthritis, the cartilage of the joint becomes roughened, thinned and distorted, resulting in pain and restricted joint movement. When non-surgical treatments are not able to reduce pain and disability surgical treatments, such as joint replacement, are considered.

Figure 1: Hip Joint



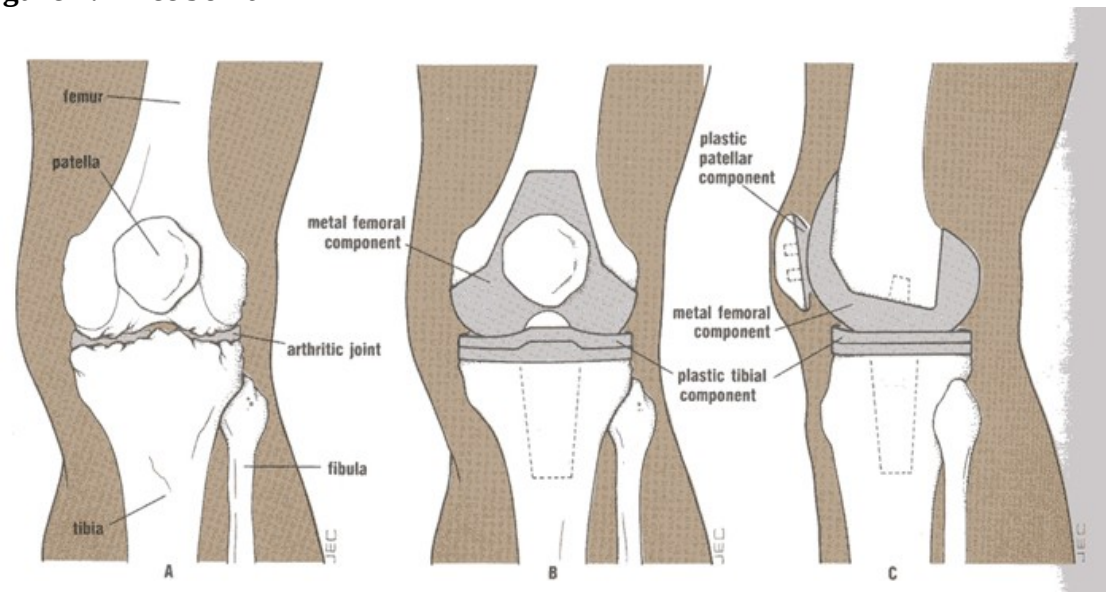
Total hip replacement was first introduced in 1938,[10] and has been performed successfully for approximately 25 years.[11] The hip implant is made up of a ball and socket (Figure 1). A ball head, which articulates in the socket, is placed on the hip shaft. The joint components are made up of a ceramic or metal head, and a polyethylene (i.e., plastic), metal or ceramic socket.

A cemented prosthesis – which uses cement to anchor the implant to the bone and allows immediate weight bearing – is usually implanted in the elderly and in persons who need to regain mobility quickly to maintain their physical condition. An un-cemented prosthesis is more suitable for younger, active patients. This type of prosthesis has a fine mesh of holes on the surface. Over a period of 6-8 weeks, bone grows into the mesh and the prosthesis becomes attached to the bone.

[10] Canadian Joint Replacement Registry *2004 Report: Total Hip and Total Knee Replacements in Canada.* Ottawa: Canadian Institute for Health Information 2004.
[11] European Federation of National Associations of Orthopaedics and Traumatology (www.efort.org).

Total knee replacement surgery was first performed in the 1960s with hinged implants that did not permit the natural rotation and bending of the knee.[12] Not only did these implants loosen shortly after being implanted, they had high infection rates. In the mid 1970s, improved implants enabled the knee to rotate and bend (condylar total knee implants). Additional advancements included implants that were easier to insert because of better instrumentation, which is the equipment that is used to prepare the bones for the implantation of the artificial joint. Most knee implants are cemented to the bone ends (Figure 2).

Figure 2: Knee Joint



Significant improvements have been made in joint replacement surgery over the years. The use of more durable materials and advances in less invasive techniques have resulted in less blood loss, lower infection rates, earlier weight bearing and mobility, shorter recovery periods, faster and less painful rehabilitation, and improved performance and longevity of joint replacements.

In France, where some 100,000 total hip replacements are performed each year, the Programme de Médicalisation du Système d'Information (PMSI) reports that complications are rare, over 90% of hip implants are still in place after 10 years, and almost 90% are still in place after 20 years.[13] According to the UK National Institute for Clinical Excellence (NICE), the best prostheses for primary total hip replacement demonstrate a revision rate of 10% or less at 10 years. [14] As well, results from the

[12] Anderson Orthopaedic Research Institute (Research@aori.org).
[13] European Federation of National Associations of Orthopaedics and Traumatology (www.efort.org).
[14] *Ibid*.

Scandinavian Joint Registries indicate that the performance and longevity of total hip replacements is generally improving.

Lengths of hospital stay for total joint replacements have decreased dramatically. In Canada over eight years – from 1994/95 to 2002/03 – the average length of stay for total hip replacements decreased 29% from 13.6 to 9.6 days. In the same time period, the average length of stay for total knee replacements decreased 39% from 12.2 to 7.4 days.[15]

6. THE PROFILE OF HIP AND KNEE JOINT REPLACEMENT ACTIVITY IN ONTARIO

Unless otherwise noted, this material – including all statistics and data – are taken from Bourne RB, DeBoer D, Hawker G, Kreder H, Mahomed N, Paterson JM, Warner S, Williams J. "Total Hip and Knee Replacement" (Chapter 5). In: Tu JV. Pinfold SP, McColgan P, Laupacis A, editors. *Access to Health Services in Ontario: ICES Atlas*. Toronto: Institute for Clinical Evaluative Sciences; 2005. Data sources include the Canadian Institute for Health Information Discharge Abstract Database, the Ministry of Health and Long-Term Care Health Insurance Plan database (OHIP) and the Ontario Joint Replacement Registry.

Volume of Hip and Knee Replacement Surgery

In 2003/04, 56 Ontario hospitals and 247 orthopaedic surgeons performed 22,724 total hip and knee replacement procedures. These procedures accounted for about 45% of all hip and knee replacement procedures performed in Canada in 2001/02.[16] (In 2002, Ontario accounted for 38.6% of Canada's population.[17])

The total number of hip and knee replacement surgeries has increased dramatically in Ontario from 1993/94 to 2003/04.

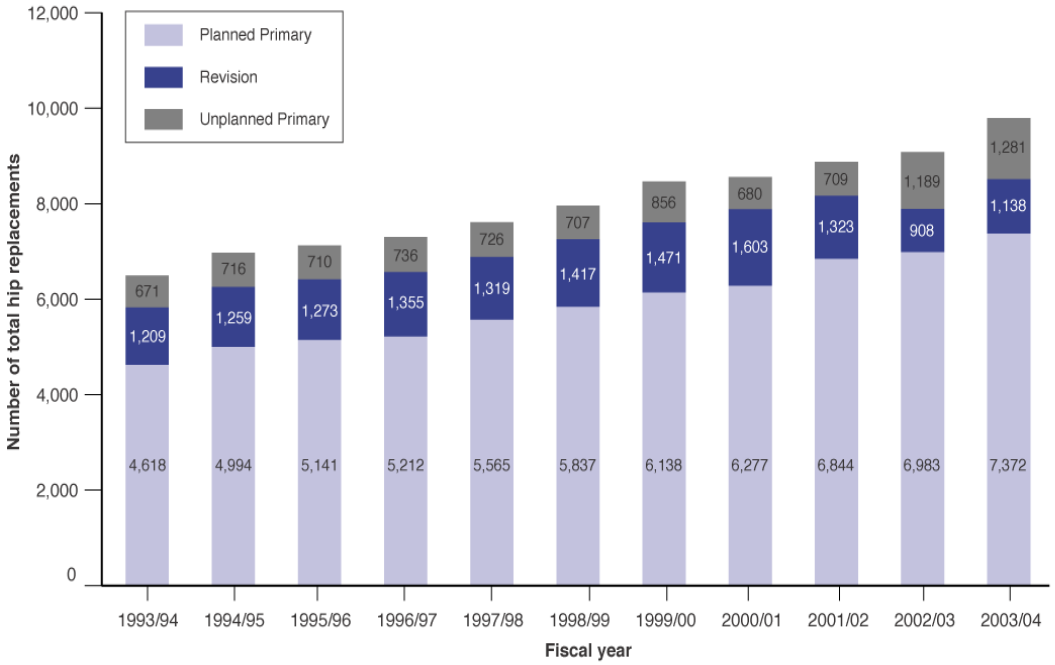
From 1993/94 to 2003/2004 for Ontarians 20 years of age and older, the number of total **hip** replacements increased 51% (Figure 5.1a). In 1993/94, primary procedures accounted for 81% of all hip replacements (71% planned and 10% unplanned) with the remaining 19% being revisions. By 2003/04, the percentage of revisions dropped to 12% with primary replacements accounting for 88% of all total hip replacements (75% planned and 13% unplanned).[18]

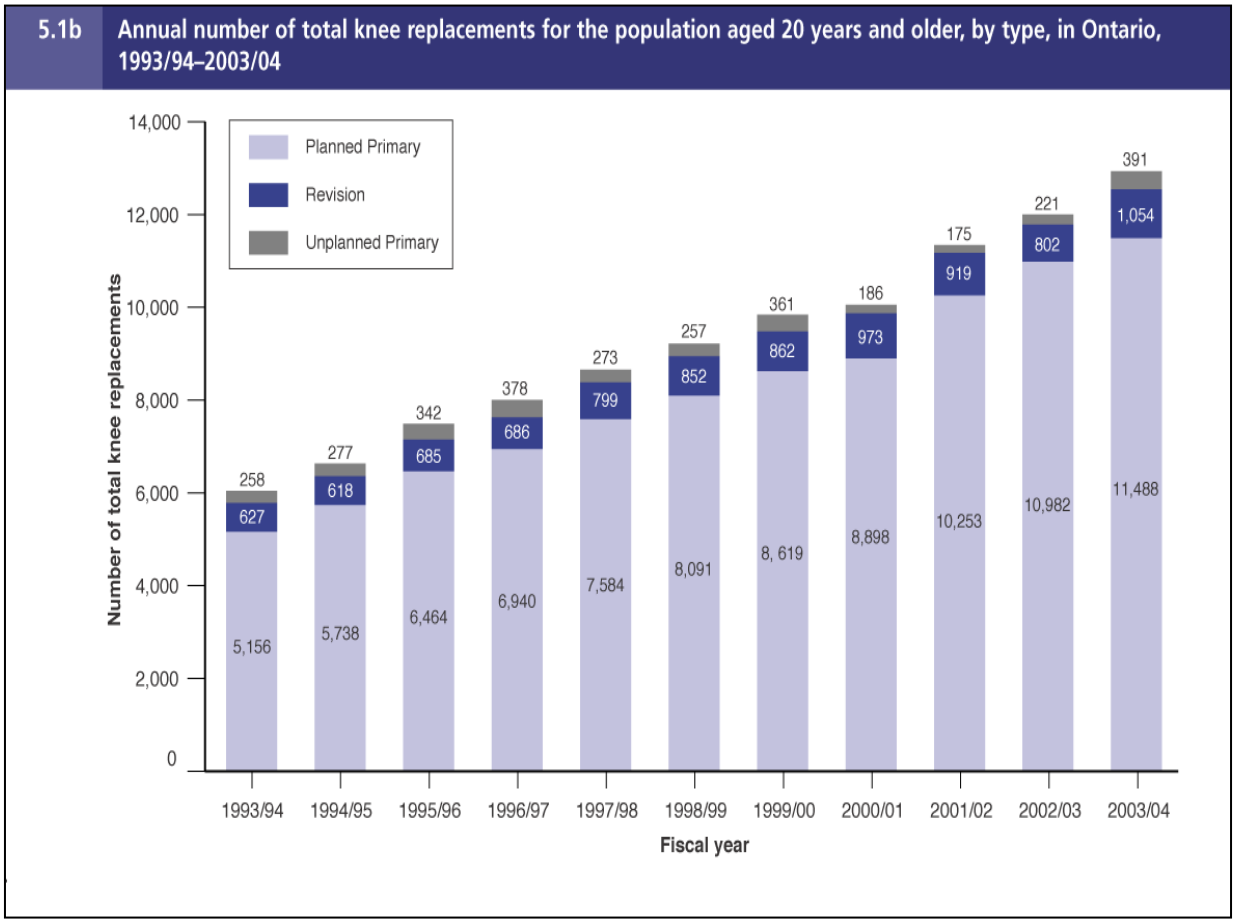
[15] Canadian Joint Replacement Registry 2005, *Ibid*.
[16] Canadian Institute for Health Information, Hospital Morbidity Database 2001/02, as reported in the Canadian Joint Replacement Registry 2004 *Report: Total Hip and Total Knee Replacements in Canada.* Ottawa: Canadian Institute for Health Information 2004.
[17] Statistics Canada, CANSIM. Population as of July 1. Last modified 2005-07-28. www.statcan.ca.
[18] Apparent changes in the proportions of revision and unplanned total hip replacements over the last two years may reflect changes in procedure and diagnosis coding rather than an actual increase in unplanned procedures.

From 1993/94 to 2003/2004 for Ontarians 20 years of age and older, the number of total **knee** replacements increased 114% (Figure 5.1b). In 1993/94, primary procedures accounted for 90% of all knee replacements (86% planned and 4% unplanned) with the remaining 10% being revisions. By 2003/04, the percentage of revisions dropped slightly to 8% with primary replacements accounting for 92% of all total knee replacements (89% planned and 3% unplanned).

There were more hip than knee replacements in Ontario up until 1994/95. In 1995/96, the trend of more knee than hip replacements began and continues to this day.

5.1a **Annual number of total hip replacements for the population aged 20 years and older, by type, in Ontario, 1993/94–2003/04**





Rate of Hip and Knee Replacement Surgery

The rate of **hip** replacements per 100,000 Ontarians aged 20 years and older, adjusted for age and sex, increased 6% over the last three years. In 2001/02, on average there were 106 hip replacements per 100,000 population 20 years and older in Ontario (Figure 5.2a). By 2003/04, the rate had risen to 112. Rates varied by Local Health Integration Network (LHIN), from a low of 89 in the Central West LHIN to a high of 139 in the South East LHIN (2003/04).

5.2a Number and age- and sex-adjusted rate of total hip replacement per 100,000 population aged 20 years and older, by Local Health Integration Network, in Ontario, 2001/02–2003/04

Local Health Integration Network	2001/02		2002/03		2003/04	
	Number of Total Hip Replacements	Rate per 100,000 Population	Number of Total Hip Replacements	Rate per 100,000 Population	Number of Total Hip Replacements	Rate per 100,000 Population
1. Erie St. Clair	572	127	549	121	532	116
2. South West	885	127	827	117	980	137
3. Waterloo Wellington	475	112	448	103	522	117
4. Hamilton Niagara Haldimand Brant	1,239	119	1,244	118	1,387	131
5. Central West	354	89	336	82	375	89
6. Mississauga Oakville	527	97	558	98	633	107
7. Toronto Central	707	88	719	89	744	91
8. Central	714	84	870	99	813	90
9. Central East	1,107	102	1,134	102	1,256	111
10. South East	421	125	440	127	481	139
11. Champlain	889	106	891	104	925	107
12. North Simcoe Muskoka	370	122	364	117	367	114
13. North East	406	95	429	99	502	116
14. North West	186	110	236	138	236	138
All Ontario	**8,876**	**106**	**9,080**	**106**	**9,791**	**112**

Summary statistics (2003/04)	Value	P-value
Extremal Quotient	1.6	
Coefficient of Variation (%)	14.4	
Systematic Component of Variation	20.1	
Adjust Chi-Square (likelihood ratio)	201.7	<0.0001

The rate of **knee** replacements per 100,000 Ontarians aged 20 years and older, adjusted for age and sex, increased 10% over the last three years (Figure 5.2b). In 2001/02, on average there were 135 knee replacements per 100,000 population 20 years and older in Ontario (Figure 5.2b). By 2003/04, the rate had risen to 149 from a low of 93 in the Toronto Central LHIN to a high of 200 in the North West LHIN (2003/04).

5.2b Number and age- and sex-adjusted rate of total knee replacement per 100,000 population aged 20 years and older, by Local Health Integration Network, in Ontario, 2001/02–2003/04

Local Health Integration Network	2001/02		2002/03		2003/04	
	Number of Total Knee Replacements	Rate per 100,000 Population	Number of Total Knee Replacements	Rate per 100,000 Population	Number of Total Knee Replacements	Rate per 100,000 Population
1. Erie St. Clair	633	141	686	152	705	155
2. South West	1,014	145	1,139	162	1,283	179
3. Waterloo Wellington	526	124	548	127	659	150
4. Hamilton Niagara Haldimand Brant	1,613	155	1,637	156	1,751	166
5. Central West	508	130	572	138	671	156
6. Mississauga Oakville	643	118	730	129	774	129
7. Toronto Central	716	90	722	90	743	93
8. Central	921	108	1,043	119	1,063	117
9. Central East	1,556	142	1,652	148	1,644	144
10. South East	532	156	579	169	689	198
11. Champlain	1,165	140	1,127	133	1,281	149
12. North Simcoe Muskoka	473	153	514	163	554	172
13. North East	639	149	649	151	729	168
14. North West	374	222	365	216	339	200
All Ontario	**11,347**	**135**	**12,005**	**140**	**12,933**	**149**

Summary statistics (2003/04)	Value	P-value
Extremal Quotient	2.2	
Coefficient of Variation (%)	18.3	
Systematic Component of Variation	36.4	
Adjust Chi-Square (likelihood ratio)	442.8	<0.0001

Variation in Surgical Rates by Age, Sex and Neighbourhood Income

The rates of total hip and knee replacements were lowest for persons less than 65 years of age, highest for those aged 65 to 84 years, and decreased for persons aged 85 years and older. Generally, age-specific rates were higher for women than men at all ages except for hip replacements in women less than 65 years of age, and knee replacements in women 85 years of age and older (Table 1).

Table 1: Age- and Sex-Specific Rate of Total Hip and Knee Replacements per 100,000 Population, Age 20 Years and Over for Ontario, 2003/04*

Age	Hip Replacement Rate		Knee Replacement Rate	
	Female	Male	Female	Male
20-64	44	45	71	44
65-74	411	335	656	538
75-84	609	427	679	601
85+	404	322	208	215

*Table compiled from information reported in Bourne RB et al., 2005.

Total hip and knee replacement rates are lowest in poorer neighbourhoods and highest in wealthier neighbourhoods. Replacement rates in the wealthiest neighbourhoods were 1.5 and 1.2 times greater than the rates in the poorest neighbourhoods for hip and knee replacements, respectively. This relationship is contrary to what would be expected since the burden of disease is greatest in poorer neighbourhoods.

Activity by Hospital

Fifty-six hospitals in Ontario – 10 academic and 46 community – performed total hip and knee replacements in 2003/04. Almost all of these hospitals performed both hip and knee replacements; one hospital performed total hip replacements only, and one performed total knee replacements only. As Table 2 indicates, the number of total hip and knee replacements varied widely by type of procedure and type of hospital.

Table 2: Number of Total Hip and Knee Replacements Performed by 10 Academic and 46 Community Hospitals in Ontario, by Type and Number of Procedure, 2003/04*

Total Hip Replacement Procedure	Type of Hospital	Number of Procedures	
		Low	High
Planned Primary Total Hip Replacement	Academic	66	535
	Community	6	210
Revision Total Hip Replacement	Academic	24	104
	Community	Less than 6	38
Unplanned Primary Total Hip Replacement	Academic	6	89
	Community	Less than 6	51
Total Knee Replacement Procedure	**Type of Hospital**	**Number of Procedures**	
		Low	**High**
Planned Primary Total Knee Replacement	Academic	105	624
	Community	29	627
Revision Total Knee Replacement	Academic	6	127
	Community	Less than 6	47
Unplanned Primary Total Knee Replacement	Academic	Less than 6	11
	Community	Less than 6	9

*Table compiled from information reported in Bourne RB et al., 2005.

Wait for Surgery

The wait for surgery is defined as the time between the date of the decision to have surgery by the surgeon and the patient, to the date the surgery is performed. In Ontario in 2003/04, the median wait time for a total **hip** replacement was 24 weeks and for a total **knee** replacement 33 weeks.

Wait times varied by LHIN. In 2003/04, the average median wait for a total **hip** replacement was 24 weeks, ranging from a low of 16 weeks in the Erie St. Clair LHIN to a high of 36 weeks in the Champlain LHIN. The average median wait for a total **knee** replacement was 33 weeks, ranging from a low of 26 weeks in Erie St. Clair to a high of 45 weeks in the North East LHIN. Generally, LHINs that had long waits for hip replacements also had long waits for knee replacements. There was no apparent relationship between the median wait time for a total joint replacement and the rate of surgery: LHINs with long waits did not always have low rates of joint replacements.

Bourne et al. note that physician experts generally agree that patients with sufficient pain and/or functional impairment who need a planned primary total joint replacement should wait no more than 26 weeks, although this target has never been formally established. In 2003/04, 53% of Ontarians waited less than 26 weeks for a total **hip** replacement and about 20% waited more than one year. For total **knee** replacements, 40% of patients waited less than 26 weeks and 30% waited more than one year.

Future Demand for Hip and Knee Replacement Surgery

The current volume and growth of hip and knee replacements in Ontario are a rough proxy of future demand for these procedures. (They are not totally accurate since they do not include unmet need.) As noted earlier, Bourne et al. reported that from 1993/94 to 2003/04 for Ontarians 20 years of age and older:

- The number of total hip replacements increased 51% (5.1% annually); and
- The number of total knee replacements increased 114% (or 11.4% annually).

SECTION C: THE EXPERT PANEL'S DELIBERATIONS AND RECOMMENDATIONS

7. THE DEFINITION OF WAIT FOR A HIP OR KNEE JOINT REPLACEMENT

A patient's wait for a total joint replacement may begin long before the orthopaedic surgeon and patient agree that surgery is necessary. For example, a person may live with pain without going to see their family physician. A person may then wait to see a family physician or other primary care provider to obtain a referral to an orthopaedic surgeon. If a person does not have a family physician, there may be further delays.

The figure below highlights the following series of waits for a patient whose role is severely disrupted, whose pain needs to be relieved and/or whose function needs to be restored:

- Wait #1: From the date the family physician or other primary care provider (e.g., nurse practitioner) makes a referral to the orthopaedic surgeon, to the date the patient sees the orthopaedic surgeon.
- Wait #2: From the time the patient sees the orthopaedic surgeon and both the surgeon and patient agree to the surgery, to the date the patient receives the operation.

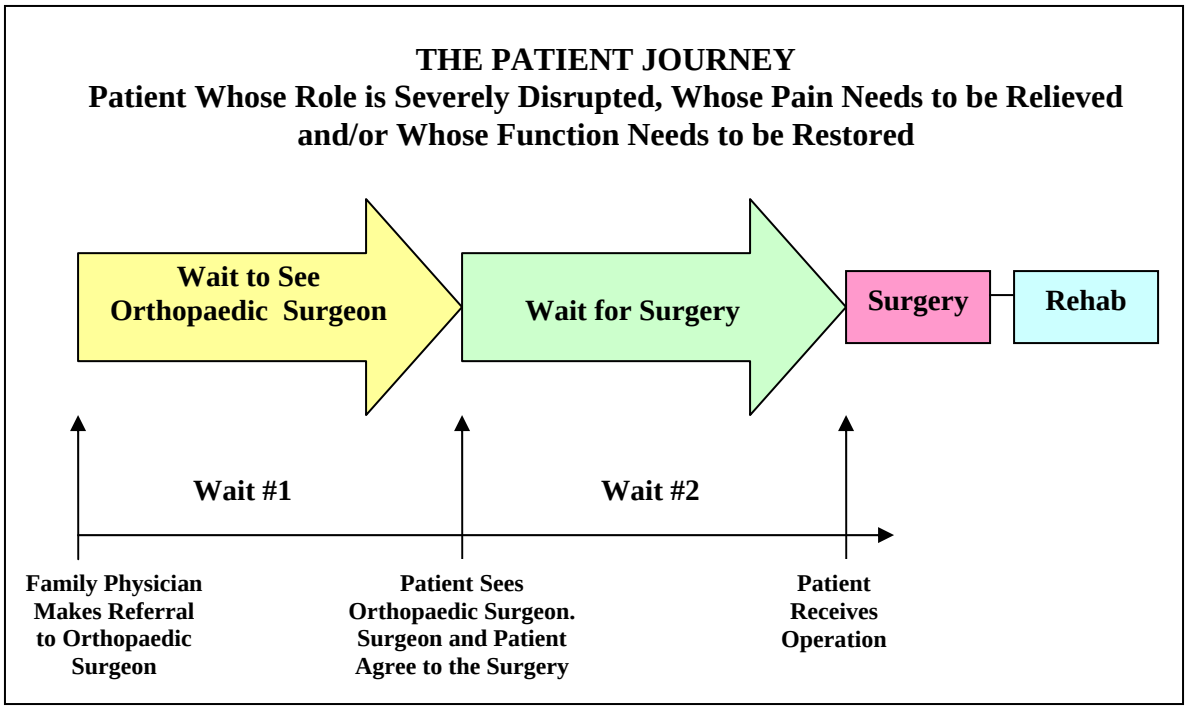
The Panel identified a broad range of factors within each of these wait times that can cause delays:

- Delays in Wait #1 can be due to the lack of orthopaedic surgeons, a referral to a surgeon with a long waiting list, and systems whereby only orthopaedic surgeons must determine who is appropriate for surgery.
- Delays in Wait #2 can be due to such things as the lack of orthopaedic surgeons, the lack of sufficient operating time, the lack of sufficient operating room staff and resources, and an inefficient use of operating room resources.

The initial focus of Ontario's Wait Time Strategy is from the date the decision is made to operate to the date the operation if performed. The Ministry will address other wait times and other areas after December 2006, building on the systems and approaches being developed now and allocating appropriate resources to support expansion.

For the purposes of the Wait Time Strategy – which looks at surgical wait times – Wait #2 is the focus of discussion.

Once surgery has been performed, the patient must access appropriate rehabilitation resources at the appropriate time. This includes coordinating the flow of patients who will receive joint surgery and managing the patients who are not ready for a joint replacement. (This is addressed in Chapter 9.6, *The Organisation of Services to Meet Future Needs*.)



8. ASSESSMENT OF THE MINISTRY'S SHORT-TERM SOLUTIONS TO REDUCE WAIT TIMES FOR JOINT REPLACEMENTS

The Ministry's solutions to reduce waits for joint replacements have focused on providing case funding to hospitals to perform additional surgeries, and establishing conditions for funding (e.g., submit wait time and quality information).

In December 2004, the Ministry allocated $12.8 million to 35 hospitals to perform 1,680 more hip and knee total joint replacements by March 31, 2005. An additional $1.7 million were allocated to community care access centres to provide home-based rehabilitation to Ontarians returning home after these surgeries.

For 2005/06, the Ministry decided to allocate $53 million to hospitals to perform 6,700 hip and knee joint replacements in two phases. This phased allocation will enable the Ministry to monitor how well hospitals are performing and to introduce additional funding conditions.

For the first phase, the Ministry allocated $25.6 million to 51 hospitals to perform an additional 3,313 hip and knee joint replacements between April 1, 2005 to September 30, 2005 (funding was announced on May 11, 2005). LHIN- and hospital-level criteria were used to guide the allocation of additional volumes. Based on the recommendations of Dr. Robert Bourne and his advisors, LHINs were allocated volumes based on the age-standardised rate of surgery in the LHIN and the extent to which wait times exceeded six months. Individual hospitals were allocated additional volumes using the following guiding criteria:

- The hospital must be in compliance with the conditions of 2004/05 wait time strategy incremental volume allocations;
- The hospital and its surgeons must be willing, able and capable of providing incremental volumes without compromising other services and requesting additional capital;
- The hospital must have the resources necessary (human and equipment) to support the additional volumes; and
- The hospital must have the critical mass to support additional volumes.

Hospitals that met the guiding criteria were allocated volumes based on the proportion of surgery currently performed by the hospital and on the hospital's stated capacity for incremental growth. Where the recommended proportion exceeded the hospital capacity, excess volume was allocated as "preferred access" volumes first to hospitals within the same LHIN, and second to a neighbouring LHIN.

In the second phase, the Ministry will allocate an additional $27.4 million to hospitals to perform 3,387 more hip and knee joint replacements from October 1, 2005 to March 31, 2006.

The Wait Time Strategy has been increasing the funding conditions. To obtain funds, hospitals must submit agreement letters signed by the Chief Executive Officer, Chief of Staff and Head of the Surgical Specialty that will perform the additional cases. In addition:

- Hospitals will agree that no additional funding beyond the case cost for such things as capital equipment and human resources will be provided by the Wait Time Strategy to perform additional volumes.[19]
- Hospitals and medical staff will agree to provide minimum volume levels of approved total hip and knee joint replacement base volumes and incremental total hip and knee joint replacement volumes.
- Hospitals will agree to provide performance data to the Ministry (minimum wait time data, and demonstration of compliance with surgical efficiency conditions).
- Hospitals and their medical staff will affirm that the delivery of additional volumes will not impede performance in delivering other services.
- Hospitals will work with the appropriate medical staff from neighbouring hospitals to ensure additional volumes are performed and that patients from the surrounding area have appropriate access to needed surgery.
- Hospitals will begin to develop surgical access management processes that facilitate equitable patient access to needed surgery irrespective of which surgeon a patient may have been referred to originally.
- Hospitals will agree to support and participate in the implementation of a province-wide Wait Time Information System.

[19] The rate for total hip and knee replacement surgery cases is the same in 2005/06 as it was in 2004/05: Community Hospitals (Primary=$6,882; Revision=$8,796) and Teaching Hospitals (Primary=$8,930; Revision=$10,776).

The Panel recognises that funding additional volumes is necessary to help address the backlog of Ontarians who need a joint replacement. Although the number of total joint replacements in Ontario has nearly doubled since 1993/94, there has been more than a four-fold increase in the number of people waiting beyond 26 weeks for this procedure (about 2,400 in 1993/94 to about 10,400 in 2003/04).[20] The increase in funded procedures will help improve throughput and decrease the number of patients with excessive wait times.

Although additional funding is welcomed, it does not address all the factors that result in long wait times. These factors include an insufficient number of orthopaedic surgeons, and insufficient operating room time and resources. These issues also need to be addressed.

There is concern that providing incremental funding for joint replacements will have a negative impact on other hospital services and other orthopaedic areas (e.g., arthroscopy, fracture management, etc.). Although one funding condition is to ensure that this does not happen, this must be monitored closely. Furthermore, there is concern that focusing on the time beginning with the decision to have surgery to when the patient receives the operation ignores other important wait times, such as the wait for a surgical consultation.

Individual hospitals were asked to submit letters for additional joint replacement volumes. Individual hospitals in northern and more remote areas may not be able to support certain specialties or justify increased volumes, but a group of hospitals in a LHIN could use innovative ways to combine their excess capacity and human resources to provide additional volumes and improve access in the network (e.g., unused capacity in a smaller hospital could be used by "visiting" surgeons who come to the area to perform surgery). The Ministry needs to invite clusters of hospitals in a LHIN to submit requests for future volumes.

The Panel notes that communications to orthopaedic surgeons about the Wait Time Strategy need to be strengthened. For example, it appears that surgeons – especially in the Greater Toronto Area – may be unaware that hospitals are receiving full case funding for additional joint surgeries. As well, surgeons who primarily focus on clinical care may be unaware of the conditions of additional case funding.

Improving access to joint replacements needs to include improved access to each part of the continuum of care. A coordinated plan for joint replacements cannot just focus on the hospital but must also include primary care, supports while people are waiting for surgery, in- and out-patient rehabilitation in specialised facilities and at home, and home care to assist with activities of daily living. The most effective and efficient ways of providing these services must be considered. Finally, there is a need to build on the benefits gained from short-term solutions by promoting longer-term goals that will lead to sustained change and system improvements in total joint replacement surgery.

[20] Bourne RB et al., *Ibid*, 2005.

9. A PROVINCIAL PLAN TO PROVIDE EQUITABLE ACCESS TO TOTAL JOINT REPLACEMENTS IN A TIMELY AND APPROPRIATE MANNER

The Panel's deliberations and recommendations, on a provincial plan to provide equitable access to total joint replacement surgery in a timely and appropriate manner, focus on long-term solutions in six areas:

- Best Practice Targets and Approaches to Support Standardisation
- Information and Information Management
- Human Resources
- Technology
- Funding
- The Organisation of Services to Meet Future Needs

These solutions and recommendations address the continuum of care including pre-operative, surgical and post-operative care.

9.1 Best Practice Targets and Approaches to Support Standardisation

There is a need for best practice targets and approaches to support standardisation in the following areas:

- Population-Based Planning Targets
- Efficiencies and Safety Through Standardisation
- Appropriateness Targets
- Patient Priority Rating Tools and Wait Time Targets

POPULATION-BASED PLANNING TARGETS

Population-based planning targets for joint replacements identify the number of surgeries that should be conducted in a region, based on the characteristics of the population. Targets can help identify inequities in access between LHINs and help focus efforts on reducing variations in service.

As noted in Chapter 6 (*The Profile of Hip and Knee Joint Replacement Activity in Ontario*), Ontario had an average of 112 hip replacements and 149 knee replacements per 100,000 population, 20 years and older in 2003/04.[21]

The Canadian Joint Replacement Registry reported that the rates of total hip and knee replacement procedures varied widely in Canada in fiscal 2002 (Table 3). Using age-standardised data, the rate of total **hip** replacements in Canada was 61.5 per 100,000, ranging from a high of 80.8 in Saskatchewan to a low of 42.3 in Quebec. Ontario was above the Canadian average at 67.2 hip replacements per 100,000. The rate of total **knee**

[21] Bourne RB et al., *Ibid*, 2005.

replacements in Canada was 75.4 per 100,000, ranging from a high of 97.9 in Manitoba to a low of 43.7 in Quebec. Ontario was well above the Canadian average at 90.2 knee replacements per 100,000.

Table 3: Age-Standardised Rates Per 100,000 Population of Total Hip and Total Knee Replacement Procedures by Province, Fiscal 2002*

	Nfld	PEI	NS	NB	Que	Ont	Man	Sask	Alta	BC	Can
Hips	50.3	71.8	69.8	63.1	42.3	67.2	67.4	80.8	75.1	64.8	61.5
Knees	48.6	85.5	97.5	90.5	43.7	90.2	97.9	89.5	93.9	66.3	75.4

*Canadian Joint Replacement Registry *2005 Report: Total Hip and Total Knee Replacements in Canada.* Ottawa: Canadian Institute for Health Information, 2005. Rates based on patients' residence. Yukon, Northwest Territories and Nunavut rates suppressed due to small numbers but included in national average. Source: Hospital Morbidity Database, CIHI, Fiscal 2002.

The apparent large increase in Ontario's rates over three years (comparing the data of the Canadian Joint Replacement Registry and that of Bourne et al. 2005) calls into question the rates that exist elsewhere.

There is wide variation in the crude rates of hip and knee replacements in various countries (unadjusted by age and sex of the population – Table 4). Comparisons must be made cautiously due to variations in the year of the data, the data sources and methodologies used.

Table 4: International Comparison of Crude Rates (per 100,000 population) of Total Hip and Knee Replacements, Primary and Revisions*

Total Hip Replacements			
Country	**Primary**	**Revisions**	**Year**
Australia	93	18	Fiscal 2002
New Zealand	124	19	2003
Norway	135	21	2002
Canada+	64	6	Fiscal 2002
United States	54	11	2000
Total Knee Replacements			
Country	**Primary**	**Revisions**	**Year**
Australia	108	13	Fiscal 2002
New Zealand	72	9	2003
Norway	50	5	2002
Sweden	81.5	7	2003
Canada++	79	5	Fiscal 2002
United States	106	10	2000

*Source: Canadian Joint Replacement Registry 2005 Report: *Total Hip and Total Knee Replacements in Canada*, CIHI: 2005.
+Rate calculation based on counts from the Hospital Morbidity database, CIHI.
++Crude rate includes total and partial knee replacements.

There are a number of reasons why procedure rates vary widely within Ontario, within Canada and across jurisdictions. These include the burden of orthopaedic-related diseases in a population, variations in the medical management and surgical treatment of orthopaedic-related conditions, patient preferences for treatment, access to trained professionals (e.g., orthopaedic surgeons, primary care providers, nurses, therapists), and surgeons' access to hospital beds and operating room time.

There is some variation in revision rates. As noted earlier (Chapter 6: *The Profile of Hip and Knee Joint Replacement Activity in Ontario*), in 2003/04, the revision rate in Ontario for total hip replacements was 12% and 8% for total knee replacements. These proportions are roughly similar to those observed in other Canadian provinces and other countries that maintain total joint replacement registries.

There is a need to develop Ontario population-based planning targets for total hip and knee joint replacements per 100,000 population (primary and revision). Such targets would be useful to help identify inequities, reduce variations in service and support quality. Developing population-based planning targets needs to be done carefully. For example, it would be inappropriate to set targets arbitrarily using current rates since these do not reflect such things as disease burden of the population, patient preferences or unmet need. Hawker et al. examined unmet need for total joint replacements in two Ontario regions by identifying individuals aged 55 years and older with severe hip or knee symptoms.[22] The researchers found that the region with the higher procedure rate had more unmet need for total joint replacements (540 per 100,000) than the region with the lower procedure rate (240 per 100,000). Unmet need was also higher for women than for men: 530 and 160 per 100,000 persons, respectively. After adjusting for age, sex, region and body mass index, the researchers found that lower education and income levels were independently associated with a greater likelihood of having a potential need for a total joint replacement.

The development of population-based planning targets needs to take into account relevant research, the experience of other jurisdictions and the expert opinion of clinicians.

The Panel recommends that:

R1 The Ministry of Health and Long-Term Care, in partnership with the orthopaedic community, develop population-based planning targets for the number of hip and knee replacements per 100,000 population in Ontario, adjusted by age. This work should take into account relevant research, the experience of other jurisdictions and the expert opinion of clinicians. Furthermore, the targets should be regularly assessed and adjustments made, where appropriate.

[22] Hawker GA et al (2000); Hawker GA et al (2001); Hawker GA et al (2002) as reported in Bourne RB et al., *Ibid*., 2005.

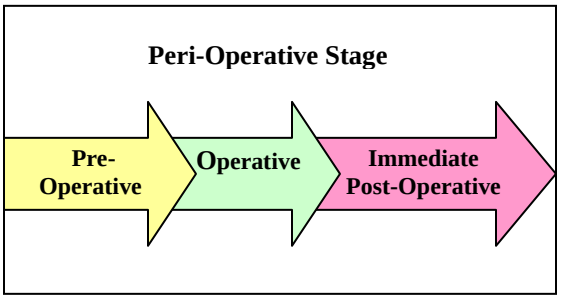
EFFICIENCIES AND SAFETY THROUGH STANDARDISATION

There are opportunities to improve the efficiency of hip and knee joint replacement procedures through standardisation along the patient journey.

Before seeing an orthopaedic surgeon, patients could be triaged by qualified individuals to determine if they need an operation. In its work on developing a priority rating scale and maximum acceptable wait times, the National Standards Committee of the Canadian Orthopaedic Association noted that orthopaedic surgeons see many patients who are not ready for surgery for a variety of reasons.[23] A comprehensive assessment of patients before they are referred to an orthopaedic surgeon would help make better use of the surgeon's expertise and time. Such a model is being piloted in Alberta (see Chapter 9.6: *The Organisation of Services to Meet Future Needs*).

The recent report of the Wait Time Strategy's Surgical Process Analysis and Improvement Expert Panel identified surgical efficiencies that can be gained throughout the peri-operative process which includes three phases:[24]

- Pre-operative: diagnostics, routine testing, patient education, preparation for surgery, preparation for discharge from the operating room and hospital.
- Operative: the surgical day.
- Immediate post-operative: recovery room, post-anaesthetic care unit (PACU).



Report of the Surgical Process Analysis and Improvement Expert Panel (Valerie Zellermeyer, Chair). Prepared for the Wait Time Strategy, June 2005.

Potential peri-operative efficiencies that should be considered for total hip and knee joint replacements include:

- Establish surgical benchmark targets such as the average time it takes to perform a surgery and first case start-time targets. The Surgical Process Analysis and Improvement Expert Panel noted that the Expert Panels established for the Wait Time Strategy should develop benchmark targets for their particular areas. This could include increasing throughput by:
  i) performing three joints a day at a minimum, in the short term.
  ii) establishing processes that support more effective delivery of anaesthesia and the optimal use of operating room resources (e.g., anaesthesia rooms where anaesthetics are given to prepare patients outside the operating room).

[23] *Report on Benchmarks For Wait Times*. The National Standards Committee, Canadian Orthopaedic Association 2005. Ted Rumble and Hans J. Kreder, Co-Chairs, March 2005.
[24] *Report of the Surgical Process Analysis and Improvement Expert Panel* (Valerie Zellermeyer, Chair). Prepared for the Wait Time Strategy, June 2005.

- Standardise peri-operative best practice targets as part of the hospital's operating plan process. The Surgical Process Analysis and Improvement Expert Panel identified 11 peri-operative best practice targets. See Appendix 3 for a summary of these targets.
- Standardise supply chain processes that support the peri-operative stage. The supply chain refers to organised and effective processes that manage how products are selected and purchased. The Surgical Process Analysis and Improvement Expert Panel identified eight best practice supply chain targets. See Appendix 3 for a summary of these targets.
- Create a "fast track system" within a hospital that responds to emergencies (e.g., fractured hips).
- Promote the widespread use of provincial care pathways for hip and knee total joint replacements including the appropriate use of homecare and inpatient rehabilitation. (See Chapter 9.6, *The Organisation of Services to Meet Future Needs*, for initiatives that incorporate care pathways, such as the Toronto Joint Network pilot project).
- Develop provincial standardised best practice targets for immediate post-operative care (e.g., rehabilitation, and step down units).
- Help hospitals and surgical teams increase their effectiveness and efficiencies by publicising best practice hospitals.

The Panel recommends that:

R2 The Ministry of Health and Long-Term Care, in partnership with the orthopaedic community and other stakeholders, support the development of standardised provincial benchmark targets for hip and knee joint replacements including the number of joints that should be performed in a day, processes that support more effective delivery of anaesthesia and the optimal use of operating room resources, provincial best practice targets, and standardised care pathways that include best practices for immediate and longer-term post-operative care.

APPROPRIATENESS TARGETS

Appropriateness targets focus on two issues:

- Are surgeries being done unnecessarily or inappropriately?
- Are surgeons performing an appropriate number of procedures to maintain proficiency and ensure patient safety?

Are Surgeries Being Done Unnecessarily or Inappropriately?

There appears to be general consensus that total joint replacements are appropriate if a patient has persistent pain or disability that interferes with daily activities and is not relieved by medical treatment, and for which there is radiological evidence of joint damage.[25] According to some Ontario clinicians, the most important factors affecting the

[25] National Institutes of Health Consensus and State-of-the-Science Statements (1994, 2003) and Thompson RC et al., (1991) as reported in Bourne RB et al., *Ibid*.

appropriateness of total joint replacements are the presence and severity of pain, the severity of functional impairment, problems with performing a care giving role, and the perceived likelihood of improvement in function with surgery.[26] Spanish clinicians have also identified appropriateness criteria for total hip and knee replacement.[27] For hips, the criteria include previous non-surgical procedures (i.e., standard medical therapies had been tried), pain level and functional limitation. For knees, the criteria include previous surgical management, symptoms, the severity of joint damage on X-ray, localisation within the knee, patient age, and mobility and stability.

Although there is general consensus on the most important factors to consider when determining the appropriateness of total joint replacement, there is no definitive and commonly accepted method to determine appropriate total joint replacements due to the subjective nature of the symptoms and the different values held by individuals assessing appropriateness.[28] However, using appropriateness criteria developed to date, Canadian studies of the appropriateness of total joint replacements have concluded that the vast majority are appropriate.[29]

In the expert view of the Panel members, it appears that joint surgeries are being performed appropriately in Ontario, at this time. Since there is such a backlog of patients who need joint replacements, there is little chance of a patient being operated on who does not need the procedure. The importance of appropriateness targets for joint surgery will become more apparent, however, when the backlog of patients is reduced. A study of variations in knee replacement surgery in Ontario found that – after controlling for age, sex and access to care – the opinions or enthusiasms of orthopaedic surgeons for the procedure was the primary determinant of geographical variations in rates of surgery.[30] This is consistent with the observation noted above that there is no definitive and commonly accepted method of determining appropriate total joint replacements due to the subjective nature of the symptoms and the different values held by individuals assessing appropriateness.

The wide variation in hip and knee joint replacement rates by LHINs, the studies of unmet need, and the fact that new technologies are making joint surgery a more viable option for both young and older people highlight the importance of developing appropriateness targets in the future. These targets should identify appropriate indications for total and partial knee replacements, and for same day surgery.

[26] Brook et al (1986); Naylor CD, Williams JI (1996) as reported in Bourne RB et al. *Ibid*. 2005.
[27] Escobar A et al (2003); Quintana JM et al. (*J Clin Epidemiol* 2000), (*Rheumatology* 2000) and (*Int J Tech Assess Health Care* 2000) as reported in Bourne RB et al., *Ibid*. 2005.
[28] Bourne RB et al., *Ibid*. 2005.
[29] van Walaven et al. (1996); Wright CJ et al. (2002) as reported in Bourne RB., *Ibid*. 2005.
[30] Wright JG et al (1999) as reported in Canadian Joint Replacement Registry, *Ibid*.

Are Surgeons Performing an Appropriate Number of Procedures to Maintain Proficiency and Ensure Patient Safety?

As noted earlier, 56 Ontario hospitals and 247 orthopaedic surgeons performed 22,724 total hip and knee replacement procedures in 2003/04 (Chapter 6: *The Profile of Hip and Knee Joint Replacement Activity in Ontario*). A review of hospital-specific activity indicates that the majority of Ontario hospitals perform a large number of joint replacement surgeries each year (Table 5). It is unclear how many surgeons in each hospital perform these procedures. A number of hospitals perform less than six revisions a year, which may be cause for concern.

Table 5: Number of Ontario Hospitals Performing Total Hip and Knee Joint Replacements by Type of Procedure and Volume of Procedure, 2003/04*

Total Hip Replacement	Volume of Procedures							
	<6	6-24	25-49	50-74	75-99	100-149	150-199	200+
Planned Primary	0	2	6	6	8	12	14	8
Revision	15	28	7	1	4	1	0	0
Unplanned Primary	11	28	15	1	1	0	0	0
Total Knee Replacement								
Planned Primary	0	0	2	3	3	13	9	25
Revision	11	36	4	3	1	1	0	0
Unplanned Primary	50	6	0	0	0	0	0	0

*Table compiled from information reported in Bourne RB et al., 2005.

An Ontario study of complication rates for elective total hip replacement operations found that surgeons who did more than 27 hip replacements annually discharged patients approximately 2.4 days earlier than surgeons with less than nine hip replacements a year, even after adjusting for discharge disposition, hospital volume, patient age, sex, co-morbidity and diagnosis.[31] Complication rates requiring hospital readmission and death rates did not differ by surgeon or hospital volume.

A number of studies analysing joint replacement data of Medicare patients in the US found consistent volume-outcome relationships. One study of elective primary total knee replacement surgery found that compared to patients treated in hospitals with 25 procedures or less, patients treated in hospitals with annual volumes of 200 procedures or more had a lower risk of pneumonia and other adverse outcomes (i.e., death, pulmonary embolus, acute myocardial infarction and deep infection).[32] The study also found that patients had a lower risk of pneumonia and other adverse outcomes when they

[31] Kreder H, Williams J, Jaglal S, Hu R, Axcell T, Stephen D. Are complication rates for elective primary total hip arthroplasty in Ontario related to surgeon and hospital volumes? A preliminary investigation *Can J Surg*. 1998; 41 (6): 431-437.

[32] Katz JN, Barrett J, Mahomed NN, Baron JA, Wright RJ, Losina E. Association between hospital and surgeon procedure volume and the outcomes of total knee replacement *J Bone Joint Surg Am.* 2004; Sep 86-A (9); 1909-16.

were operated on by surgeons who performed more than 50 procedures annually compared to surgeons who performed 12 procedures or less. Another study of Medicare patients who underwent elective primary total hip replacements found that patients of high volume surgeons had lower rates of revision hip replacements than patients of low volume surgeons (less than 12 elective primary total hip replacements annually) regardless of hospital volumes.[33] The effect of surgeon volume on revisions was striking in the first 18 months after surgery but was not evident in subsequent years.

In the Panel's view, research findings on the relationship between volume of surgery and outcomes do not support setting specific mandatory volume limits in Ontario, at this time. It would, therefore, be inappropriate to identify the number of hip and knee joint replacements that a surgeon should perform each year to maintain proficiency. Rather, the Panel believes that there is a need to increase the use of best practice guidelines, actively monitor quality and safety outcomes (e.g., length of stay, complication rates, death rates, etc.), and focus on improving outcomes. The Panel did note, however, that complex joint revisions should be performed in hospitals that have sufficient volumes to support the specialised staff, expertise and equipment that are needed for this surgery.

A number of players including the orthopaedic community, hospitals and Local Health Integration Networks (LHINs) all have a role to play in monitoring and improving performance to ensure quality and patient safety. The orthopaedic community is responsible for bringing its clinical expertise to bear on the development of standards, guidelines and best practices. Hospitals are responsible for monitoring and improving performance and ensuring access to safe quality care within their organisations, whereas LHINs are responsible for these functions within their networks. For example, LHINs would be responsible for ensuring that complex joint revisions are performed in hospitals with sufficient volumes.

The Panel recommends that:

R3 The orthopaedic community, hospitals and Local Health Integration Networks support the provincial use of best practice guidelines, actively monitor quality and safety outcomes, and focus on improving outcomes. Furthermore, complex joint revisions should only be performed in hospitals that have sufficient volumes to support the specialised staff, expertise and equipment that are needed for this surgery.

PATIENT PRIORITY RATING TOOLS AND WAIT TIME TARGETS

Although surgeons use their professional opinion to prioritise patients by the urgency of their condition, Ontario does not have a uniform patient priority rating tool for joint replacement surgery. According to Bourne et al, there is general consensus among physician experts in Ontario that patients with sufficient pain and/or functional impairment to warrant a planned, primary total joint replacement should wait no more

[33] Losina E, Barrett J, Mahomed NN, Baron JA, Katz JN. Early failures of total hip replacement: effect of surgeon volume *Arthritis Rheum* 2004; Apr: 50 (4): 1338-1343.

than 26 weeks, although this has not been established formally. This maximum wait time is consistent with physician opinion in countries such as Spain, New Zealand, and the United Kingdom.[34]

A formal patient priority rating system would enable surgeons, hospitals and the Ministry to monitor demand for service, better manage access, and target system improvements. A rating system should:

- Delineate priority categories and wait time targets whereby the most urgent patients receive surgery before less urgent patients.
- Recognise functional and social factors in addition to physiological damage to the joint.
- Be easy to administer, and use a minimum of time and resources.

Some of the key priority rating tools and wait time targets are summarised below.

The *Ontario Joint Replacement Registry* developed wait time threshold guidelines for total hip and knee replacement surgery based on patient severity and outcomes.[35] Using the Registry's pre-operative severity scores, the length of the wait and post-operative outcomes, and literature reviews, the Registry determined waiting thresholds based on pre-operative WOMAC™ scores and one year post-operative outcomes.[36] Three patient priorities and wait targets were recommended based on patient severity at the decision for surgery. Priorities ranged from Priority I (highest) with a maximum wait of one month to Priority III with a maximum wait of six months. The priorities are to be followed in conjunction with the surgeon's clinical assessment, taking into consideration patient preference (e.g., a patient may prefer to delay surgery beyond the recommended threshold). See Appendix 4 for the Registry's priority rating scale.

The Western Canada Waiting List Project (WCWL) is a federally and provincially funded partnership of 19 organisations created to develop tools for managing waitlists.[37] The WCWL panel on hip and knee replacement surgery developed maximum acceptable wait times for hip and knee replacement surgery by identifying seven key criteria affecting urgency: pain on motion, at rest and with walking; other functional limitations; abnormal findings on examination; potential for progression of disease based on X-ray findings; and threat to role and/or independence.[38] Ratings were weighted and summed to produce

[34] As reported in Bourne RB et al. *Ibid*., 2005.
[35] Ontario Joint Replacement Registry (Dr. R. B. Bourne, Medical Director; Dr. Bert Chesworth, Director of Data Operations and Research; Dr. Nizar Mahomed, Chair OJRR Research Sub-Committee), *Guideline for Wait Time Thresholds for Total Hip and Knee Replacement Surgery Based on Severity (Summary).* Submitted to the Ministry of Health and Long-Term Care, June 2005. Updated information provided by Susan Warner, July 21, 2005.
[36] WOMAC is the Western Ontario McMaster University Osteoarthritis Disability Questionnaire, a tool for quantifying patient function and pain.
[37] Arnett G, Hadorn DC. 2003 "Developing priority criteria for hip and knee replacement: results from the Western Canada Waiting List Project" *Can J Surg* 2003 Aug; 46(4); 290-296. Also see, www.wcwl.ca.
[38] Hadorn DC (2003); Arnett G, Hadorn DC (2003); Conner-Spady et al. (2004) as reported in Bourne RB et al., *Ibid*.

three priority levels ranging from I (least urgent) with a maximum wait of five months, to III (most urgent) with a maximum wait of one month. Experts have since endorsed the priority levels. Additional research is being conducted on the ratings including comparing the criteria scores with scores from other tools such as the WOMAC, testing the forms with general practitioners, and developing a set of operational definitions and instruments to accompany the criteria. See Appendix 4 for the WCWL Project's Priority Rating Scale.

The *National Standards Committee of the Canadian Orthopaedic Association* used a consensus approach to develop a priority rating scale and maximum acceptable wait times for benchmarking purposes, after considering the issues and reviewing the experiences of other jurisdictions.[39] The committee focused on a priority rating scale for scheduled procedures. These patients are generally not admitted immediately after consultation but tend to be scheduled for surgery and discharged home. Although some acute fractures and soft tissue injuries – such as locked knee – are discharged home and scheduled for surgery, these were not considered to be scheduled procedures, at this time.

In the National Committee's view, no patient should be asked to wait longer than six months following a mutual decision by the surgeon and patient to operate. Each patient's actual maximum acceptable wait time for surgery is determined using a three scale priority system similar to the one used in Australia. Priorities range from I (highest) with a maximum wait of one month, to Priority III with a maximum wait of six months. The committee noted that maximum acceptable wait time benchmarks should be based on the best available evidence and be constantly updated as new information becomes available. See Appendix 4 for the National Standards Committee's Priority Rating Scale.

The *Wait Time Alliance for Timely Access to Health Care* – formed in 2004 and made up of several national medical specialty societies – recently released its final report on wait time benchmarks for a number of specialty areas.[40] Wait time benchmarks for hip and knee replacement surgery are assessed using a three point scale that includes emergency (with an immediate to 24 hour wait), urgent (within 30 days if priority 1 and within 90 days if priority 2), and scheduled (a consultation within three months, and treatment within 10 working days of consultation). See Appendix 4 for the Wait Time Alliance's Wait Time Benchmarks by Priority Level.

A great deal of research has been conducted on whether the timing of surgery impacts on outcomes. The *National Standards Committee of the Canadian Orthopaedic Association's* report on benchmarks presents a compelling summary of research that links timeliness of surgery to outcomes.[41] This summary notes that:

[39] *Report on Benchmarks For Wait Times*. The National Standards Committee, Canadian Orthopaedic Association 2005. Ted Rumble and Hans J. Kreder, Co-Chairs, March 2005.
[40] *It's about time: Achieving benchmarks and best practices in wait time management.* Final Report by the Wait Time Alliance for Timely Access to Health Care, August 2005.
[41] For an overview of the literature and references, see *Report on Benchmarks For Wait Times*. The National Standards Committee, Canadian Orthopaedic Association 2005. Ted Rumble and Hans J. Kreder, Co-Chairs, March 2005.

- *Early total joint replacement surgery is associated with better functional outcomes.* Fortin et al. (2002) found that patients with worse functioning at the point of decision for surgery – as measured by WOMAC and SF-36 scores – had worse functioning six months and two years after surgery compared to patients with better functioning at the point of decision for surgery. As well, Holtzman et al. (2002) found that patients with worse pre-operative status were more likely to be worse off one year post-surgery. Hajar et al (2002) also found that measures of pain and function were worse one year later among patients with worse scores prior to a total hip replacement. Patients who waited more than twelve months for consultation with a surgeon or for the actual surgery suffered significantly worse measures of pain and function twelve months post-total hip replacement.
- *Health status declines while waiting for surgery.* Killi et al. (2003) concluded that patients requiring total hip replacement deteriorate while on the waiting list.
- *There are economic advantages to performing surgery earlier.* Saleh et al.'s work (1997) examined whether there were economic advantages to performing total hip arthroplasty early rather than having patients wait. The researchers concluded that there is the potential for substantial savings in resources as a result of timely surgery.

A recent Ontario Joint Replacement Registry analysis found that some patients with high baseline severity at the point of decision for surgery showed excellent outcomes one year after surgery (their median wait time was under three months).[42] The Registry's analysis also showed, however, that waiting more than one year from referral to surgery decreases the chances of large gains from surgery. Compared to patients who received their total joint replacement within six months of referral, those who waited over 12 months from referral to surgery were almost two times more likely to show small gains from surgery.

Bourne et al. note that proponents of urgency rating severity systems suggest that certain patients are at high-risk of disease progression and will have poorer post-operative outcomes if their surgery is not completed in a timely manner. [43] The authors conclude that, in fact, evidence for improved outcomes with quicker access is circumspect and inconclusive. Indeed, what one does while waiting for surgery may impact on disease progression. Preliminary results from a London, Ontario study using therapists from The Arthritis Society have shown reduced deterioration in patients waiting for surgery who have participated in a rehabilitation program.[44]

The Panel supports the need to develop a priority rating scale that reflects the full range of patients including emergency, urgent and scheduled cases. Each priority should have a target time frame that identifies the time that each level of patient should wait for a total

[42] Ontario Joint Replacement Registry (Dr. R. B. Bourne, Medical Director; Dr. Bert Chesworth, Director of Data Operations and Research; Dr. Nizar Mahomed, Chair OJRR Research Sub-Committee), Guideline for Wait Time Thresholds for Total Hip and Knee Replacement Surgery Based on Severity (Summary). Submitted to the Ministry of Health and Long-Term Care, June 2005.
[43] Bourne RB et al., *Ibid*.
[44] Jo-Anne Sobie, The Arthritis Society, Ontario Division. Written communication, August 25, 2005.

hip or knee joint replacement. More urgent patients should receive surgery before less urgent patients. The scale should recognise functional and social factors in addition to physiological damage. Most importantly, the scale should be easy to administer, and use a minimum of time and resources.

The Panel debated whether the scale should incorporate a scoring system such as the WOMAC or the Functional Independence Measure (FIM). One of the concerns with a scale such as the WOMAC is that it is time and resource intensive to complete. Although the motor FIM score is quicker and simpler to determine, the Panel concluded that, at this time, the priority rating scale for total hip and knee joint replacement in Ontario would not include a scoring system. This does not preclude such a system being incorporated in the future.

Table 6 presents the Panel's recommended priority rating scale and the target time frame for total hip and knee joint replacement in Ontario.

Table 6: Recommended Priority Rating Scale and Target Time Frame for Total Hip and Knee Joint Replacement

Priority Rating	Target Time Frame
0	**Immediate next available** • Emergent such as peri-prosthetic fracture, uncontrolled deep infection of a joint replacement, acute irreducible dislocation of a total hip joint replacement.
I	**6 weeks maximum (1.5 months)** • Urgent hip or knee joint conditions/complications that actively affect an individual's role and independence such as bed ridden, impending fracture, recurrent dislocation of a total hip joint replacement.
II	**12 weeks maximum (3 months)** • Some pain and disability because of a hip or knee joint condition that is an imminent threat to role and independence.
III	**26 weeks maximum (6.5 months)** • Minimal pain and disability because of a hip or knee joint condition with role and independence not threatened.

The Panel recommends that:

R4 A priority rating scale with target time frames be adopted for total hip and knee joint replacements in Ontario. The rating scale – measuring the time from the decision to operate to the operation – should reflect four priority ratings:

- **0: Emergent such as peri-prosthetic fracture, uncontrolled deep infection of a joint replacement, acute irreducible dislocation of a total hip joint replacement.**
- **I: Urgent hip or knee joint conditions/complications that actively affect an individual's role and independence such as bed ridden, impending fracture, recurrent dislocation of a total hip joint replacement.**
- **II: Some pain and disability because of a hip or knee joint condition that is an imminent threat to role and independence.**
- **III: Minimal pain and disability because of a hip or knee joint condition with role and independence not threatened.**

9.2 Information and Information Management

Three areas were addressed related to information and information management:

- Public and Patient Information
- Provider Information
- Information Management to Monitor Performance and Support Ongoing Improvements

PUBLIC AND PATIENT INFORMATION

Primary and specialised healthcare providers, and organisations and associations such as hospitals and The Arthritis Society, play a valuable role providing information and support to the public and patients on joint health and disabilities. These efforts tend to be ad hoc and disjointed rather than part of a comprehensive approach to public and patient education. All members of the public need consistent information on what causes joint problems, ways to avoid joint damage, and when to see a health provider for care. Once an individual seeks professional help, he or she needs consistent information on:

- Viable options to address joint problems (including lifestyle changes such as exercise and losing weight, medical treatment and surgery); and
- If surgery is warranted, what to expect when waiting for surgery, how to manage while waiting, what to expect after surgery, and ways to become as fully functioning as possible after surgery.

There are opportunities to capitalise on current infrastructure and efforts when educating the public and patients. For example:

- Primary and specialised healthcare providers can use patient visits as teaching moments. Providers such as physiotherapists and occupational therapists are well trained to educate patients and evaluate their needs related to joint problems, mobility and functional impairments.
- Information can be provided to organisations to disseminate on their physical and web sites (e.g., hospitals and professional organisations such as Canadian and Ontario associations that represent orthopaedic surgeons, physiotherapists and occupational therapists).
- Associations such as The Arthritis Society – which already makes available a wide range of information and tools – can take a more prominent leading role to help further public awareness of joint health and disability. The Society's website provides information on the types of arthritis, tips for living well, programs and resources, research and local programs (www.arthritis.ca). In addition, The Arthritis Society and the Total Joint Network have partnered with the GTA Rehab Network which is leading the development of an evidence-based patient website. Based on an extensive literature review and patient focus groups, this information website explains what to expect, how to prepare, how to exercise, and how to continue to improve after a joint replacement. The web site will be launched on September 21, 2005 (www.myjointreplacement.ca). The Arthritis Society is also planning to lead a comprehensive and coordinated patient education forum for healthy joints. The Summit on Arthritis Care – to be held November 1-2, 2005 in Ottawa – is a consortium of all the key agencies involved in research, patient care, advocacy and education. Over the past four months working groups have drafted eight standards that include standards for public awareness, and public education.

Information will help the public and patients navigate their way through the system. Information should be communicated using a wide range of methods including printed information such as brochures and community newspaper articles, and web-based electronic information. As well, public spaces such as shopping malls should be used to disseminate information.

The Panel recommends that:

R5 The Ministry of Health and Long-Term Care support efforts to promote public and patient education on joint health and disabilities, including the benefits and risks of joint replacement surgery.

PROVIDER INFORMATION

Primary care providers need to play a more active role in assessing and diagnosing joint problems and supporting patients who have musculoskeletal problems. Currently, family physicians receive minimal training on musculoskeletal issues in their medical school curriculum. Continuing education programs would equip these professionals with valuable information to help their patients. One such program – funded by Health Canada's Primary Health Care Transition Fund to March 31, 2006 – is offered to primary

healthcare providers by The Arthritis Society. *Getting a Grip on Arthritis* is a national primary healthcare community initiative that is designed to improve the ability of primary healthcare providers to diagnose osteoarthritis and rheumatoid arthritis, and provide helpful advice to patients. The program emphasises arthritis prevention, early detection, local collaborative care, self-management, and timely referral to specialised care, as needed. The program includes five components:

- Assessing the learning needs of primary healthcare providers and their patients about arthritis, and assessing the arthritis-related community resources that are available.
- Updating and adapting clinical practice guidelines for arthritis, including education material for primary healthcare providers and patients to help diagnosis and treat arthritis.
- Providing workshops throughout Canada for primary healthcare providers to learn more about the diagnosis and treatment of arthritis.
- Developing methods to reinforce training such as newsletters, follow-up workshops, and so on.
- Conducting ongoing evaluation of the program and its objectives.

The project has successfully linked primary care physicians with community resources and created community teams with an expertise in arthritis. Such programs would be especially valuable to primary care providers practising in remote areas where there are no orthopaedic surgeons.

INFORMATION SYSTEMS TO MONITOR PERFORMANCE AND SUPPORT ONGOING IMPROVEMENTS

The Wait Time Strategy makes hospital boards and CEOs accountable for waiting times in their facilities. Boards and management need simple information systems to monitor performance and support ongoing improvements.

In April 2005, the Minister and Deputy Minister of Health and Long-Term Care – George Smitherman and Ron Sapsford – approved the recommendations and funding outlined in the *Report of the Wait Time Information Expert Panel*. Considerable progress has been made on implementing this plan. The Wait Time Information Expert Panel and project team finalised the business, functional, technical and security requirements for the provincial wait time information system.

The Wait Time Information Strategy (WTIS) will be a single provincial information system linked to all hospitals participating in the Wait Time Strategy (i.e., those receiving wait time funded volumes). The success of the WTIS depends on a provincial Enterprise Master Patient Index (EMPI). In June 2005, the Deputy Minister of Health and Long-Term Care announced that a provincial EMPI will be developed along with the WTIS. Although implementation of the EMPI will first focus on meeting the needs of the WTIS, it will be designed to support the needs of other critical transformation initiatives such as LHINs and eHealth (e.g., Picture Archive and Communication Systems or PACS). Work is well underway on the EMPI project. A request for proposals for EMPI software has

been posted and the vendor will be selected in September. Collaborative discussions are ongoing with Ontario's eHealth leaders, and Canada Health Infoway to leverage its knowledge and tools and to secure additional funding for the project.

The first group of selected hospitals will implement the WTIS and EMPI by March 31, 2006. The next round of hospitals will start implementation immediately afterwards. The target is to complete implementation in approximately 50 hospitals – which represent 80% of Wait Time Strategy-funded volumes – by December 2006.

A Wait Time Information Office has been established to receive, analyse and report on wait time data from all hospitals that received wait time volume funding. The Office has been monitoring compliance with data reporting requirements, and working with hospitals to address issues of compliance and data quality. Beginning in September, wait times by hospital will be reported publicly on the Wait Times website using data collected through the current interim wait time data collection process.

When developing the WTIS, current information systems – such as those used by the Ontario Joint Replacement Registry and the Cardiac Care Network of Ontario – were reviewed to determine the most effective and efficient way to capture and report wait time information for all five clinical areas. For various reasons, the Ontario Joint Replacement Registry (OJRR) was found to be incompatible with the provincial WTIS. Currently, orthopaedic surgeons submit wait time and surgical data on total hip and knee replacement surgeries to the OJRR. As of October 1, 2005, this data will be collected and reported as follows:

- Hospitals will submit data required by the Wait Time Strategy funding agreements to the Ontario WTIS Office which is responsible for managing and reporting wait times for the five clinical areas. When the WTIS is fully functioning, orthopaedic surgeons and hospitals will use this system to input and receive data.
- Surgeons will submit surgical data to the Canadian Joint Replacement Registry, which is a division of the Canadian Institute for Health Information and a national registry that collects and reports the surgical data currently being collected and reported by the OJRR.

A transition strategy for the OJRR was developed collaboratively by OJRR's management, the London Health Sciences Centre (OJRR's administrative centre), the Canadian Institute for Health Information and the Ministry. The Minister approved the transition strategy in July 2005, and implementation is underway.

In addition to minimum data requirements to be submitted to the Ministry, the Wait Time Strategy's conditions for additional funding stipulate that hospitals must demonstrate compliance with surgical efficiency conditions. These include:

- Having a group responsible and accountable for planning and managing operating theatre performance and collecting data to improve OR efficiency.
- Capturing and reporting, by September 2005, the following information:

- Cancellations: The number of operations cancelled on the day of surgery that are cancelled by the patient, the hospital for non-clinical reasons, and the hospital for clinical reasons.
- Total number of patients cancelled within 48 hours of the surgical day that are cancelled by the patient, by the hospital for non-clinical reasons, and the hospital for clinical reasons.
- Delays: First case start-time accuracy (Delay=Time>15 Minutes): Delays that are due to patient action (i.e., late arrival, etc), due to clinical reasons, due to non-clinical reasons (i.e. equipment failure, ICU delay, etc).
- First Case Start-Time Accuracy (Delay=Time>15 Minutes): Defined as first patient in the room.
- Unplanned OR Closures: Closures due to unplanned events (i.e., no scheduled cases, lack of Anaesthesia, lack of staff, etc).
- Pre-Admission Process: Percentage of scheduled surgical cases pre-assessed and/or pre-screened through a pre-admission process.

The Panel believes that hospitals should be required to submit quality and safety indicators as part of the Wait Time Strategy. Local Health Integration Networks should use this information to monitor performance and focus improvement efforts. These indicators should include, but not be limited to, length of stay, complication rate, death rate, and post-operative outcomes (ideally at three, six and 12 months). This information should be available by hospital on the Wait Times website. Additional work is needed to identify these quality indicators.

In addition, the Panel supports the goals and objectives of the Canadian Joint Replacement Registry (CJRR) that relate to outcomes. The CJRR is a national registry that follows joint replacement recipients over time to monitor their outcomes including revision rates. The CJRR's ultimate goal is to improve the quality of care and clinical outcomes of joint replacement recipients through post-market surveillance of orthopaedic implants, improved quality of surgical practices and the study of risk factors affecting outcomes. CJRR is working towards obtaining and analysing information on health outcomes of joint replacement patients, in partnership with Statistics Canada and other organisations. CJRR also plans to: i) pursue outcomes assessment in terms of technologies used in joint replacement; ii) work with Statistics Canada to collect vital statistics data on joint replacement patients; and iii) measure and monitor revision rates, particularly as they relate to specific implants.

9.3 Human Resources

A sufficient number of appropriately qualified human resources is needed to meet the increasing demand for hip and knee total joint replacement surgery. The Panel examined orthopaedic surgeons, operating room staff such as anaesthesiologists and nurses, and rehabilitation professionals.

Orthopaedic Surgeons: An Overview and Ways to Maximise the Use of Their Skills

There were 337 active orthopaedic surgeons in Ontario in 2000 or just over two full-time equivalents per 100,000 population.[45] Ontario educates a high proportion of the orthopaedic surgeons trained in Canada. In 2003, Ontario trained 44% of the surgeons who were trained in Canada (Table 7).

Table 7: Physicians Exiting Orthopaedic Surgery Training in Ontario and Canada, 1993-2003

Year of Training	Number Trained		Percentage Trained in Ontario
	In Ontario	In Canada	
1993	21	50	42%
1994	16	44	36%
1995	21	50	42%
1996	25	47	53%
1997	21	53	40%
1998	21	50	42%
1999	23	57	40%
2000	25	48	52%
2001	23	51	45%
2002	24	53	45%
2003	27	61	44%

*Source: Canadian Post-M.D. Education Registry (CAPER), CMA Masterfile. Provided by Dr. Peter Schuringa, July 22, 2005.

A substantial number of Ontario-trained orthopaedic surgeons leave the province to practise. Table 8 presents the number of orthopaedic surgeons trained in Ontario by their year of training and practice location two years later. Of the 220 orthopaedic surgeons trained in Ontario between 1993 and 2002, 128 or 58% were practising in Ontario two years after completing their post-MD training.

Table 8: Physicians Exiting Orthopaedic Surgery Training in Ontario, by Year of Training and Practice Location Two Years After Exit From Post-M.D. Training*

Year Trained and Number Trained		Practice Location Two Years After Exit From Post-M.D. Training							
		Ontario	Nfld, NS, NB	Quebec	Man, Sask	Alta, BC	US	Other	Unkn
1993	21	10	2	1	1	2	4		1
1994	16	12			1	2	1		
1995	21	12		1	2	2	4		
1996	25	16	1	2	1		5		
1997	21	11		1	1	2	6		
1998	21	10	1			2	6	1	1
1999	23	14	2			3	3	1	
2000	25	15	2	1		3	3		1
2001	23	16		1		2	3		1
2002	24	12	3	1	1	4	2		1
Total	220	128	11	8	7	22	37	2	5

*Source: Canadian Post-M.D. Education Registry (CAPER), CMA Masterfile. Provided by Dr. Peter Schuringa, July 22, 2005.

Ontario is a net "exporter" of orthopaedic surgeons having exported 92 or 42% of the surgeons that it trained between 1993 and 2002. Ontario only attracted 22 surgeons

[45] Shipton D, Badley EM, Mahomed NN "Critical Shortage of Orthopaedic Services in Ontario, Canada" *The Journal of Bone and Joint Surgery.* 2003; 85-A (9) September: 1710-1715.

trained in other provinces in that time period.[46] Ontario has an estimated 34% of the orthopaedic surgeons in Canada who conduct hip and knee replacements.[47]

A recent study on the adequacy of orthopaedic services in Ontario concluded that there is a shortage of services in this province, which will be exacerbated by the aging of a profession already working near full capacity.[48] The study further noted that the estimated supply of orthopaedic surgeons in Ontario (two full-time equivalents per 100,000 population) falls short of the recently calculated requirement in the United States (5.6 full-time equivalents per 100,000 population).

Training more orthopaedic surgeons in Ontario is a longer-term solution that can help address the increasing demand for joint replacement surgery. However, given the high proportion of surgeons that leave Ontario, solutions to improve access and reduce wait times must focus on recruiting and retaining Ontario-trained surgeons in Ontario, and maximising the efficient use of current resources.

A Canadian study of 1995 graduates who moved to the United States found that 98% of college and 77% of university graduates whose field of study was in health or in the health sciences moved mainly for work-related reasons. This compared to 57% of all other graduates. A total of 58% of health graduates moved due to greater job availability in general, 48% moved due to greater job availability in a particular field, and about 30% moved for higher salaries.[49] A recent study of Canadian physicians noted that since the mid-1990s, fewer physicians have been leaving Canada for other countries.[50] In 2004, more physicians returned to Canada than moved abroad (317 and 262, respectively). The other notable trend is that Canada's total number of physicians has kept pace with population growth since the 1990s.

It has been estimated that orthopaedic surgeons only spend about a third of their time operating, and that an increasing number of surgeons are working below one full-time equivalent due to a lack of resources.[51] The lack of sufficient operating room time and operating room supports such as beds, equipment, implants, professional support staff such as anaesthesiologists and nurses, and rehabilitation services all contribute to orthopaedic surgeons leaving Ontario to seek job opportunities elsewhere. Increasing operating room time and supports would help create more work opportunities for new

[46] OPHRDC Active Physician Registries 1993-2002. Report prepared July 21, 2004. Provided by Dr. Peter Schuringa, July 22, 2005. These data do not indicate whether Ontario gained orthopaedic surgeons from outside of Canada.
[47] Canadian Joint Replacement Registry, *Ibid*.
[48] Shipton D, Badley EM, Mahomed NN, *Ibid*.
[49] Frank J, Belair E 1999 *South of the Border: Graduates from the Class of /95 Who Moved to the United States.* Ottawa: Human Resources Development Canada and Statistics Canada (http:www.hrdc-drhc.gc.ca/arb).
[50] Canadian Institute for Health Information, *Supply, Distribution and Migration of Canadian Physicians*, 2004 (www.cihi.ca).
[51] Hans J. Kreder (Chair, National Standards Committee, Canadian Orthopaedic Association; Representative of the Ontario Orthopaedic Association). *Critical Shortage of Orthopaedic Services* Presentation to the Canadian Orthopaedic Association, June 2005.

surgeons as well as improve the working conditions of surgeons who are currently practising.

There are opportunities to improve the efficient and effective use of highly skilled orthopaedic surgical resources. The *Report of the Surgical Process Analysis and Improvement Expert Panel* recommended a number of strategies to expand surgical resources, including:[52]

- *Increase the use of first assist surgical assistants, Registered Nurse first assistant and Registered Nurse first assistant (Advanced Practice)*: The Panel recommended that the Ministry of Health and Long-Term Care support the implementation of roles that complement and expand surgical resources provided by the surgical specialties.
- *Increase the use of peri-operative technical assistants*: The Panel recommended that the Ministry support the development of a standardised peri-operative technician role. This role should be open to Registered Practical Nurses and other health care personnel with appropriate basic health care education, including foreign-trained healthcare providers who are not able to gain employment in their specialty field.
- *Expand the use of interdisciplinary peri-operative teams*: The Panel recommended that hospitals support the development of innovative interdisciplinary peri-operative teams that include the use of other healthcare providers in addition to surgeons, anaesthesiologists and nurses. These providers could include technical assistants and others that would increase efficiencies while maintaining safety and quality, and help minimise nurses doing non-nursing duties.

In addition to the strategies noted above, there are opportunities to maximise the skills of orthopaedic surgeons through the innovative use of other healthcare professionals and innovative models of care. For example:

- Enhance the role of family physicians in assessing the need for joint replacements by increasing the musculoskeletal component in medical school curricula, and providing continuing education opportunities to practising family physicians.
- Use healthcare professionals in pre-operative clinics to assess the need for joint surgery, provide pre-operative education and conduct pre-operative screening (e.g., nurse practitioners, clinical nurse specialists, physiotherapists). St. Michael's Hospital (Toronto) and The Arthritis Society have developed a post-graduate CME credentialed one-year course that results in an extended class of rehabilitation practitioner, the Advanced Clinical Practitioner in Arthritis Care. In June 2006, the first five graduates will be able to use advanced skills within Arthritis Centres and in the North to screen and triage patients, support specialists, and provide case management to patients who need community but not specialist care.
- Use healthcare professionals to assess patients post-operatively and in follow-up clinics (e.g., family physicians, fellows and residents in teaching hospitals, nurse practitioners or nurses with specialised training in community hospitals, physiotherapists). These professionals can alert the surgeon if the patient's condition needs specialised attention.

[52] Valerie Zellermeyer, Chair. Prepared for the Wait Time Strategy, June 2005.

- Promote the use of telemedicine to support family physicians in smaller and more remote areas who need specialised musculoskeletal consultations for their patients. Appropriate compensation would be required.
- Support "visiting orthopaedic surgeons" who routinely go from larger centres to smaller hospitals to operate. For example, "visiting specialists" are commonplace in North West Ontario. Orthopaedic surgeons have been performing out-patient procedures – such as arthroscopies – in many smaller communities for the past 25 years. Three years ago, Dryden's surgical program was expanded to perform joint arthroplasties. Initially funded out of the hospital's global budget, this program has continued to receive hospital support because of the overwhelming need of local population, and the recognised benefit to a community that is a four hour drive from the nearest tertiary centre in Thunder Bay. Another example of the "visiting specialist" occurs with Toronto teaching hospital orthopaedic surgeons who perform complex surgeries in larger community hospitals in the Greater Toronto Area.
- Exporting this expertise would help improve access and reduce wait times for both routine and more complex surgery.

The Panel recommends that:

R6 The Ministry of Health and Long-Term Care, in partnership with the orthopaedic community, focus efforts on recruiting and retaining Ontario-trained surgeons in Ontario. This includes increasing operating room time and supports, improving the working conditions of surgeons, and supporting the innovative use of other healthcare professionals and innovative models of care. In addition, more orthopaedic surgeons should be trained in the long term to help meet the increasing demand for joint replacement surgery.

Operating Room Staff: Anaesthesiologists and Nurses

The *Report of the Surgical Process Analysis and Improvement Expert Panel* noted that Canada is short 200-250 anaesthesiologists; 80-100 of these shortages are in Ontario (Engen 2005).[53] Many factors have led to the shortage of anaesthesiologists including cutbacks in medical school enrolments; a reduction in residency slots; a curtailment of international anaesthesiologists from entering the licensing and certification process; the expansion of anaesthesiology out of the operating room into acute pain, chronic pain, pre-assessment, intensive care unit, and the post-anaesthetic care unit; and the out migration of anaesthesiologists to the US and other jurisdictions. The shortage of anaesthesiologists is a significant barrier to the utilisation of peri-operative resources. The Surgical Process Analysis and Improvement Expert Panel recommended a number of strategies to expand anaesthesia resources, including:[54]

- *Increase the use of anaesthesia assistants:* The Panel recommended that the Ministry support the implementation of advance practice roles to complement and expand

[53] Valerie Zellermeyer, Chair. Prepared for the Wait Time Strategy, June 2005.
[54] *Ibid*.

anaesthesia services currently provided by anaesthesiologists. Potential roles include the general practitioner anaesthetist, the anaesthesia assistant and the acute care nurse practitioner with special training in anaesthesia. The type of hospital will influence the model that is adopted.

- *Expand the use of anaesthesia teams*: The Panel recommended that Ontario hospitals incorporate the use of teams to provide anaesthesia services. Depending on the type of hospital and the surgery, anaesthesia teams could include a combination of anaesthesiologists, anaesthesia assistants, advanced care nurse practitioners, respiratory therapists and others.

With regard to nursing, a number of the recommendations made by the Surgical Process Analysis and Improvement Expert Panel focus on nursing roles to maximise the skills of orthopaedic surgeons and anaesthesiologists. A major difficulty is that there is a nursing shortage. It is predicted that by 2008, Ontario hospitals could experience a projected shortfall of up to 12,897 full time registered nurses and 4,025 registered practical nurses.[55] Although retirement will be a significant factor in nurse supply over the next five years, there are concerns about a lack of sufficient seats in nursing programs, clinical opportunities for students and faculty who are graduate prepared. Furthermore, about 45% of RNs and 52% of RPNs are not being employed to their full potential, choosing to work either casual or part-time. It has been estimated that if these nurses worked full time in 2001, the equivalent of 2,592 full-time positions would have been available. The Ministry of Health and Long-Term Care has a provincial human resource planning process that is focused on attracting people to the healthcare professions, and identifying ways to retain these professionals.

Rehabilitation Professionals

Rehabilitation professionals are necessary to manage individuals who do not yet need joint replacements, who are waiting for joint surgery, or who have had surgery and need to regain physical functioning. There are shortages of rehabilitation professionals such as physiotherapists and occupational therapists in hospitals and the community sector in Ontario. A survey of hospitals and health provider agencies found the most reported vacancies for personal support workers/healthcare aides (511), physiotherapy (147) and occupational therapy (117).[56] The vacancy rates for rehabilitation-related positions were also high. The vacancy rates for rehabilitation assistants was 10%, followed by physiotherapists, occupational therapists and physiotherapist assistants, each at 8%. The study noted that hospitals and the community sector reported a fair amount of difficulty in recruiting new employees; the inability to offer full-time employment was a major problem. As noted above, the Ministry of Health and Long-Term Care has a provincial

[55] O'Brien-Pallas L et al. *Stepping to Success and Sustainability : An Analysis of Ontario's Nursing Workforce* Nursing Effectiveness, Utilization and Outcomes Research Unit, University of Toronto, October 2003.

[56] Ontario District Health Councils Provincial Health Care Labour Market Survey, July 2002, and The Ontario Hospital Association First Annual Health Care Provider Labour Market Survey, February 2002. *Combined Findings Report*. March 31, 2003.

human resource planning process that is focused on attracting people to the healthcare professions, and identifying ways to retain these professionals.

9.4 Technology

Joint implant technology has advanced quite rapidly since hip and knee joint replacements were first introduced. The basic components that make up a joint implant – hip socket, hip shaft, knee implants that rotate and bend – are well established. What varies are the materials that make up these components (e.g., ceramic, metal, cross-linked polyethylene) and the instrumentation. New and more durable materials are prolonging the life of joints.

Generally, new technologies – especially when first introduced – tend to be more expensive than those that are currently in use. Although advancements in technology need to be supported, cost benefit analyses are also needed to ensure that the higher costs are justified by improved outcomes and quality of care. Currently, most decisions about which new technologies to adopt are made by individual surgeons or hospitals. A standardised comprehensive approach is needed to guide the introduction of new joint implant technologies in Ontario, based on evidence. This approach needs to involve the orthopaedic community which will bring its clinical expertise to bear on the assessment of new technologies. Local Health Integration Networks need to work with the orthopaedic community and hospitals to adopt a comprehensive approach to guide the introduction and purchasing of joint implants (see Chapter 9.5, *Funding).*

Many international, national and provincial organisations and groups evaluate medical technologies. In Ontario, the Ontario Health Technology Advisory Committee (OHTAC) plays a valuable role in evaluating emerging technologies and recommending field evaluations of emerging devices to the Medical Advisory Secretariat. The evaluations done by organisations such as OHTAC should be used to inform the adoption, diffusion and withdrawal of joint replacement technologies. Furthermore, the orthopaedic community should proactively identify emerging technologies to be assessed by existing evaluation groups.

Finally, there are concerns about the safety and potential risks of new technologies. There is a need to monitor implants that fail or lead to complications. This should be the responsibility of the Canadian Joint Registry which can bring a national perspective on implant safety and quality issues.

The Panel recommends that:

R7 Local Health Integration Networks (LHINs) work with the orthopaedic community and hospitals to adopt a comprehensive approach to guide the introduction of new joint implant technologies based on evidence. The evaluations done by organisations such as the Ontario Health Technology Advisory Committee should be used to inform the adoption, diffusion and withdrawal of joint replacement technologies. Furthermore, the orthopaedic community should proactively identify emerging technologies to be assessed by existing evaluation groups.

9.5 Funding

There are a number of funding issues related to total joint replacement surgery that were addressed. These include:

- Operational funding
- Funding to support efficiencies

OPERATIONAL FUNDING

Providing Full Case Funding

Prior to 2004/05, the Ministry funded hip and knee joint replacements at a case rate that covered the cost of the device. Hospitals were expected to cover all other costs using their global budgets. In 2004/05, the Ministry incorporated this case funding into the base budget of hospitals with the expectation that hospitals would continue to use these funds to perform the same number of joint replacements. Since this case funding only covers the cost of the implant, joint surgeries are one of a number of competing priorities for hospital resources. The Wait Time Strategy introduced case funding for joints whereby a hospital receives a set amount for each joint replacement surgery it performs. This funding covers the complete cost of the operations. If access to joint surgery is to be improved and lower waiting times maintained, the Ministry needs to implement case funding for all hip and knee total joint replacements. Case funding should cover the complete cost of the operation and be attractive enough to encourage efficiencies. Funding should be sensitive to case complexity by distinguishing between primary and revisions, and between simple and more complex cases.

An assessment of funding also needs to recognise that the cost of providing in- and out-patient rehabilitation after joint replacement varies by the complexity of the case. Case funding eventually needs to reflect the full continuum of care from surgery to rehabilitation that is provided on an in- or out-patient basis or at home.

The Panel recommends that:

R8 The Ministry of Health and Long-Term Care implement full case funding for all hip and knee joint replacement surgery. In the longer term, case funding should reflect the full continuum of care from surgery to rehabilitation.

Increasing the Purchasing Power of Hospitals

Group efforts to purchase hip and knee joints should be pursued to take advantage of group discounts. Savings can be substantial. To illustrate, in January 2004, the Ministry allocated funds that enabled 33 hospitals to replace seven MRIs, 27 CTs and five diagnostic cardiac catheterisation imaging units. Bulk purchasing was used to reduce administrative costs, achieve greater standardisation and negotiate the best price and service package. This process resulted in a 25% savings off the list price for the purchase of the MRI and CTs.

In the area of hip and knee joint replacements, group purchasing efforts need to involve the orthopaedic community which can bring its clinical expertise to bear on purchasing discussions. Local Health Integration Networks (LHINs) should work with the orthopaedic community and hospitals to develop strategies to increase the purchasing power of organisations in the area of joint replacements. This includes group request for proposals, purchasing initiatives and service contracts for joints, as well as equipment required for in- and out-patient rehabilitation and home-based rehabilitation. It is noted that the Toronto Hip and Knee Replacement Task Force created a cooperative procurement working group to investigate potential areas for improvement across the entire supply chain for orthopaedic implants.[57] The task force determined that many Toronto acute care hospitals individually purchase hip and knee joints from the same suppliers. The task force is completing a second survey and recommendations on joint pricing that will be submitted to the Ministry. The outcomes of this work should be tabled with the appropriate LHINs for their consideration and action.

The Panel recommends that:

R9 Local Health Integration Networks work with the orthopaedic community and hospitals to develop strategies to increase the purchasing power of organisations in the area of joint replacements (e.g., group purchasing, group service agreements).

Providing Funding to Support Increased Capacity

The lack of sufficient capacity such as operating rooms, intensive care beds, ward beds, and rehabilitation beds can contribute to long waits for total hip and knee joint replacements. Although hospitals may have enough space for additional operating rooms and beds, they may not have sufficient operating funds to support this increased capacity. It is recognised that hospitals need to make the most efficient and effective use of their

[57] *Final Report* Toronto Hip and Knee Replacement Task Force, May 17, 2005.

resources to meet the goals of the Wait Time Strategy. In addition, however, the Ministry needs to assess whether current capacity is adequate to meet the increasing demands of the future, and provide funding to support increased capacity, where necessary.

FUNDING TO SUPPORT EFFICIENCIES

The *Report of the Surgical Process Analysis and Improvement Expert Panel* noted that current funding arrangements do not support efficiencies and, in fact, promote surgical inefficiencies.[58] For example, hospitals may be reluctant to use their global budgets to support innovative team models that use appropriately trained providers other than physicians. Since physicians who fulfil surgical and anaesthesia roles generally bill OHIP for their services, these physician costs remain "invisible" to the hospital even though they may cost the system significantly more than using appropriately trained alternate providers.

Current funding arrangements can also discourage innovation. For example, it appears that some hospitals have discouraged certain in-patient joint surgeries being done on an out-patient basis because incentives are higher for in-patient care. As well, hospitals must use funds from their global budgets to support the travel costs of "visiting surgeons" who come to perform surgery locally. These surgeries use excess capacity at the local hospital, help maintain specialised staff in local areas, reduce costs for the patient, and ensure local follow-up care. Yet a third example is the lack of appropriate reimbursement for certain telehealth initiatives. Some specialists in the south will no longer read orthopaedic x-rays from a remote site due to reimbursement issues. As well, physicians do not get paid for examining X-rays through PACS[59] and consulting by phone with an outlying physician.

There is a need to align incentives to support the efficient and effective use of surgical resources throughout Ontario.

The Panel recommends that:

R10 The Ministry of Health and Long-Term Care review how surgical services are funded and how staff are compensated with the goal of aligning incentives to support the efficient and effective use of surgical resources.

9.6 The Organisation of Services to Meet Future Needs

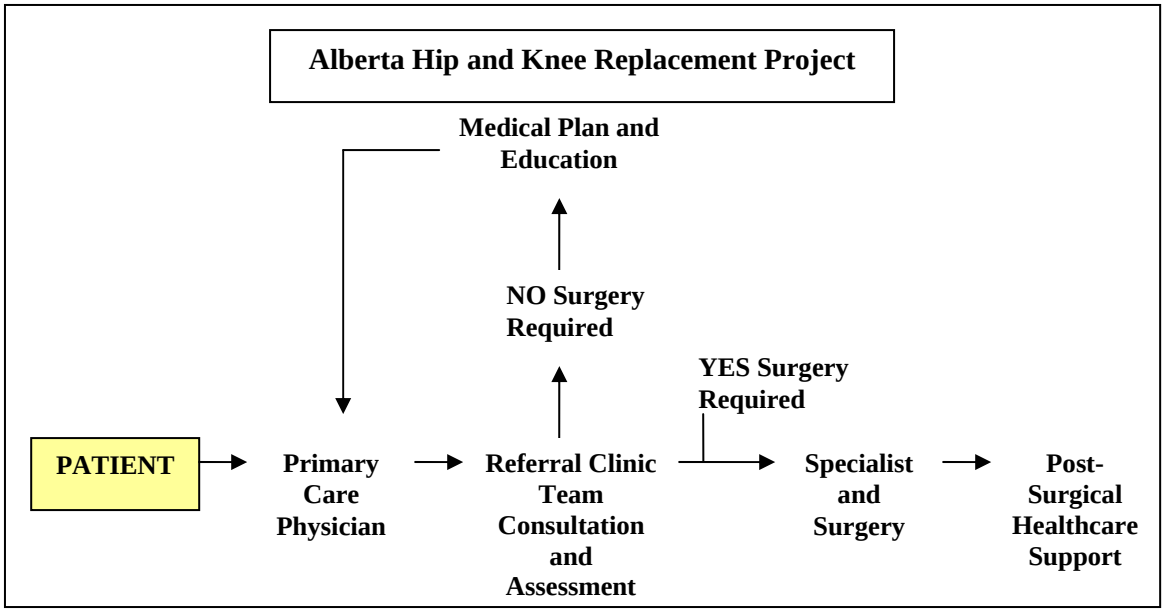
The increasing demand for total hip and knee joint replacements highlights the importance of implementing more effective and efficient ways of organising services to meet the future needs of Ontario's aging population. These approaches should maximise the use of specialised expertise and resources, focus on the full continuum of care, and

[58] Valerie Zellermeyer, Chair. Prepared for the Wait Time Strategy, June 2005.
[59] A Picture Archive and Communication System (PACS) supports the ability of hospitals to transfer diagnostic images electronically.

support equitable and improved access to services. These approaches also need to capitalise on the creation of Local Health Integration Networks, and adopt a network-based approach to joint replacements. A number of current initiatives and research studies that focus on improving access to joint replacements meet some of these goals.

The Alberta Hip and Knee Replacement Project – a randomised control trial – was officially launched on April 8, 2005.[60] The model includes care pathways that govern each part of the patient's journey throughout the healthcare continuum from primary care to rehabilitation.

According to the model, if the primary care physician decides that the patient needs an assessment, the patient is referred to a clinic for a team consultation and assessment. This multidisciplinary bone and joint health team includes nurses, therapists and a case manager. The team uses standardised criteria to determine suitability for surgery and rates urgency using the Western Canada Waiting List project's rating tools. If the team determines that surgery is not needed, the person receives a medical plan and education and is referred back to the family physician. If the team determines that surgery may be needed, the patient is referred to the most appropriate surgeon with the shortest waiting list. Post surgical healthcare support is provided.



It is anticipated that the referral clinic will streamline the referral process and reduce the number of patients inappropriately referred for surgical consideration. Patients requiring surgery are cared for by a physician before and after surgery. This helps ensure that patients are healthy enough for surgery as they near their surgical date, and results in fewer patients having to reschedule and a smoother recovery process. As part of the study, patients requiring surgery sign a "contract" with their orthopaedic surgeon that sets

[60] Information obtained from: i) Dr. Ron Zernicke, Executive Director, Alberta Bone and Joint Institute, Personal Conversation August 22, 2005; ii) Kathy Gooch, Alberta Hip and Knee Replacement Project, Personal Conversation, August 29, 2005; iii) http://www.albertaboneandjoint.com.

out their responsibilities to prepare for surgery and to engage in post-surgical activities (e.g., attend The Arthritis Society self management program, limit alcohol consumption, watch their weight, exercise, etc.).

The control trial includes an assessment intake clinic in three cities (Calgary, Edmonton, Red Deer), one surgical practice site in each city with staff dedicated to the project (if possible), and 13 orthopaedic surgeons. Patients in all three cities follow the same care pathways throughout the continuum of care.

It is anticipated that the streamlined process will increase the number of surgeries, reduce patient length of stay and maximise the use of the specialist's time. The pilot project began accepting patients in April with surgeries beginning in early May. By the end of the study – March 31, 2006 – it is anticipated that 2,400 patients will be served and 1,200 new surgeries completed. The evaluation will assess indicators in domains such as effectiveness of the model, access, safety, costs, appropriateness and acceptability.

It must be noted that the study to date does not yet follow the model exactly. Currently, family physicians refer their patients to orthopaedic surgeons, who then alert the study about potential participants. If the patient agrees to participate in the study, he or she is put into a control or intervention group. To date – August 29, 2005 – 264 surgeries have been completed. Preliminary results of one surgical site indicate that 80% of the patients seen by the assessment team are referred for a final surgical assessment. Although the final report of the study is not expected until the end of March 2006, there is widespread support from providers to sustain the project beyond this date.

A second initiative is in Ontario's ***North West Local Health Integration Network***, where visiting orthopaedic surgeons perform arthroplasties in smaller community hospitals that have underused surgical capacity. For three years, arthroplasties have been performed at the Dryden Regional Health Centre. This surgical program was expanded this year to Kenora Lake-of-the-Woods District Hospital and the Fort Frances site of the Riverside Health Care Facilities. These two community hospitals have excellent operating rooms, good GP anaesthesia coverage, fully staffed physiotherapy units, and less pressure on surgical beds. The visiting orthopaedic surgeons perform uncomplicated total knee joint replacements and remain on site to provide immediate post-operative care, as appropriate. Complicated cases or patients with a higher anaesthetic risk are transferred to tertiary centres for their surgery. In this fiscal year, 200 uncomplicated total knee joint replacements will be performed at these facilities with additional capacity available to expand to 300 knee joints.

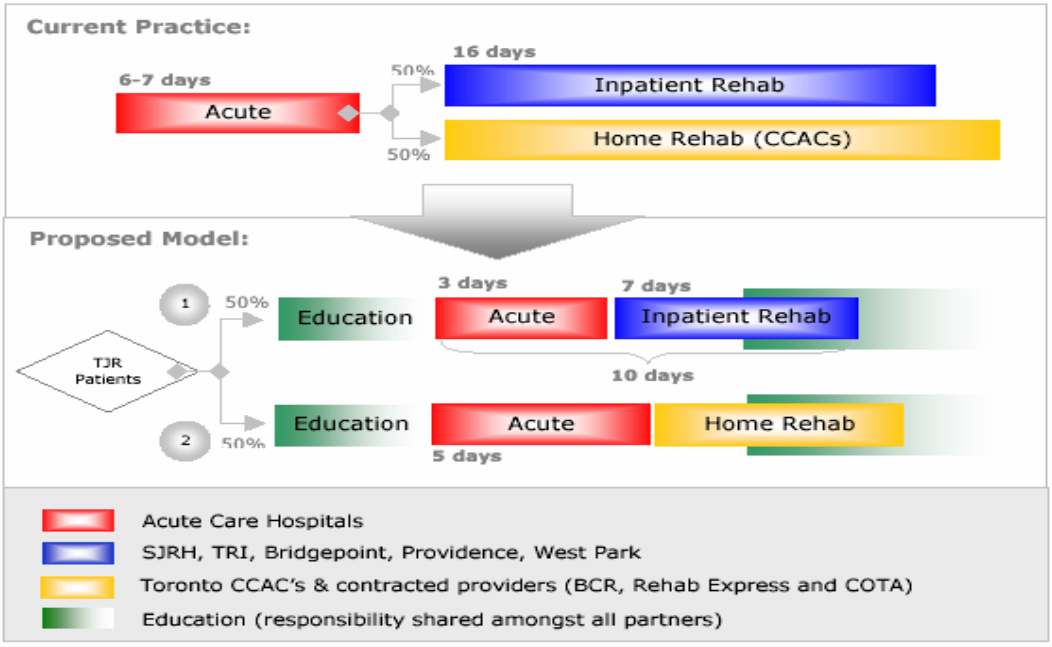
A third initiative to improve access to joint replacements is the ***Toronto Joint Network's*** integrated model of care for total primary hip and knee replacements.[61] This collaborative pilot project involves 10 acute and five rehabilitation hospitals in Toronto, eight community care access centres in the Greater Toronto Area, and three additional

[61] Toronto Joint Network: *Integrated Model of Care for Total Joint Replacement Network. A collaborative approach to increase capacity for primary hip and knee replacement.* October 2004.

partner organisations.[62] The Network proposes to reduce wait times by reducing the total length of stay and improving the integration of the patient's experience across the continuum of care for total primary hip and knee replacement surgery. Full scale implementation and evaluation of the project was funded by the Ministry for two years beginning April 2005.

The model is summarised below. Currently, patients in Toronto who undergo a primary hip or knee joint replacement have an average acute care hospital stay of 6-7 days. Depending on the severity of their condition, about 50% of patients undergo inpatient rehabilitation for about 16 days; the other 50% receive home rehabilitation services through community care access centres. The model proposes to reduce the length of stay for these two streams of patients:

- Patients who require inpatient rehabilitation after their joint surgery will have their total length of stay reduced by 57% from 23 to 10 days.
- Patients who receive home-based rehabilitation after their joint surgery will have their total length of stay reduced by 29% from seven to five days.



The pilot project uses integrated and standardised care pathways for all eligible patients undergoing total joint replacement surgery in Toronto. The aim is to have 50% of eligible patients on the protocol by the summer of 2005 with approximately 50% going to inpatient rehabilitation and 50% going home. The long-term goal is to have 75% of eligible patients on the protocol by December 2005.

[62] The three additional organisations are the GTA Rehab Network, Ontario Joint Replacement Registry and The Arthritis Society, Ontario Division.

Pre- and post-hospital education, assessment and follow-up uses recommendations from the GTA Rehab Network's discharge education project that has an information package for patients undergoing total joint replacement. Patient will see a therapist prior to admission to acute care. Ideally, the therapist will educate the patient on what he or she can expect and conduct pre-assessment work. The therapist will also help ensure that the home is properly equipped and that the patient is safe, and has the knowledge and tools to regain their independence following joint replacement.

As part of the Toronto project, The Arthritis Society is working with three family health units to explore ways to facilitate screening clinics that can triage and link patients – who do not need surgery or a specialist appointment – with self management and rehabilitation resources. Begun in June 2005, the project was initiated by all three family health units participating in "Getting a Grip" workshops. In the fall, a variation of the Alberta Hip and Joint Replacement project framework will be presented to the three family health units for buy in.

A further initiative to improve access to joint replacements is the processes used at the ***Thunder Bay Regional Health Sciences Centre***. Key elements include:

- Pre-operative teaching in a formal setting with anaesthesiologists, nurses, and physiotherapists. Patients learn what will happen to them in hospital as well as when they will be expected to be discharged. This teaching is essential for early discharge.
- Clinical pathways that have shortened the average length of stay significantly along the continuum of care. Working in partnership with the rehabilitation hospital, community care access centre and discharge team, total knee joint replacement patients leave the unit on the first postoperative day, leave acute care two days post op, and have five days at the rehabilitation facility, if needed.
- Efforts are being made to set up an arthroplasty unit within the hospital to consolidate all arthroplasty patients in the same area. It is expected that this will streamline discharges, and increase the efficiency of nursing, physiotherapy and the discharge team.
- There is interest in setting up a 24 hour surgical unit to fast-track the transfer of patients back to their referring communities where they can convalesce after surgery for hip, ankle and long-bone fractures. Local referring hospitals are able to accept these patients quickly, and the timely discharge will free up surgical beds.

The initiatives noted above incorporate a number of elements that can be used to improve access to joint replacements. These include:

- Care pathways along the continuum of care from primary care to rehabilitation.
- Inter-disciplinary assessment and screening clinics to determine whether a patient needs to be considered for surgery by an orthopaedic surgeon.
- Standardised criteria to determine patient urgency.
- Education and services for those who do not need surgery (e.g., self-management, rehabilitation).

- Pre-operative education and services for those waiting for surgery (e.g., self-management, surgical preparation, pre-assessment).
- Post-operative education and services for those who have had surgery (e.g., rehabilitation, home follow-up, social supports).

In most of the initiatives noted above, these elements come together in a network approach to improve access to joint replacement. This provides an opportunity to capitalise on the creation of Local Health Integration Networks, and adopt a network-based approach to joint replacements.

To ensure standardisation, each of the 14 LHINs would promote the use of common care pathways along the continuum of care. LHINs would have assessment and screening clinic(s) that use standardised criteria to determine whether a person needs surgery and the urgency of their condition. Individuals who are not appropriate for surgery would receive appropriate education and support services, whereas those who have indications for surgery would be referred to a surgeon for a final assessment. LHINs would oversee the development and distribution of standardised comprehensive education packages that include information on joint health and self-management, and pre-and post-operative joint care.

The LHINs would also be accountable for monitoring and ensuring access to services in their networks. These LHIN-based networks would:

- Establish joint replacement goals within each LHIN and across LHINs;
- Determine joint replacement requirements for each site in the LHIN, with a view to coordinating the needs within the LHIN;
- Ensure quality and safety by promoting standards and best practices for orthopaedic services;
- Ensure that surgeons, rehabilitation providers, hospitals, community care access centres and other agencies within the LHIN work together so that additional volumes are performed and patients within the LHIN receive a standardised approach to pre-operative care, surgery and post-operative care; and
- Monitor and improve performance.

The Panel recommends that:

R11 A Local Health Integration Network (LHIN) approach to joint replacements be adopted in Ontario. This approach should include the following elements: i) common care pathways along the continuum of care from primary care to rehabilitation; ii) assessment and screening clinic(s) that use standardised criteria to determine whether a person needs to be considered for surgery by an orthopaedic surgeon and the urgency of their condition; iii) appropriate education and support services for those who do not need surgery; iv) a referral process to a surgeon for a final surgical assessment; and v) standardised comprehensive education packages that include information on joint health and self-management, and pre-and post-operative joint care.

It is further recommended that:

R12 Local Health Integration Networks (LHINs) be accountable for monitoring and ensuring access to joint services in their networks. LHIN-based networks should: i) establish joint replacement goals within each LHIN and across LHINs; ii) determine joint replacement requirements for each site in the LHIN, with a view to coordinating the needs within the LHIN; iii) ensure quality and safety by promoting standards and best practices for orthopaedic services; iv) ensure that surgeons, rehabilitation providers, hospitals, community care access centres and agencies work together to provide a standardised approach to pre-operative care, surgery and post-operative care; and v) monitor and improve performance.

The Panel will continue its deliberations on the organisation of services to meet future needs with the intention of providing ongoing advice to the Wait Time Strategy on total hip and knee joint replacement surgery.

SECTION D: CONSOLIDATED LIST OF RECOMMENDATIONS

Best Practice Targets and Approaches to Support Standardisation

The Panel recommends that:

R1 The Ministry of Health and Long-Term Care, in partnership with the orthopaedic community, develop population-based planning targets for the number of hip and knee replacements per 100,000 population in Ontario, adjusted by age. This work should take into account relevant research, the experience of other jurisdictions and the expert opinion of clinicians. Furthermore, the targets should be regularly assessed and adjustments made, where appropriate.

R2 The Ministry of Health and Long-Term Care, in partnership with the orthopaedic community and other stakeholders, support the development of standardised provincial benchmark targets for hip and knee joint replacements including the number of joints that should be performed in a day, processes that support more effective delivery of anaesthesia and the optimal use of operating room resources, provincial best practice targets, and standardised care pathways that include best practices for immediate and longer-term post-operative care.

R3 The orthopaedic community, hospitals and Local Health Integration Networks support the provincial use of best practice guidelines, actively monitor quality and safety outcomes, and focus on improving outcomes. Furthermore, complex joint revisions should only be performed in hospitals that have sufficient volumes to support the specialised staff, expertise and equipment that are needed for this surgery.

R4 A priority rating scale with target time frames be adopted for total hip and knee joint replacements in Ontario. The rating scale – measuring the time from the decision to operate to the operation – should reflect four priority ratings:

- 0: Emergent such as peri-prosthetic fracture, uncontrolled deep infection of a joint replacement, acute irreducible dislocation of a total hip joint replacement.
- I: Urgent hip or knee joint conditions/complications that actively affect an individual's role and independence such as bed ridden, impending fracture, recurrent dislocation of a total hip joint replacement.
- II: Some pain and disability because of a hip or knee joint condition that is an imminent threat to role and independence.
- III: Minimal pain and disability because of a hip or knee joint condition with role and independence not threatened.

Information and Information Management

The Panel recommends that:

R5 The Ministry of Health and Long-Term Care support efforts to promote public and patient education on joint health and disabilities, including the benefits and risks of joint replacement surgery.

Human Resources

The Panel recommends that:

R6 The Ministry of Health and Long-Term Care, in partnership with the orthopaedic community, focus efforts on recruiting and retaining Ontario-trained surgeons in Ontario. This includes increasing operating room time and supports, improving the working conditions of surgeons, and supporting the innovative use of other healthcare professionals and innovative models of care. In addition, more orthopaedic surgeons should be trained in the long term to help meet the increasing demand for joint replacement surgery.

Technology

The Panel recommends that:

R7 Local Health Integration Networks (LHINs) work with the orthopaedic community and hospitals to adopt a comprehensive approach to guide the introduction of new joint implant technologies based on evidence. The evaluations done by organisations such as the Ontario Health Technology Advisory Committee should be used to inform the adoption, diffusion and withdrawal of joint replacement technologies. Furthermore, the orthopaedic community should proactively identify emerging technologies to be assessed by existing evaluation groups.

Funding

The Panel recommends that:

R8 The Ministry of Health and Long-Term Care implement full case funding for all hip and knee joint replacement surgery. In the longer term, case funding should reflect the full continuum of care from surgery to rehabilitation.

R9 Local Health Integration Networks work with the orthopaedic community and hospitals to develop strategies to increase the purchasing power of organisations in the area of joint replacements (e.g., group purchasing, group service agreements).

R10 The Ministry of Health and Long-Term Care review how surgical services are funded and how staff are compensated with the goal of aligning incentives to support the efficient and effective use of surgical resources.

The Organisation of Services to Meet Future Needs

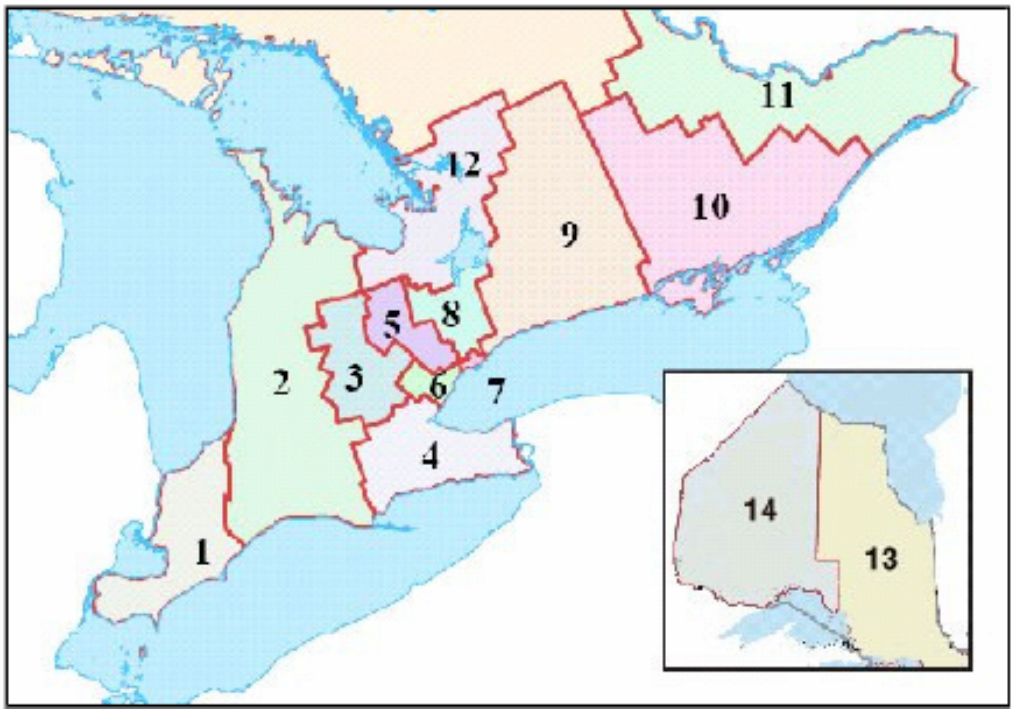
The Panel recommends that:

R11 A Local Health Integration Network (LHIN) approach to joint replacements be adopted in Ontario. This approach should include the following elements: i) common care pathways along the continuum of care from primary care to rehabilitation; ii) assessment and screening clinic(s) that use standardised criteria to determine whether a person needs to be considered for surgery by an orthopaedic surgeon and the urgency of their condition; iii) appropriate education and support services for those who do not need surgery; iv) a referral process to a surgeon for a final surgical assessment; and v) standardised comprehensive education packages that include information on joint health and self-management, and pre-and post-operative joint care.

R12 Local Health Integration Networks (LHINs) be accountable for monitoring and ensuring access to joint services in their networks. LHIN-based networks should: i) establish joint replacement goals within each LHIN and across LHINs; ii) determine joint replacement requirements for each site in the LHIN, with a view to coordinating the needs within the LHIN; iii) ensure quality and safety by promoting standards and best practices for orthopaedic services; iv) ensure that surgeons, rehabilitation providers, hospitals, community care access centres and agencies work together to provide a standardised approach to pre-operative care, surgery and post-operative care; and v) monitor and improve performance.

APPENDIX 1: LOCAL HEALTH INTEGRATION NETWORKS

Local Health Integration Networks (LHINs)



1. Erie St. Clair	2. South West
3. Waterloo Wellington	4. Hamilton Niagara Haldimand Brant
5. Central West	6. Mississauga Oakville
7. Toronto Central	8. Central
9. Central East	10. South East
11. Champlain	12. North Simcoe Muskoka
13. North East	14. North West

APPENDIX 2: MEMBERS OF THE TOTAL HIP AND KNEE JOINT REPLACEMENT EXPERT PANEL

Allan Gross, MD, FRCSC Chair	Ghert Family Foundation Chair of Lower Extremity Reconstructive Surgery, Mount Sinai Hospital. Professor of Surgery, University of Toronto.
Maurice Bent, MD, FRCSC	Chief of the Division of Orthopaedic Surgery, North York General Hospital
William Bloor	Executive Director, Niagara Community Care Access Centre.
Robert Bourne, MD, FRCSC	Professor and Chair, Division of Orthopaedic Surgery, University of Western Ontario. President, Canadian Orthopaedic Association.
William Caccia, BSc, BScPT	Patient Services Manager, Ambulatory Care, St. John's Rehab Hospital.
Robert Devitt	President and CEO, Toronto East General Hospital.
John Flannery, MD, FRCPC	Medical Director, MSK Rehabilitation Program, Toronto Rehab Hospital. Residency Program Director, University of Toronto.
Jeffrey Golish, MD, FRCSC	Head, Arthroplasty Program Orthopaedic and Arthritic Institute, Sunnybrook and Women's College Health Sciences Centre.
David Healey, MD, FRCSC	Sudbury Regional Hospitals.
Hans J. Kreder, MD, MPH, FRCSC	Chair, Orthopaedic Clinical Epidemiology. Associate Professor, University of Toronto. Orthopaedic Surgery and Health Policy Evaluation and Management, Sunnybrook and Women's College Health Sciences Centre.
Nizar Mahomed, MD, ScD, FRCSC	Smith & Nephew Chair in Orthopaedic Surgery. Associate Professor, Department of Surgery, University of Toronto. Director, Musculoskeletal Health and Arthritis Program, University Health Network.
John Porter, MD, FRCSC	Thunder Bay Regional Health Sciences Centre.

Jo-Anne Sobie	Executive Director, The Arthritis Society, Ontario Division
Rajca Soric, MD, FRCPC	Physiatrist and Consultant Musculoskeletal Service, West Park Healthcare Centre. Assistant Professor, Division of Physiatry, University of Toronto.
James Waddell, MD, FRCSC	A. J. Latner Professor and Chair, Division of Orthopaedic Surgery, University of Toronto.
Ken White	President and CEO, Trillium Health Centre.

The Panel wishes to thanks Joann Trypuc, PhD for working with the members to develop this report.

APPENDIX 3: PERI-OPERATIVE BEST PRACTICE TARGETS AND BEST PRACTICE SUPPLY CHAIN TARGETS

The following peri-operative best practice targets and best practice supply chain targets were recommended in the *Report of the Surgical Process Analysis and Improvement Expert Panel* (Valerie Zellermeyer, Chair). Prepared for the Wait Time Strategy, June 2005.

Peri-Operative Best Practice Targets

1. All electively scheduled patients will be screened either by telephone or in person to ensure that they are ready for surgery.
2. All patients and their families will be educated to ensure that they understand the procedure and participate in care.
3. Discharge planning will begin before surgery.
4. Surgery will be conducted on an out-patient basis in a separate location, wherever possible.
5. Surgical patients will be admitted on the same day as the surgery, wherever possible.
6. The time the patient goes into the operating room to the time the patient leaves the operating room will be equal to the time that was booked for the case.
7. The amount of time scheduled for surgery will be as close to the expected time that the surgery should take.
8. Surgeries will begin at the scheduled start time.
9. The “emergency surgeries” that are conducted will reflect true emergencies.
10. Surgical cases that have similar procedures will be grouped as a block, where possible.
11. Surgeons will work in consolidated blocks of time, where possible.

Best Practice Supply Chain Targets

1. Sufficient Capacity to Support the OR Schedule: Peri-operative services will ensure that there is sufficient instrumentation and supplies to support the operating room schedule. Appropriate investments will be made to support surgical activity and throughput.
2. Separate Physical Supports for Clean and Soiled Instrumentation and Supplies: Surgical suites will have separate dedicated physical supports for clean and soiled instrumentation and supplies between peri-operative and central processing services.
3. Instrument Management: Systems will be used to help manage instrumentation, and cleaning and sterilisation processes.
4. Supply Management: Hospitals will link supply consumption to surgical activity by actively managing the inventory supply replenishment process using automated systems and material management support.
5. Standardisation of Instrumentation: To the extent appropriate to the clinical activity of the hospital, peri-operative services will use a limited but sufficient range of instrumentation to enable good choice and minimise inefficiencies and confusion.

6. Standardisation of Vendors: To the extent appropriate to the clinical activity of the hospital, peri-operative services will use a limited but sufficient number of vendors to enable good choice and minimise inefficiencies and confusion.
7. Access Management of Vendors: Hospitals will develop access management policies for their vendors.
8. Standardisation by Procedure or Program: To the extent appropriate for the facility, custom packs, case carts and pick lists will be standardised by procedure or program, rather than by individual physician.
9. Value Analysis of New Technologies: Hospitals will use clearly defined processes to analyse the value of new peri-operative technologies.

APPENDIX 4: SELECTED PRIORITY RATING SCALES

Ontario Joint Replacement Registry: Priority Rating Scale and Guidelines*

Priority	Guidelines
Priority I	1 month maximum (Note 1) • Peri-prosthetic fracture, septic replaced total joint • Recurrent dislocation • Affected joint is an immediate threat to role and independence (Note 2)
Priority II	3 months maximum • Baseline WOMAC 30/100 (Note 3) • Affected joint is a threat to role and independence (but not an immediate threat)
Priority III	6 months maximum • Baseline WOMAC > 30/100 • Affected joint is *not* a threat to role and independence

*Ontario Joint Replacement Registry (Dr. R. B. Bourne, Medical Director; Dr. Bert Chesworth, Director of Data Operations and Research; Dr. Nizar Mahomed, Chair OJRR Research Sub-Committee), Guideline for Wait Time Thresholds for Total Hip and Knee Replacement Surgery Based on Severity (Summary). Submitted to the Ministry of Health and Long-Term Care, June 2005. Updated by Susan Warner, July 21, 2005.

Note 1: Patients rated as Priority I should receive surgery within the specified maximum wait time, and before patients rated as Priority II or III receive surgery.

Note 2: Threat to role and independence is defined as a "threat to patient role and independence in society (i.e., ability to work, give care to dependants, live independently)" (WCWL, New Zealand)

Note 3: Use WOMAC™ scale with 0=most severe disability; 100=no disability.

The National Standards Committee of the Canadian Orthopaedic Association: Priority Rating Scale and Maximum Acceptable Wait Times*

Priority	Maximum Acceptable Wait Times
Priority I	1 month maximum • A situation that has the potential to deteriorate quickly and result in an emergency admission
Priority II	3 months maximum • A situation which involves some pain and disability but which is unlikely to deteriorate quickly to the point of becoming an emergency admission
Priority III	6 months maximum • A situation that involves minimal pain, dysfunction or disability and which is unlikely to deteriorate quickly to the point of requiring emergency admission

**Report on Benchmarks For Wait Times*. The National Standards Committee, Canadian Orthopaedic Association 2005. Ted Rumble and Hans J. Kreder, Co-Chairs, March 2005.

The Western Canada Waiting List Project: Priority Rating Scale and Maximum Acceptable Wait Time for Hip and Knee Joint Replacement Surgery*

Priority	Maximum Acceptable Wait Time
Urgency III (most urgent)	1 month
Urgency II	3 months
Urgency I (least urgent)	5 months

*See www.wcwl.ca.

The Wait Time Alliance for Timely Access to Health Care: Wait Time Benchmarks by Priority Level for Hip and Knee Replacement Surgery*

Type of Case	Definition	Wait Time Benchmark
Emergency case	Immediate danger to life, limb or organ	Immediate to 24 hours
Urgent case	Situation that is unstable and has the potential to deteriorate quickly and result in an emergency admission	Within 30 days (Priority 1) Within 90 days (Priority 2)
Scheduled case	situation involving minimal pain, dysfunction or disability; also called "routine" or "elective"	Consultation within 3 months Treatment within 6 months of consultation.

* *It's about time: Achieving benchmarks and best practices in wait time management. Final Report by the Wait Time Alliance for Timely Access to Health Care*, August 2005.