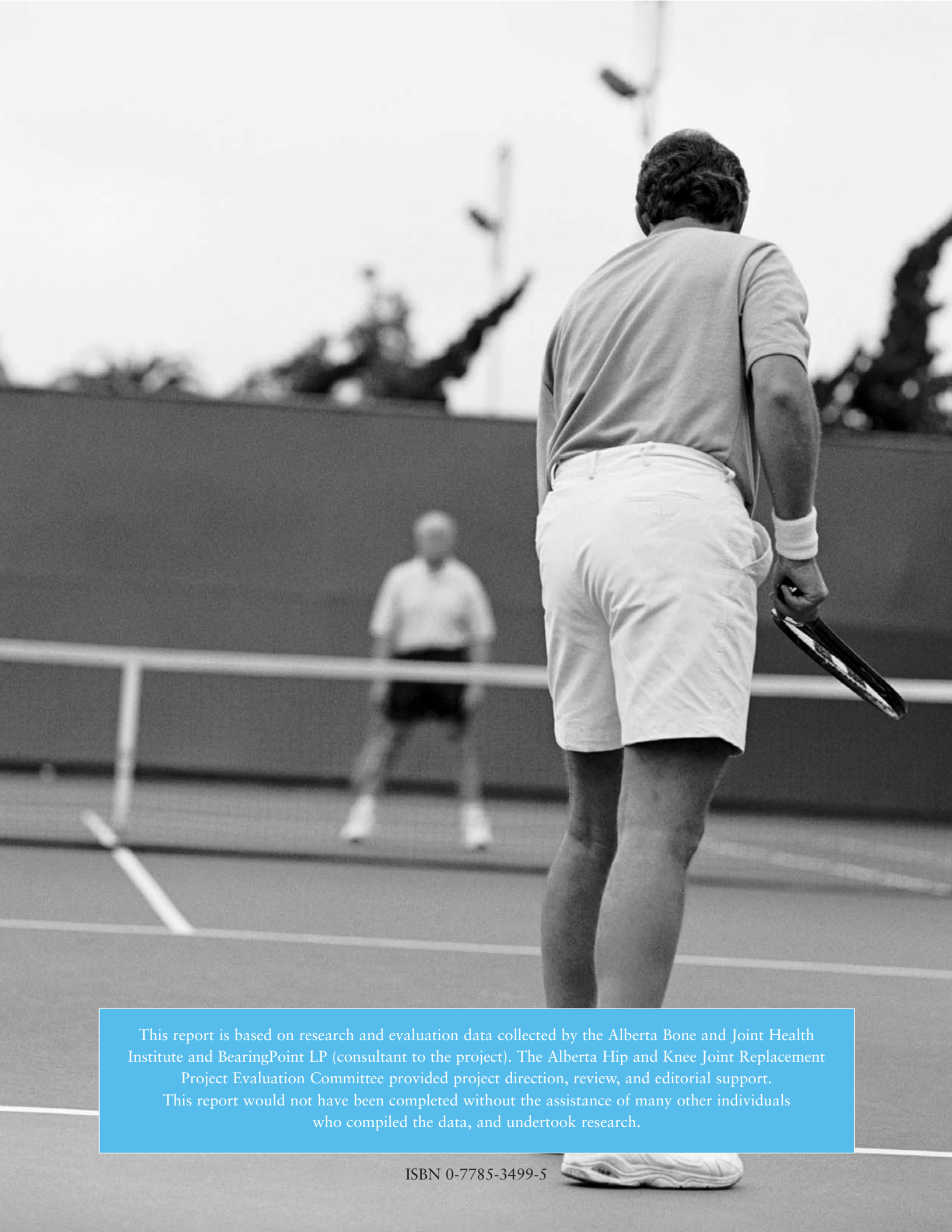
Alberta Hip & Knee Joint Replacement Project

[EVALUATION REPORT]

Alberta Health and Wellness



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Alberta Hip and Knee Joint Replacement Project Partners

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Capital Health

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Alberta Hip and Knee Joint Replacement Project Supporters

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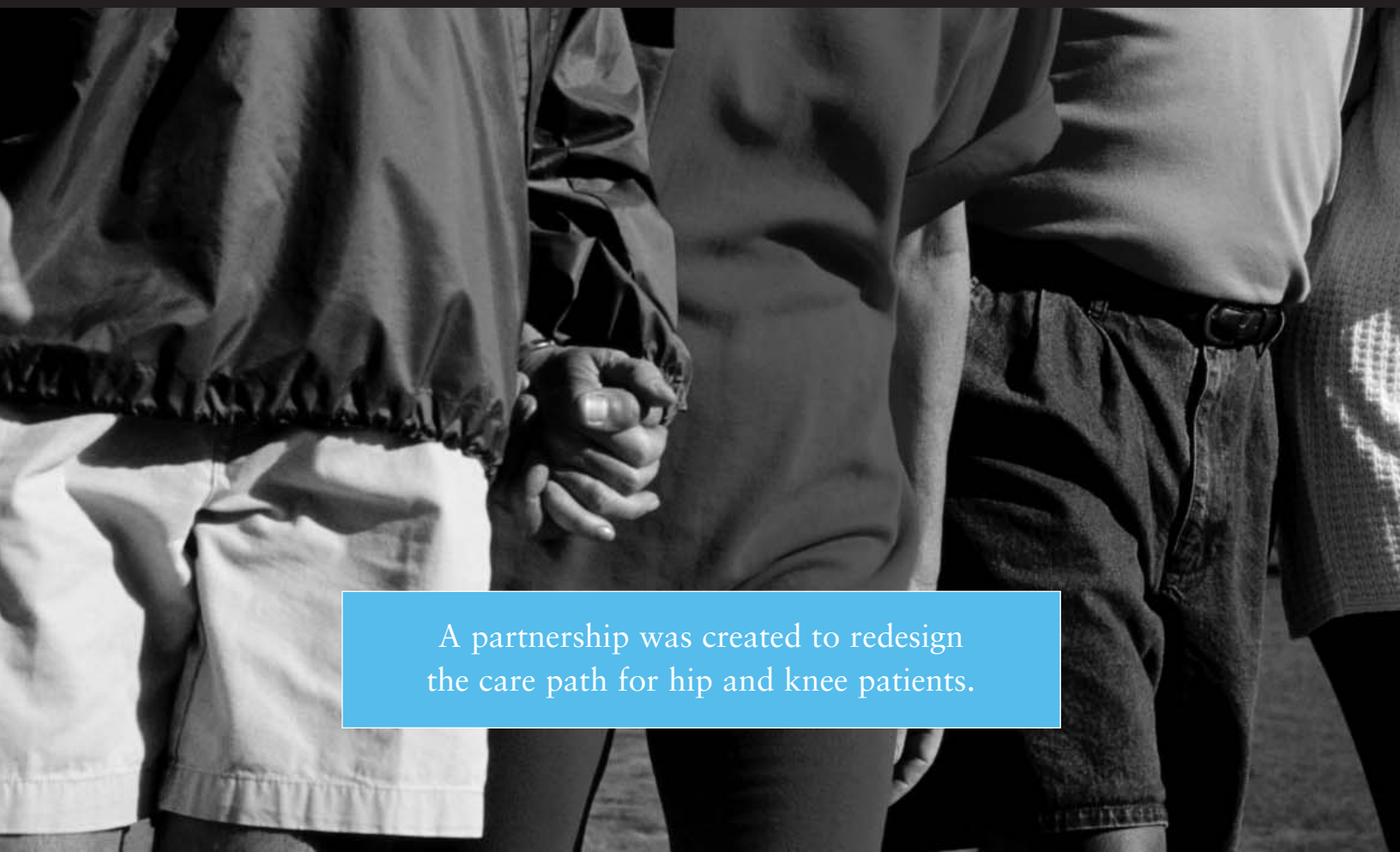
Executive Summary



A partnership was created to redesign the care path for hip and knee patients.

In *A Framework for Reform* [1], the Premier's Advisory Council on Health recommended the government institute a 90-day access guarantee. In response to this proposal, Alberta Health and Wellness consulted with medical and clinical experts who examined the evidence for wait time goals. A partnership of Alberta Health and Wellness, three regional health authorities (Capital Health, Calgary Health Region, and David Thompson Regional Health Authority), Alberta Orthopedic Society, and medical professionals worked together to redesign the care path and develop change management strategies in the Alberta Hip and Knee Joint Replacement Project. The Alberta Bone and Joint Health Institute was a partner in the project design, evaluation, and clinical research.

A new clinical care path for hip and knee replacement patients was developed based on 'best available' international evidence and standards of care. The care path involved a 'shared care' approach using patient focused care extending from the time of referral to the orthopedic surgeon, through long-term recovery. A single intake process in each of the three regional health authorities was established in April 2005. In this process, patients were assessed, prioritized, and educated; resources were booked; and the surgical and rehabilitation process was optimized.

Alberta Health and Wellness provided dedicated funding for an additional 1,200 patients to participate in the new care path and evaluation. The new care path maintained quality, improved patient access, and improved system efficiencies. The Alberta Hip and Knee Joint Replacement Project achieved its goal, in a separate research environment, of reduced patient wait times by realigning resources to create efficiencies.

Conclusions

This project, which aimed to evaluate a new care path for hip and knee replacement surgery, supports the following conclusions:

1. The new care path had several benefits for patients and providers, related to improved management and greater certainty about when and how services will be provided. These benefits are due to a collaborative approach to care delivery with greater focus on care standards, use of case management, and the centralization of patient intake, assessment, and measurement of outcomes.
2. Failure to identify issues among key stakeholders prior to the start of the project initially delayed the project and impacted relationships. This project reinforced the need to engage key practitioners along the continuum of care in the planning.
3. Research must be sensitive to the perspective of patients. Some patients assigned to the control group in a research design will feel that they have been disadvantaged unfairly. The impact of these types of studies on the control group must be taken into account and the project needs to assume accountability for patient issues created by the study design.
4. With dedicated funding and resources, it was possible to reduce wait times for selected patients receiving hip and knee replacement surgery. However, these results were achieved in a separate research environment. Patients requiring revisions take longer to move through the system because they require more resources. It will not be possible to realize the very short wait times achieved for patients in this study when the new care path is integrated into the broad context of the entire health system without additional capacity.
5. Improvements to the quality of the patient journey in one area of service delivery can be accomplished by realigning resources within that service area through collaboration and cooperation amongst stakeholders.
6. The new care path demonstrated that reorganization and alignment of services does not necessarily increase costs in the system. Costs were primarily shifted within the new care path to improve the patient journey.
7. Standardized measurement is critical in the evaluation of strategies to improve access to services and clinical utilization.

Project Framework

Quality Dimension	Project
Access Health services are obtained in the most suitable setting in a reasonable time and distance	**Innovations** > 1,209 hip and knee replacement surgeries were completed using the new care path. **Results** > **New care path**[1] patients waited on average 100 days less time than **current** patients from accepted referral to first orthopedic consultation. > Newly referred (**new referrals**) patients in the **new care path** waited a median of 32 days to receive surgery compared to 305 days for all **current** care path patients.
Acceptability Health services are respectful and responsive to user needs, preferences and experiences	**Results** > 94% of **new care path** patients were satisfied with their overall experience. > Over 80% of surgeons, referring physicians, clinic, operating room, inpatient, sub-acute, home care, and community rehabilitation staff were satisfied with the new care path. > **New care path** patients rated their experience 9.6 out of 10 compared to **current** care path patients 7.9 out of 10.
Appropriateness Health services are relevant to user needs and are based on accepted or evidence based practice	**Innovations** > All components of the new care path were based on the consensus of best available evidence and medical judgment. > Access to care resources was predicated on predefined appropriateness standards. **Results** > 94% of **new care path** patients complied with pre-surgical contracts that specified patient and provider commitments related to treatment.
Efficiency Resources are optimally used in achieving desired outcomes **Costs**	**Results** > **New care path** patients were in the operating room for an average of 106 minutes compared to 122 minutes for patients in the **current** care path. > **New care path** patients were discharged home from the inpatient setting 4.2 days compared to 6.2 days for patients in the **current** care path. > The **new care path** was about 4% less expensive than the **current** care path, from first orthopedic consultation to home from surgery.
Effectiveness Health services are provided based on scientific knowledge to achieve desired outcomes **Safety** Mitigate risks to avoid unintended or harmful results	**Results** > Evaluations for effectiveness and safety require additional time to ensure complete data are captured for all patients. Results will be reported in 2007.

[1] In this report, "**new care path**", in bold, refers to the group of patients receiving surgery in the new care path process of the project.

1. Alberta Hip & Knee Joint Replacement Project

The new care path was developed to include service from primary care through to recovery.

1.1 The new care path

In December 2001, the Premier's Advisory Council on Health presented its report, titled *A Framework for Reform*, to the Government of Alberta. Their recommendations involved many areas of health system reform, including access to health services, in which the Council suggested the government institute a 90-day access guarantee. In response, Alberta Health and Wellness began extensive consultations with medical and clinical experts in Alberta to examine this proposal and to consider the clinical evidence for wait time goals, and methods to achieve the goals.

In 2002, the focus changed from 90 day guarantees to setting the most appropriate wait time goals. The Provincial Arthroplasty Working Group, a stakeholder expert committee, was established to recommend these goals. From this work, the Alberta Hip and Knee Joint Replacement Project partnership emerged, consisting of representatives from Alberta Health and Wellness, three regional health authorities (Capital Health, Calgary Health Region, and David Thompson Regional Health Authority), Alberta Orthopedic Society, and physicians who worked together to redesign the care path and develop change management strategies. The Alberta Bone and Joint Health Institute was a partner in the project design, evaluation, and clinical research.

The new care path was developed with a 'shared care' approach that included primary care, medical and surgical specialists, regional health authorities, and other healthcare professionals who worked as partners on a patient-focused approach to care delivery (Figure 1).

The aim of the new care path was to provide the right *care*, to the right *individuals*, for the right *reasons*, in the *right way*, by the right *provider* in the right *setting*, at the right *time*. The new care path has specific refinements that should benefit patients and providers compared to the current care path (Table 1).

Figure 1. The new care path for hip and knee replacements

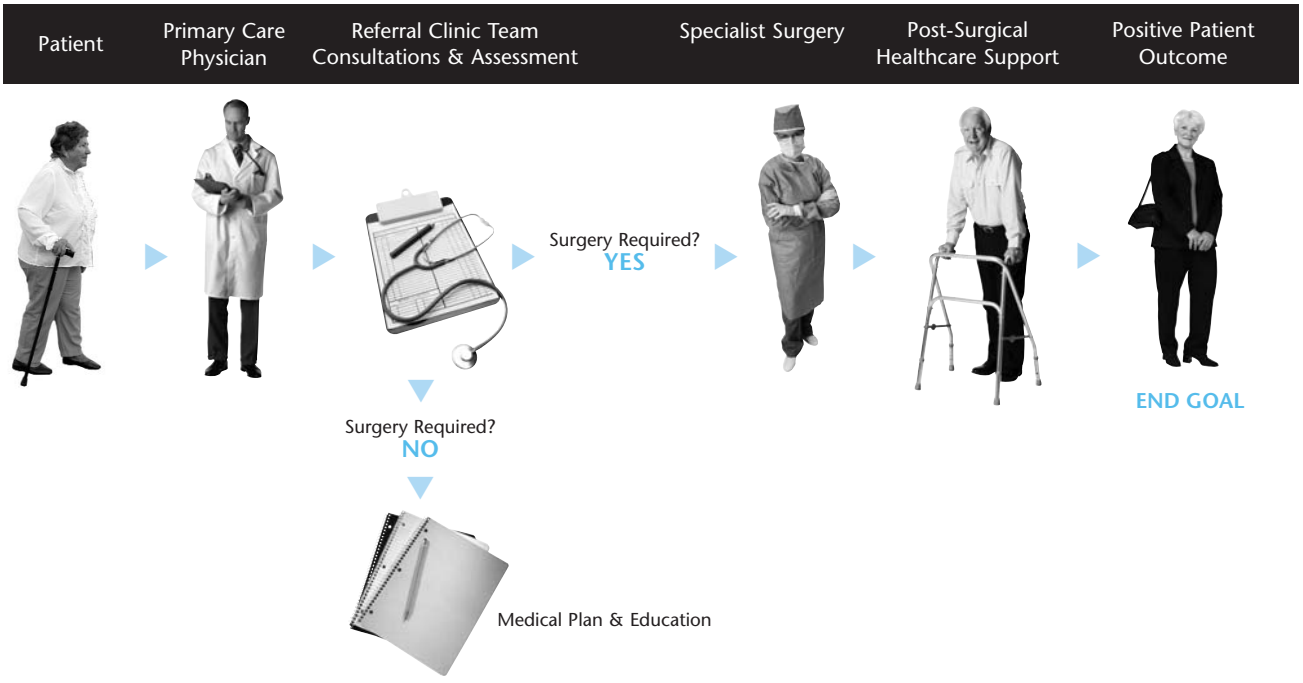


Table 1. Summary of continuum changes and anticipated benefits

Process Step	Project goals	Current	Key anticipated results and improvements
Patient Referral	> Standardized referral tool > Standardized diagnostic images > Common point of entry > Patients linked to Primary Care Network	> No standardized referral tool and no image standards > Potential for multiple referrals to multiple surgeons	> Single referral per patient > Reduction in inappropriate imaging and multiple imaging
Screening & Scheduling	> Standardized screening tool > Response to referral within 48 hours > Evaluation within 10 working days of screening > Feedback to primary care provider with explanation and advice regarding treatment	> Screening method based on surgeon preference > Response delay varies with surgeon	> More consistent referrals > Shorter waits for screening and evaluation > Availability of surgeons increased > Consistent treatment during waiting period
Evaluation & Detailed Assessment	> Patients receive evaluation and detailed assessment by care team	> Usually only an orthopedic surgeon evaluates patient > Minimal outcome measurement work done	> Availability of surgeons increased > Less repeat testing lowers costs > Improved quality of outcomes due to team approach > Surgeon satisfaction increased
Non-surgical Planning	> Non-surgical patients receive specific advice and a plan, with copy to referring provider, regarding treatment	> Advice dependent on provider > Planning process varies	> Patient and referring provider satisfaction increased > More consistency
Surgical Planning	> A treatment plan developed for each patient based on own goals > Customized patient contracts that obligates patients and their care team to establish goals	> Patients attend an 8 hour pre-operative briefing, assessment and education session > No contract and minimal focus on specific goals	> Resource planning completed six weeks in advance of surgery produces ability to manage resource need > Patients more aware of expectations
Surgical Preparation	> Patients receive their surgery within 180 days of referral > Patients prepare physically for surgery and recovery with team guidance > Patients prepare their home for post surgical recovery with team > Patients meet predefined thresholds for preparation before surgery	> Patients could wait more than a year from referral to surgery > Minimal or no physical preparation > Inconsistent home preparation > Surgery scheduled independent of patient preparation	> Reduction in intervention costs due to earlier surgery > Increased patient satisfaction due to decreased wait for surgery > Reduced length of stays and decreased length of recovery
Operating	> Standardization of processes set for surgeons and surgical suite operators to optimize resources and to ensure clinical quality > Standardization of protocols for anesthesia	> Variability of efficiency and resource use > Anesthesia protocols vary	> Improved resource utilization > Improved surgical outcomes > Increased patient satisfaction

Table 1. Summary of continuum changes and anticipated benefits (continued)

Process Step	Project goals	Current	Key anticipated results and improvements
Inpatient Treatment & Recovery	> Common standardized clinical path based on best available evidence > Resources provided to achieve length of stay standards	> Non-standardized approach > Variable length of stay > Resources allocated as needed	> Reduced length of stay, faster recovery > Better patient outcomes > Lower post-treatment resource needs
Post-Discharge Treatment & Recovery	> Patients discharged based on patient plan and standardized care path > Patients follow-up by assessment clinic team > Continual evaluation and care until functional goals reached	> Fragmented follow-up that may not be focused on clear goals > Minimal outcome measurement work done	> Improved patient outcomes > Ability to continually improve care path based on outcomes research > Increased patient satisfaction
Monitoring	> Patients return at scheduled intervals for monitoring of function	> Variable monitoring standards	> Reduction in resource requirement due to proactive patient management > Increased patient and referring provider satisfaction
Case Management	> Patients assigned to a case manager who ensures adherence to plan or modifies and updates plan as needed	> Patients managed by multiple providers with limited integration across the care path	> Increased overall efficiency and effectiveness > Increased patient satisfaction > Increased provider satisfaction
Medical Management	> Medical management of patients' length of stay with primary care provider	> Limited continuity of care	> Continuity of medical care

1.2 Project and evaluation overview

The Provincial Arthroplasty Working Group developed a new care path for hip and knee replacement patients. The new care path extended from the time of referral to the orthopedic surgeon through to recovery after a hip or knee replacement. A single intake process was established in each of the three participating health regions to assess, prioritize and educate patients, book resources, and optimize the surgical and rehabilitation process. A total of 3,370 patients were recruited to participate in the project and then randomized into either the new care path or current care path. The new care path was implemented in three centers: Calgary Health Region; Capital Health; and David Thompson Health Region. The new assessment clinics were established separately from existing health care facilities within each region.

An evaluation methodology was developed to compare patients in the new care path (**new care path**) to the current care path (**current**) (Figure 2). An additional comparison of **new care path** patients was done against all **historical** patients who received either a primary hip or knee replacement in fiscal year 2004/05 excluding revisions and unicompartmental knee procedures for the cost analysis.

The Alberta Health and Wellness Quality Framework, which consists of six dimensions of quality care, guided the evaluation: Appropriateness, Effectiveness, Access, Safety, Efficiency, and Acceptability (Figure 3). The quality of care data was collected from medical charts, patient questionnaires and interviews, as well as administrative datasets maintained by the regional health authorities and Alberta Health and Wellness.

The Minister provided additional funding for 1,200 surgeries in the new care path. These funds were used in a demonstration project that tested various changes to the care path in a highly controlled segregated environment on a subset of patients in three Health Regions. Between May 1, 2005 and April 30, 2006, 1,209 **new care path** patients received surgery.

Figure 2. Overview of the patient groups

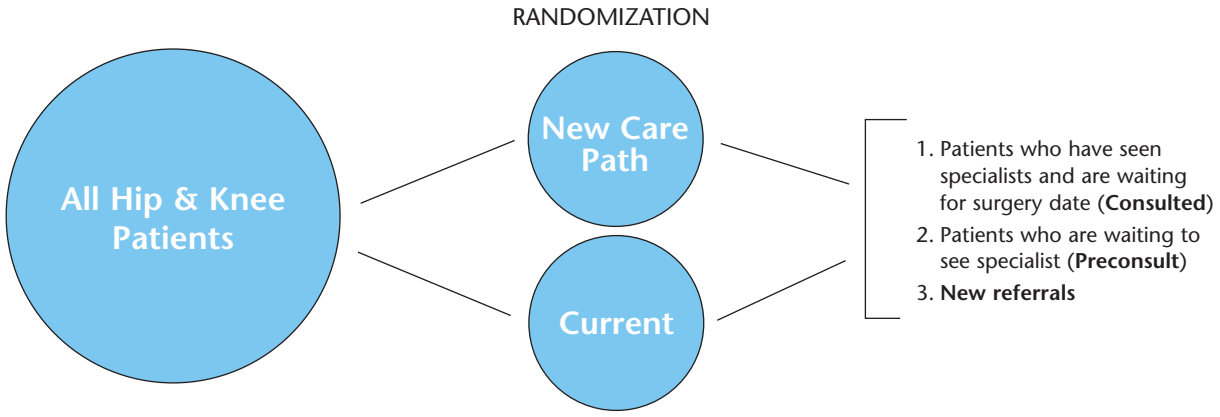


Figure 3. Alberta Health and Wellness Quality Framework

1.3 Patient profile

All patients in the evaluation were randomized into either the **new care path** or the **current** care path to ensure comparability. Randomization limited bias and equitably identified patients who would receive care in the new care path. The characteristics of patients in the project were compared to the patients in the Canadian Joint Replacement Registry (CJRR) to assess applicability of the project results to all hip and knee replacement patients. The CJRR, which has approximately 72% of Canadian orthopedic surgeons participating, collects information on total hip and total knee replacement surgeries done in Canada [2]. There were no differences in patient demographics among the **new care path**, **current** patients, and the CJRR (Table 2).

Table 2. Characteristics of patient in the new care path and current group compared to the Canadian Joint Replacement Registry (CJRR)

Characteristics		New Care Path	Current	CJRR
Age (average years)		68	68	65
Female Patients (%)		60	60	60
Overweight/Obese (%)	Hip	74	76	72
	Knee	84	84	87

Patient Groups

Patients selected into the new care path process were identified as **new care path** patients, while those patients in the existing care path were identified as **current** patients. **New care path** and **current** patients were classified into one of 3 groups, based on their wait list status (Table 3). The wait list status categories were:

- **Consulted:** Patients who saw an orthopedic surgeon prior to the start of the Alberta Hip and Knee Joint Replacement Project, consented to joint replacement surgery, and were waiting for surgery.
- **Preconsulted:** Patients who had been referred to an orthopedic surgeon prior to the start of the Alberta Hip and Knee Joint Replacement Project, but who had not yet been seen by an orthopedic surgeon.
- **New referral:** Patients newly referred to an orthopedic surgeon after the start of the Alberta Hip and Knee Joint Replacement Project.

Patient Prioritization

The Western Canada Waiting List Project (WCWL) developed a tool to score the level of priority for patients to enhance fairness of access to health care through standardized urgency rating [3]. The WCWL developed benchmarks for acceptable wait times for hip and knee replacement based on the priority scores [4]. Most (74%) **new care path** patients (n=252) were given WCWL priority scores. **New care path** patients with a **consulted** wait list status were not included in the priority score data because these patients waited for surgery prior to the initiation of the project. **Current** patients are prioritized by surgeons using their own standards of need and potential benefit and thus, WCWL priority scores were not available.

For **new care path** patients, the median number of weeks waiting for surgery from the first orthopedic consult date decreased as the urgency scores increased (Table 4). The majority of **new care path** patients received surgery before the WCWL recommended maximum wait time was reached.

Table 3. The number of patients randomized into the Alberta Hip and Knee Joint Replacement Project

Group	Wait List Status	Randomized[1] (n)	Surgical Patients[2] (n)
New Care Path Patients	Consulted	502	406
	Preconsulted	219	101
	New Referral	966	476
	Total	1687	983
Current Patients	Consulted	504	254
	Preconsulted	209	30
	New Referral	970	70
	Total	1683	354

[1] The number of patients randomized into either the new care path or current care path as of March 31, 2006.
[2] The number of patients who received surgery or had a surgery date as of March 31, 2006.

Table 4. Distribution of new care path patient wait times by patient priority score

Priority Score[1]	WCWL Maximum (days)	Patients (n)	Patients (%)	Median (days)	90th (percentile)	Range (days)
Urgency I (least urgent)	140	12	4.8	39	95.9	25-98
Urgency II	84	137	54.4	29	59.7	4-111
Urgency III (most urgent)	28	103	40.9	25	58.6	3-122

[1] Priority scores we collected from chart reviews for patients who had surgery before November 30, 2005.

2. Results

The evaluation focused on accessibility, acceptability, efficiency, and cost.

2.1 Access

Accessibility to the system was defined as health services obtained in the most suitable setting within a reasonable time and distance. A central intake strategy was used to reduce the wait time to access a surgeon. Access was evaluated using wait time data, patient and provider comments relating to distance for initial clinic care, and rural patient visit data for follow-up treatments.

2.1.1 Wait times

An objective of the new care path was to improve access by reducing the overall wait times for patients requiring hip and knee replacements in Alberta. The wait times measured were:

1. Initial referral to first orthopedic surgeon consultation (T0-T1)
2. First orthopedic consult (decision date for surgery) to date of surgery (T1-T2)

WAIT TIME FROM REFERRAL TO FIRST ORTHOPEDIC VISIT (T0-T1)

The target wait time from the date of receiving a completed standardized referral template to the first orthopedic consultation, was 19 days. The median wait time for new **referrals** in the **new care path** patients (n=221) from the original referral from the referring physician to the first orthopedic visit was 49 days which included 42 days for patient selection and the completion and receipt of the new standardized referral template (Table 5).

New referrals in the **new care path** waited a median of 7 days from the completion of the new standardized referral template to the first orthopedic surgeon visit excluding the wait time incurred by the randomization process and wait time to access the referring physician to complete the new standardized referral template. **Current** patients (n=23) waited 92 days from referral to first orthopedic visit excluding the wait time incurred when the patient referral required revisions before being accepted.

FIRST ORTHOPEDIC CONSULT TO SURGERY DATE (T1-T2)

Preconsult and **new referral** patient wait times in the **new care path** were combined. The wait time for this group of patients reflects the time all **new care path** patients spent waiting for surgery. All current patients were used for comparison to reflect the inherent variability and spectrum of wait times to surgery in the current system. **Consulted new care path** patients were on a wait list for surgery before the start of the project; therefore their wait times did not reflect the impact of the new care path and were excluded from this comparison.

The new care path identified a target range of 28 to 112 days as an appropriate wait time from decision date for surgery to date of surgery (T1-T2) (Table 5). The wait time range reflects the varying length of time patients' need for optimization before surgery. The new care path assumed 45% of surgical patients would require functional, medical, or social optimization prior to surgery.

All **new care path** patients received surgery within 112 days of the decision date. Approximately 42% of **new care path** patients (n=293) waited less than 28 days which is defined as the minimum wait time to ensure resource readiness. Only 34% of **new care path** patients waited 40 days or longer.

Reduced wait times for **new care path** patients were achieved in a highly controlled segregated environment. The median wait times reported for this project would not likely be achieved in the integrated health system, due to the competing needs of patients with other health service requirements. Further assessment of achievable wait times in a system context is required.

Table 5. Median wait times for patients[1]

Patient Group		(n)	T0-T1[3] Median (days)	T1-T2[4] Median (days)
New Care Path Patients	Consulted	217	98	216
	Preconsulted	72	167	33
	New Referral	221	7[5]	28
	Preconsulted and new referral	293	-	32
	Total	510	59	50
Current Patients[2]	New Referral	23	92	-
	Preconsulted and new referral	31	-	76
	Total	141	107	305

[1] Surgery before November 30, 2005.

[2] **Current** patients were combined for analysis because a limited amount of surgical data was available for **current** patients.

[3] T0-T1 was the wait time from the original referral from the referring physician to the first orthopedic visit. **Consulted** and **preconsulted new care path** patients were not used in the comparison to **current** patients because those patients were previously referred in the existing system. The actual referral date (T0) was used for **current** patients.

[4] T1-T2 was the wait time from decision date for surgery to actual surgery date. **Consulted** - **new care path** patients were already on a wait list for surgery before the start of the project; therefore their wait times did not reflect the impact of the new care path and were excluded from this comparison.

[5] The median T0 – T1 wait time for **new care path** was 7 days excluding patient wait time for original referral to the project. Patient selection and receipt of the completed standardized referral template took an additional 42 days for a total wait time of 49 days.

2.1.2 Distance

ACCESS TO CLINIC

Patients and providers were surveyed about their experiences. **New care path** patients generally did not have significant concerns about barriers related to the clinic access. Overall, 90% of patients who had surgery by January 15, 2006 (n=367) agreed the assessment clinic location was acceptable. However, some patients chose not to participate in the project because of the clinic location and their views are not reflected in the analysis. A few patients had difficulty with the availability and expense of parking (Calgary Health Region), and with the distance and lack of public transportation to the clinic (Capital Health).

Patients listed distance from home to hospital/care center (11%), as a concern about their care before surgery. Other concerns included fear of possible surgical complications (20%), care commitments of family member or spouse (11%). Some patients had no concerns (37%) before surgery. After surgery, distance from home to hospital/care center was a concern to 14% of patients. Patients were also concerned about complications (12%) and care commitments of family member or spouse (5%) after surgery. Approximately 40% of patients had no concerns after surgery.

Over 67% of the surgeons (n=13) noted clinic location was an inconvenience personally and for patients. Clinic staff (n=22) had more favourable comments about the location than the surgeons. The inconvenience reported by surgeons may relate to their need to work in a second practice location to implement this component of the redesigned care path.

ACCESS TO FOLLOW-UP SERVICES

There were concerns that applying a central intake and follow-up model would impede access for rural patients, particularly in their follow-up assessments. A patient was defined as a rural patient if the first number in their postal code was a "0", e.g. T0T 1Z7 [5]. Results showed that the percentage of rural patients, who received their hip or knee replacements surgery by November 30, 2005, returning for a 3 month assessment following surgery was 25% for **new care path** patients (n = 31) compared to 20% for **current** patients (n = 11). Approximately 60% of urban **new care path** patients (n = 412) returned to the clinic for a 3 month post operative assessment compared to 22% of urban **current** patients. Patients appeared to have increased use of follow-up treatment with personalized case management. The distance to the clinics appears to be a factor in attending follow-up treatment for some patients.

2.2 Acceptability

Acceptability was defined in the Alberta Health and Wellness Quality Framework as 'health services are respectful and responsive to users needs, preferences, and expectations'. Patients and providers provided their opinions on acceptability of the care path through surveys and interviews.

2.2.1 Acceptability to patients

INTERVIEW

Telephone interviews were conducted on a small sample of both **new care path** (n = 12) and **current** patients (n = 12) who received surgery by September 30, 2005. The sample of **current** patients included patients who were waiting for surgery at the time of the start of the project (**consulted**). The sample of **new care path** patients included **new referral** patients only. Patients were asked to describe their experience. Answers were coded and analyzed to illustrate differences between the patient groups. Aggregate results were converted into scores out of 10.

On average, the **current** patients rated their overall experience as 7.9 out of 10 compared to 9.6 out of 10 for **new care path** patients. **Current** patients had more complaints about the waiting period, recovery period, nursing staff, hospital rehabilitation, and a lack of administrative coordination. The **new care path** patients gave consistently positive responses, with no complaints relevant to their care.

SURVEY

New care path patients (n=367) were surveyed about their opinions of the new care path. Participants rated their experience using a four-point scale where (1) = strongly disagree, (2) = somewhat disagree, (3) = somewhat agree and (4) = strongly agree. "Refused" and "don't know" were also available response options. The results were converted into percentages of respondents who somewhat agreed or strongly agreed. Patients indicated a high level of satisfaction with their experience in the new care path (Table 6).

The new care path was viewed as a positive change by patients because it was perceived to have reduced wait times, improved communication, and decreased length of stay as illustrated by their comments (Table 7).

Table 6. New care path **patient acceptability of the care path**

Respondent[1] (n=367)	Question	Agreed (%)
New Care Path Patients	Satisfaction with overall experience	94
	Surgery improved their ability to live with condition	95
	Able to comply with the pre-surgical contracts	94
	Wait time to get appointment acceptable	79
	Wait time to see a surgeon acceptable	88
	Wait time for surgery after clinic visit	98
	Length of stay after surgery was appropriate	92
	Pre-surgical contracts helped patients prepare	96
	Care was excellent during the hospital stay	96
	Able to contact case manager for timely answers	89
	Post-discharge services were available when needed	80

[1] 367 patients who completed their 3 month post-operative visit before April 15, 2006, responded to the survey.

Table 7. Summary of new care path patient (n=367) comments on the care path

Process Step	Comments
Referral Process	Patients found the information and tests they received prior to referral to be beneficial.
Clinic Assessment Process	Patients were satisfied with the clinic assessment process, preferred to know their surgery and discharge dates, and considered the contract helpful to prepare them for surgery. Assignment of case managers: > Patients had a high level of satisfaction with their ability to contact a case manager directly for timely answers at any point in their care. > Pre-surgical contracts were well received by the patients.
Surgery & Inpatient Care	Pre-surgical contracts were a value-added feature of the new care path. Patients felt prepared for the post-operative experience and found that knowing their discharge schedule eased their fears.

2.2.2 Acceptability to providers

Acceptability of the care path was assessed through surveys and interviews with referring physicians, project surgeons and other health care providers. Health care providers were also asked about their perceptions of patient satisfaction.

SURVEY

Participants rated their experience using a four-point scale where (1) = strongly disagree, (2) = somewhat disagree, (3) = somewhat agree and (4) = strongly agree. "Refused" and "don't know" were also available response options. The results were converted into percentages of respondents who somewhat agreed or strongly agreed. A series of interviews were conducted with health care providers in Capital Health and David Thompson Health Region. Data were not collected from all health care regions.

The new care path was viewed as a positive change for referring physicians because of the reduced wait times, improved assessment process, and streamlined processes even though some refinement of the processes are still needed (Table 8). Health care providers agreed with referring physicians, adding that dedicated operating room and ward staff were positive changes.

COMMENTS

Survey respondents had the opportunity to provide additional comments. Providers were encouraged to comment on all aspects of the care path (Table 9). While ratings were mostly positive, comments tended to focus on areas for future improvements.

Table 8. Provider acceptability of the new care path

Respondent (n)	Question	Agreed (%)[1]
Project surgeons (13)	Overall experience improved	85
	Perceived increased satisfaction for patients	85
Referring physicians (74)	Access to surgeon improved	88
	Patients moved easily and smoothly through process	82
	Assessment clinic improved process	74
	Non-surgical management plan added value	62
	Patients complied with non-surgical management plan	67
	Improved information on surgery results	58
	Will result in fewer after hour and emergency visits	50
Clinic staff (22)	Overall experience improved	95
	Perceived increased satisfaction for patients	86
Operating room staff (8)	Overall experience improved	88[2]
	Perceived increased satisfaction for patients	75[2]
Inpatient staff (33)	Overall experience improved	94
	Perceived increased satisfaction for patients	97
	Length of stay after surgery was appropriate	97
Sub-Acute Care Staff (20)	Overall experience improved	90[2]
	Perceived increased satisfaction for patients	85[2]
Home Care Staff (20)	Overall experience improved	62
	Perceived increased satisfaction for patients	52
Community Rehabilitation Staff (11)	Overall experience improved	82[3]
	Perceived increased satisfaction for patients	91[3]

[1] Percentages were calculated using a 4 point scale from strongly agree to strongly disagree. Respondents were also given the option "don't know".

[2] Respondents were from Capital Health and David Thompson Health Region. Data was not available from Calgary Health Region.

[3] Respondents were from Capital Health. Data was not available from Calgary or David Thompson Health Region.

Table 9. Summary of comments from providers (n=202) on the new care path

Process Step	Comment
Referral Process	Referring physicians reported concerns with inadequate or unclear information about the project.
	Referral forms were long and difficult to complete, but were modified during the project.
	Clinic staff experienced difficulty arranging other patient consultations such as internal medicine.
Clinic Assessment Process	Some project surgeons indicated preferences for their own office pre-operative assessment and post operative care processes.
	Assignment of case managers: > Viewed positively as a single contact for patients. Some surgeons with nurse personnel in their office practice saw this position as redundant. > Other health providers thought case managers improved coordination by providing a single point of contact and reference for patients.
	Communication of information to patients: > Adequacy, timeliness and thoroughness of patient education were acceptable to clinic, inpatient, rehabilitation, and home care staff. Sub-acute staff had a lower level of satisfaction with the information. > Patient education methods were viewed as a major improvement and key to surgical and post operative success. > A concern raised early in the project was that short preparatory times before surgery prevented optimization of some patients.
	Communication of information to referring physicians: > Referring physicians generally agreed surgeons provided timely and thorough information on results of the clinic assessments. > Clinic staff felt that overall communication to the family physician was good. Timeliness and thoroughness of information was very good. > Some surgeons were concerned that some family physicians were uninformed about the project.
	Pre-surgical contracts were well received by the patients.
	Plans for management of non-surgical patients received limited evaluation.
	Family physician compliance with the care map for the non-surgical patients was not assessed.
	Clinic staff rated patient acceptance as high.
Surgery & Inpatient Care	Pre-surgical contracts were a value-added feature of the new care path.
	Operating room staff also indicated that they thought the patients were thoroughly prepared for surgery.
	There were diverse views on the improvements with the revised anesthesia protocol that ranged from greatly improved to no change.
	Early mobilization protocol received the highest improvement ratings over the former protocols, including patient compliance to the protocol.
	Pain and nausea protocols received mixed ratings for improvement. Some regions indicated that these protocols were similar to current practices, while others indicated that they were improvements over existing practices.
	Other inpatient recovery routines also scored high on patient compliance.
	Timeliness of communication about patient status was a major concern for referring physicians.

Table 9. Summary of comments from providers (n=202) on the new care path (continued)

Process Step	Comment
Sub-acute Care	Patient transfer to sub-acute care in the morning would ensure they were able to attend exercise classes.
	Increased rehabilitation and exercise activities were an improvement, but require adequate physiotherapy staff to be available 7 days per week.
	The exercise logbook, completed by patients, was a valuable reference for rehab staff.
	The exercise and rehabilitation schedule for total knee replacement patients was excellent.
	The exercise program appears to be too extensive for many total hip replacement patients.
	Occupational therapy support was not perceived to be included in the new care path plans, but was required by many hip replacement patients.
Recovery/After Hospital Care	Post-operative / follow-up visits were highly valued by health providers.
	Physiotherapy, home care and other community services were also valued by referring physicians who were aware of them. However, 40-50% did not know about the services.
Home care	Staff noted communication issues between home care and clinic staff when making arrangements to send the patient to a Community Rehabilitation Program.
	Patients used the normal referral process to home care without issue.
	Post-operative clinic visits were valuable for patients to identify and resolve issues early.
	The exercise program could not be completed in some cases.
	Patient education materials provided by the clinic were good and improved patient motivation and compliance with reinforcement by home care.
Community Rehabilitation Program	Case manager continues to be considered important from a patient perspective. Community professionals had little interaction with the case manager and limited understanding of that role. The post-operative clinic visits at 2, 6 and 12 weeks were considered valuable.

Overall, health care providers indicated high satisfaction on the new care path, and believed that patients were also very satisfied. Assessment Clinic staff recommended improvements to communication and more involvement with family physicians. Sub-acute care staff indicated that the new care path achieved improved patient education and preparation, increased rehabilitation activities and decreased length of stay. Community rehabilitation program and home care staff were positive about the new care path; however, some staff indicated that they had low awareness of the project. Staff expressed a desire for more information about patients referred for care. Home care staff thought the pre-operative processes and patient preparation improved. Changes to home care processes were not included as part of the project for **new care path** patients.

2.3 Appropriateness

Appropriateness was achieved if health services were relevant to user needs and based on accepted or evidence-based practice. As part of the evaluation, pre-booking of resources and patient transfers was assessed. Staff involved in these activities were surveyed.

2.3.1 Pre-booking of resources

Staff involved in the pre-booking of in-patient beds, sub-acute care, home care, and rehabilitation resources were surveyed (n = 87) on the appropriateness of pre-booking surgery and discharge dates. Project surgeons, inpatient staff, sub-acute staff, and home care staff agreed pre-booking of surgery and discharge dates was satisfactory (75%, 78%, 85%, and 68%, respectively). The results of pre-booking of in-patient beds, sub-acute care, home care, and rehabilitation resources varied across the project. Complex patients in the Calgary Health Region received surgery at an alternative site, which created pre-booking issues due to current booking practices. Some facilities were unable to change current practices and continued to book home care services only 24 hours in advance. The impact of the new care path on other services could not be evaluated in the controlled environment of this evaluation.

2.3.2 Patient transfers

Health care providers (n=33) considered patient transfers satisfactory (78%). The following areas were noted for improvement:

- Provide more advanced notice for timing of patient transfers.
- Outpatient transportation to treatment clinics.
- Additional information on patient status prior to transfer.

The greatest impact achieved was the reduced length of stay and reduction in sub-acute care in some regions for patients discharged home. The process for patients discharged to post-acute facilities requires further investigation to assess changes in transitions and compliance with the care path.

2.4 Efficiency

Efficiency is the optimal use of resources in achieving desired outcomes. Four measures of efficiency were used to evaluate the Alberta Hip and Knee Joint Replacement Project: completion of standardized patient referrals, length of stay, length of time in the operating room, and costs. The impact of additional services, for example the case manager's impact on efficiency, was indirectly measured using the length of stay. Although costs are a component of efficiency, they are presented separately.

2.4.1 Patient referrals

Efficiencies can be gained through an integration and realignment of resources and by eliminating duplication. The savings can be used to improve patient access to resources and expertise.

A standardized referral process was developed to improve the quality, efficiency, and appropriateness of patient referrals to orthopedic surgeons for hip or knee replacements. The new referral form collected specific information pertaining to past and current treatments, including outcomes. Primary care physicians were provided the opportunity to request the next available surgeon for their patients rather than referral to a specific surgeon.

The new mandated referral form was completed for all **new care path** patients (n=221) by either their primary care physician (77%) or a physician on site at the assessment clinic (23%). Referral forms were completed by contracted physicians in Capital Health and Calgary Health Region to expedite the referral process and ensured patients access to the assessment clinic. Of all referrals sent to the assessment clinic (n=1,687), 72% of patients were surgical candidates.

2.4.2 Length of stay

The cost of total hip and knee replacement surgery is related in part to the length of stay in the acute care hospital. Multiple methods were used to reduce the length of stay:

- assertive pre-operative education plan combined with pre-surgical function, medical, and social optimization,
- case manger to manage individual patient care and access to resources using a standardized approach,
- predefined postoperative recovery and rehabilitation plan to enable earlier discharges, and
- increased patient preparation.

All of these changes could decrease the use of inpatient resources. Previous attempts at applying evidence based clinical pathways have been successful in reducing costs and length of stay in the acute care hospital, without compromising patient outcomes [6]. Hospital chart reviews were used to assess the length of acute care stay for patients who were discharged home after total hip or knee replacement surgery.

A target of 4.5 days from admission to discharge post-surgery was determined for patients discharged home with or without home care. The target for patients who have a predetermined discharge to an inpatient sub-acute facility was 3.2 days.

Compared to **current** patients, **new care path** patients had an average 2 day shorter length of stay. On average **current** patients had a length of stay of 6.2 days (n = 264) compared to 4.2 days for **new care path** patients (n = 770). Length of stay did not differ between hip and knee patients in the new care path.

New care path patients discharged to acute or sub-acute facilities had an average length of stay of 4.2 days. **New care path** patients discharged home had an average length of stay of 4.1 days. Treatment requirements of patients during the initial acute stay were similar regardless of discharge plan to home or another facility.

New care path patients had a shorter length of stay in post-acute facilities. The median length of stay for **current** patients in post acute facilities was 11 days compared to 9 days for **new care path** patients.

2.4.3 Length of time in the operating room

Efficiencies in the operating room could be gained by using a single operating room and operating team dedicated to hip and knee replacement surgeries without compromising patient safety. An overall reduction in the length of operating room times (time patient entered to the time the patient leaves the operating room) would increase the efficiency of operating room use. Reducing the time between patient surgeries would also improve efficiency of operating room use.

A target operating time of 90 minutes was developed through evidence, benchmarks, and surgeon consensus. Operating room turn around time, the time between one patient leaving the operating room and the next patient entering the operating room, was estimated to be 30 minutes. Based on these targets, an average of 4 surgeries in each operating room per 8-hour day was expected.

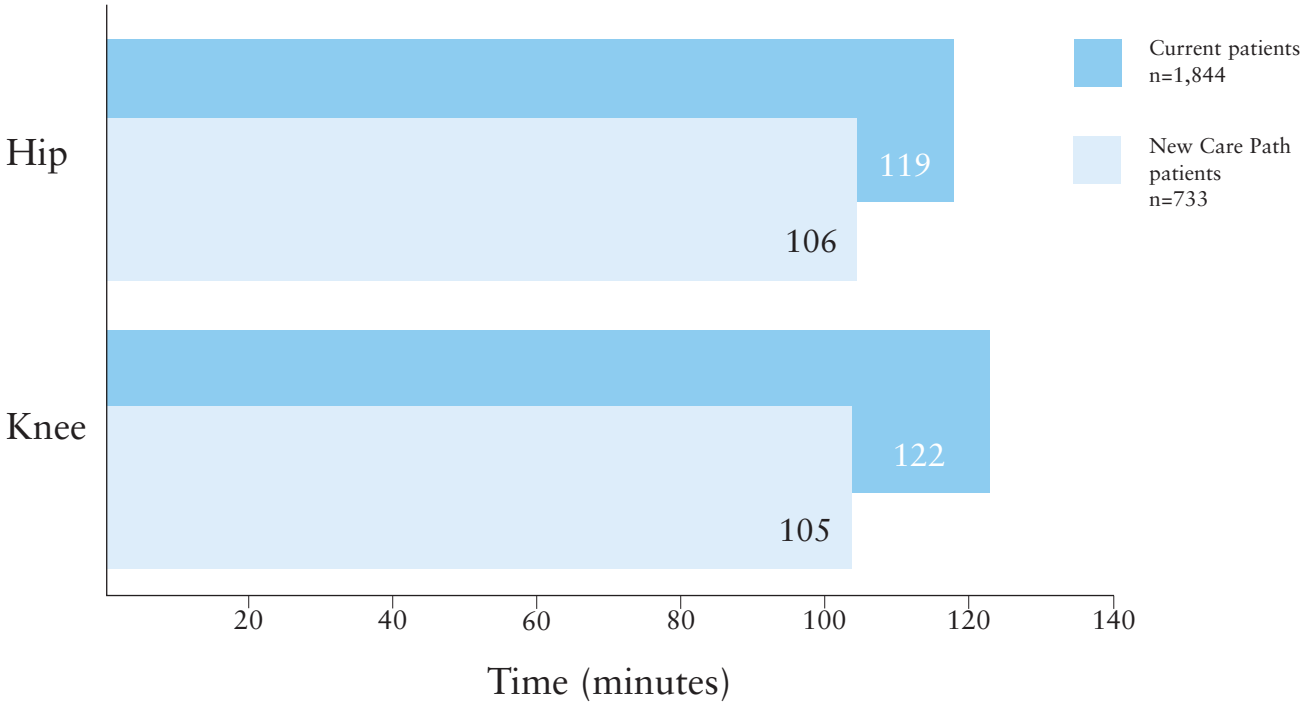
Operating room information was provided by the three regions for a 3 month period. A total of 341 surgeries were performed in dedicated operating rooms.

Ten patients were removed from the analysis due to time gaps that lasted for several hours between cases for unknown reasons. These surgeries included **new care path** and other patients who received joint replacement surgery in the new care path operating rooms.

New care path patients spent 13% less time in the operating room than **current** patients. **New care path** patients were in the operating room for a median of 106 minutes (n = 773) compared to 122 minutes for **current** patients (n = 264) (Figure 4). All patients were in the operating room for longer than the 90 minutes target.

There were no significant differences in operating room minutes for **new care path** patients who received either a hip or knee replacement (106 and 105 minutes, respectively). The number of procedures performed in a day ranged from 1 to 5, with an average of 3.3. The average operating room turn around time was 19 minutes. Operating room turn around time was less than the target of 30 minutes. On average, four cases were completed using the new care path in 8 hours and 12 minutes.

Figure 4. Median operating room minutes for new care path patients compared to current patients



2.5 Costs

The objective of the cost analysis was to compare the total costs per case for **new care path** patients to **historical** patients to determine the savings from the efficiencies achieved. Costing methodologies were used that facilitated timely reporting and enabled comparisons between the **new care path**, **historical**, and **current** patients. The complete care path including inpatient services from hospitals, sub acute care, assessment clinic, rehabilitation, and physician fee for service costs were assessed.

The ratio of hip to knee patients was standardized at 43/57 based on the **new care path** patient ratio. The standardization ratio was used to eliminate cost differences for **historical** and **current** patient average and median costs across the regional health authorities.

2.5.1 Regional costs for inpatient stay and surgery

The full costs of inpatient stays and surgeries were calculated for both the **historical** patients and the **new care path** patients using a consistent methodology. Costs of services were allocated to patients based on related key measurable activities (cost drivers) that were available for both groups.

The regions determined the standard costs for approximately twenty components of inpatient care and about twelve components for surgery depending on each region's tracking process. Two regions calculated these cost components using the methodology from the Alberta Costing Partnership project (an established methodology that guides cost calculations reported at a national level). The third region determined the standard costs by assigning values based on line by line calculations of expected resource usage. The regions used historical cost records for **historical** patients to determine standard costs for each and recalibrated these standard costs to reflect the changes in processes for **new care path** patients.

Table 10. Weighted standard costs in dollars per patient

Cost Element	New Care Path	Current/Historical	Increase (Decrease)
Standard cost driver per patient (without per unit costs)	n[1]=773		
Operating room	1,232	1,514	(282)
Diagnostic imaging	157	157	-
Pre-laboratory work	76	76	-
Cast clinic	-	49	(49)
Pre-admission clinic	-	227	(227)
Pre/post clinic	837	-	837
Prosthesis[2]			
Hip	3,351	3,351	-
Knee	2,061	2,061	-

[1] January 31, 2006 was the latest practical surgery date to determine cost of follow up care. **New care path** patients received surgery between April 1, 2005 and January 31, 2006. **Historical** patients received surgery between April 1, 2004 and March 31, 2005 in the same regions by the same surgeons as the project group. **Current** patients received surgery between April 1, 2005 and January 31, 2006.

[2] The actual average **new care path** patient prosthesis cost was used for **historical** patients to control for this cost variable.

Certain costs, such as clinics, operating room supplies, and laboratory work, are fixed costs per patient (Table 10). Variable cost drivers, which included inpatient days, operating room hours, transportation, and home care, had unit costs (Table 11). The average consumption of these variable cost drivers was calculated from the individual cases (Table 12). Total costs were calculated by multiplying the unit costs (Table 11) by the average consumption (Table 12) and adding the fixed costs (Table 10).

Operating room costs (including per hour costs and per case costs) were $282 lower for **new care path** patients. **New care path** patient pre/post clinic costs were $610 higher than the cast and pre-admission costs of **historical** patients. The pre/post clinic offered additional services to **new care path** patients including more intensive rehabilitation services and provided service to non-surgical patients. Standard costs per unit increased for **new care path** patients' inpatient days due to the need for more intensive rehabilitation services associated with the new care path and the shorter length of stay.

Table 11. Weighted standard costs in dollars per cost driver unit[1]

Cost Element	New Care Path	Current/Historical	Increase (Decrease)
Standard cost driver per unit	n[2]=773		
Inpatient day	680	604	76
Operating room hours	295	325	(30)
Transport to rural hospital	590	590	-
Transport to sub-acute	249	249	-
Rural hospital inpatient day	348	348	-
Sub-acute inpatient day	357	357	-
Home care visit (post)	73	73	-
Physiotherapy visit (post)	34	34	-

[1] The amounts in this table are the summary of cost components before cost driver volumes (e.g., inpatient days, operating room minutes, etc.,) are applied. Costs are expressed in 2005/06dollars for all patients. Further adjustments for inflation were not required for comparative analysis.

[2] January 31, 2006 was the latest practical surgery date to determine cost of follow up care. **New care path** patients received surgery between April 1, 2005 and January 31, 2006. **Historical** patients received surgery between April 1, 2004 and March 31, 2005 in the same regions by the same surgeons as the project group. **Current** patients received surgery between April 1, 2005 and January 31, 2006 with the same surgeons in the three regions.

ACTIVITY MEASURES /COST DRIVERS

The inpatient length of stay and number of operating room minutes decreased significantly for new care path patients. New care path patients also had lower utilization of cast clinic and sub-acute services. The assessment clinic eliminated the need for cast clinic visits in the hospital and a shorter stay contributed to lower utilization of sub-acute services (Table 12).

New care path patients demonstrated higher utilization of home care and physiotherapy services. Although, fewer **new care path** patients were discharged to home care (36% compared to 46% **historical** patients), patients discharged to home care received more intensive service. The number of outpatient post-operative physiotherapy visits increased for **new care path** patients.

Table 12. Average consumption of resource units per case

Cost driver (resource)	New Care Path	Current/Historical	Increase (Decrease)	
n	773	1,854	#	%
Inpatient days	4.6	6.2	(1.6)	(25)
Operating room minutes	109	125	(16)	(13)
Transport to rural hospital	0.04	0.05	(0.01)	(19)
Transport to sub-acute	0.12	0.09	0.03	27
Rural hospital days	0.6	0.5	0.1	18
Sub-acute days	1.1	1.4	(0.3)	(20)
Home care visits	2.1	1.2	0.9	70
Physiotherapy visits	3.4	1.6	1.8	109
Cast clinic visits	0	1.1	(1.1)	(100)

SUMMARY OF COSTS FOR INPATIENT / SURGERY / OTHER SERVICES

The average case cost for **new care path** patients decreased by approximately $528 (5.3%) compared to **historical** patients or $256 (2.6%) compared to **current** patients (Table 13). Median costs showed a similar pattern. **New care path** patient median case costs were 3.9% and 4.4% lower than **current** and **historical** patients, respectively. Median case costs were lower than average case costs because of the skewed distribution of case costs.

Cost results also suggest that **current** costs may be lower than **historical** costs by $273 on average, which suggests a small overall improvement within the system. Details for average costs for hip and knee patients are reported separately (Table 14). Differences in costs for hip and knee replacements can be accounted for mostly by a difference of $1,290 in cost of the prosthesis.

Table 13. Comparison of cost of inpatient / surgery / other services[1]

Cost Element		New Care Path	Historical	Current
n		773	1,854	180
Cost per case ($)	Median	8,618	9,011	8,967
	Average	9,447	9,976	9,703
Cost difference for project ($)	Median		(393)	(349)
	Average		(528)	(256)
Decrease in case cost for hips and knees (%)	Median		-4.4	-3.9
	Average		-5.3	-2.9

[1] Physician fees not included.

Table 14. Comparison of average case cost details[1]

Cost Component		Group		Increase (Decrease)	
		New Care Path ($)	Historical ($)	($)	(%)
n		773	1,854		
Hip	Inpatient	3,378	3,880	(503)	(13)
	Operating room	1,775	2,191	(416)	(19)
	Prosthesis	3,351	3,351	0	0
	Transport	61	64	(3)	(5)
	Post-acute stay	677	668	9	1
	Clinic	898	378	520	138
	Home care	165	114	51	45
	Physiotherapy	67	66	1	1
	Total	10,373	10,713	(340)	(3)
Knee	Inpatient	3,226	3,870	(643)	(17)
	Operating room	1,760	2,161	(401)	(19)
	Prosthesis	2,061	2,061	(0)	(0)
	Transport	51	65	(14)	(22)
	Post-acute stay	461	694	(233)	(34)
	Clinic	925	382	543	142
	Home care	110	120	(10)	(8)
	Physiotherapy	152	64	88	137
	Total	8,747	9,417	(671)	(7)

[1] Average case costs details for the **current** group were not available due to the limited number cases available for analysis by January 31, 2006.

2.5.2 Physician costs for services

The average fee for service (FFS) billing per case was calculated for the 8-month period that encompassed four months before and after the surgery. This includes FFS billings by all significant providers because it was not possible to definitively identify services specifically associated with hip or knee replacement surgery. Providers and specialists that historically did not provide services to hip and knee replacement patients were excluded. Fee information, extracted from the paid fee files at Alberta Health and Wellness, was the actual amount paid to physicians.

ACTIVITY MEASURES/ CLAIMS VOLUMES

New care path[2] (n = 465) and **historical**[3] (n = 3,762) patients had similar utilization patterns between 30 and 3 months before surgery with an increase in the monthly claim volumes of about 36% from 30 to 13 months prior to surgery. The volumes of claims leveled off at about 1.5 claims per patient 12 months before surgery and stayed at that level till 3 months prior to surgery after which utilization of FFS increased in preparation for the surgery. This usage pattern justified using the ± 4 month period for comparative fee analysis.

SUMMARY OF COSTS FOR FEE FOR SERVICE

The average FFS billings per case in an 8-month period that encompassed four months before the surgery and four months after (i.e., -4 to +4 months) was approximately $2,600[4] for **new care path** patients compared to $2,400 for **historical** patients, a difference of $200 or 8.3%.

Total fee-for-service billings were about $100 higher per **new care path** case related to a change in diagnostic imaging service provision from the hospital (non-FFS) to community-based (FFS) clinics. The remaining $100 of the increase reflects inflation in the FFS rates as there were four increases in the fee schedule in the data set over the period of analysis.

SUMMARY OF FINDINGS RELATED TO COST

The average case cost for new care path patients from a regional perspective was $9,447 based on a 43/57 percent mix of hip/knee cases (Table 15). This was 2.6% and 5.3% lower than the current and historical case costs, respectively. The new care path, therefore, resulted in a $250 to $530 cost reduction per case for the regional health authorities due to a more efficient use of inpatient and surgical resources. The fee for service costs did not change for **new care path** patients compared to **historical** patients or **current** patients, other than to reflect an inflationary increase.

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[2] This number includes patients who received surgery 4 months prior to the final date for data collection.

[3] **Historical** patients were all patients who received knee and hip replacement surgery in Alberta between April 1, 2004 and March 31, 2005.

[4] Special case rates were implemented for **new care path** patients who represented a bundle of services for either surgical or non-surgical management of cases. Orthopedic surgeons charged one of two case rates for hip or knee replacement surgery:

- $1,468.60 if a physician was the first assistant during the procedure.
- $1,384.21 if a nurse was the first assistant during the procedure.

The case rate encompassed payment for the general practitioner referral and examination, orthopedic consultation (including a second opinion where required or requested), surgical procedure, surgical assistant payment (physician or nurse), and three follow-up visits, which occurred up to 12 weeks post-operatively.

Table 15. The average case costs for regional health authorities and physicians

Cost Element	New Care Path		Current		Historical	
RHA ($)	9,447	n=773	9,703	n=180	9,976	n=1,854
Physicians ($)	2,600	n=465	2,675	n=3,097	2,400	n=3,762
Total ($)	12,047		12,378		12,376	

2.6 Effectiveness & Safety

Reports on effectiveness and patient safety are expected to be available in 2007. The effectiveness and safety analysis will be undertaken for all patients three months post surgery. The definition and classification of various adverse events are being established by the Alberta Hip and Knee Replacement Safety Review Committee. Adverse event rates will be measured against other safety reports. Patient outcome measures will be applied to costing information to create economic models comparing the cost-effectiveness and cost-utility of the new care path to the current care path. Sensitivity analysis will be undertaken to examine the robustness of the economic models under different patient environments. The safety analysis report will compare rates of various adverse events in the new care path to the current care path.

Patient outcomes are critical for measuring the quality of healthcare services. Outcome measures are used to determine the effectiveness and safety for patients. Obtaining quality of life measures, at defined times in the patient's care path, will provide quantitative evidence to compare the effectiveness of new care path to current care path outcomes.

3. Assessment of the Change Management Process

Partnership was critical to initiate and measure change.

3.1 Initiation

System re-design began with the alignment of broad project goals and objectives of the Government of Alberta, three regional health authorities, and physicians. This partnership was critical to initiating change and measuring change. These partners and supporters agreed to a set of operating principles and developed a project plan based on a foundation of existing evidence, expert opinion, and information sharing.

The partners envisioned a project that would improve access while maintaining quality for a reasonable cost. The partners and supporters were accountable to all patients whether they were involved in the system change or receiving services in the current system. Care was taken to prevent negative impacts on other services by providing new dedicated funding.

3.2 Developing a new care path

The current conventional approach to hip and knee replacements typically reflects the practice of the individual surgeon, hospital(s), and health region(s) in which the patient receives care. The operative component as performed by the surgeon is broadly standardized with the exception of the implant used. The balance of the care path, including both pre and postoperative components, can vary widely in terms of access, quality and cost.

The Alberta Orthopedic Society and the Provincial Arthroplasty Working Group developed an improved evidence-based hip and knee replacement care path over a 3 year period. The new care path integrated and aligned roles related to responsibilities, accountability, and authority. The best available evidence and expert-based consensus were used to develop standards related to access, wait times, clinical quality, resource use, and health outcome measures. The new care path was developed to address challenges patients and providers found in the current care paths for many services. These included:

- inconsistent patient referral and assessment,
- the availability of case management,
- operating room scheduling,
- pre and post-operative care, and
- provision of information to physicians and patients about the care path.

3.3 Change management

The change management process encompassed patient care path changes from initial referral stages through to home or home care for patients, and involved health care professionals, health regions, and government. The partners provided insights on the components of change management needed to implement the new care path (Table 16). Increased collaboration with referring physicians and clear communication to all providers and patients was important to successful change. The new care path required changes to current clinical practices. Effectiveness, efficiency, and sustainability of the care path were critical components of the change management strategy.

Table 16. Components of change management in the new care path

Component	Issue	Suggested solution
Wait List Management (patients waiting for consultation by surgeon)	Current wait lists have duplications and completed patients.	A central management system that inventories all patients referred for hip or knee replacement consultation would prevent patient duplication and facilitate the process for referrals. Managing patients using a central system, with a standard method of assigning a level of urgency to a patient, would ensure each patient received treatment within an appropriate time for the individual.
Volumes	Scheduling operating room time requires a balance of surgeon practice and patient complexity.	Rather than targeting a volume of 4 cases per day, operating room schedules should allow for 3 to 5 cases per day to accommodate surgeon, patient, and site needs.
Patient optimization and compliance with contract	Patient optimization requires an adequate amount of time to prepare the patient for their surgery.	Patients and professionals work together on the patient's goals for each step in the care path including planning for optimization. Surgery should only be booked once the patient has been optimized. Defined timelines and expectations need to be clear for patients and health care providers. Attention to this component will be a focus in sustainability.
Pre-referral medical management	Expectations must be known and communicated so that patients are managed in a consistent and optimal manner.	Physicians including those in Primary Care Networks need to be informed and educated about the referral process and expectations.
Clinic Staffing	Staff and resource supply at the assessment clinic must match the demand of patients accessing these facilities.	The assessment clinic needs adequately trained staff and space available to manage the increased patient volume and the capability to handle non-surgical patients. All staff must work to full scope of practice. Equitable, collaborative, and open communication among the partners will ensure patients' needs are managed effectively, safely and efficiently.
Resources and staffing needs	Facility, clinic and community services will have specific resources and staffing needs. Changing the practice of established, experienced surgeons is a complex process.	New staff or reassignment of staff throughout the care path may be required to support and achieve the timelines. Improved business process to pre-book resources and communication of expectations related to patient outcomes is essential.

Table 16. Components of change management in the new care path (continued)

Component	Issue	Suggested solution
Continuum management	Health regions and the surgeons are jointly responsible for care path consistency and reporting between providers.	Planning meetings held with clinic providers and health region providers are important for discussing concerns on a regular basis. Implementation and ongoing evaluation should follow the planning stage.
Accountability	Multiple administrative structures are responsible for accountability in reporting, achieving outcomes, and financial management.	Resource sharing and reallocation plans need to continue to be developed.
Other Services (eg. Internal Medicine, Anesthesiology)	Other services are impacted whenever system redesign is implemented.	Determine how changes to the care path impact other services so that expectations are clear and changes can be managed.
Education & Maintenance	Ongoing accountability to the care path and mechanisms to address potential improvements to the care path are needed.	Project teams continue to maintain and improve upon best practices. System checks may be used to prevent variation from the new care path. Reporting of care path results implemented to ensure patient outcomes and service utilization results are maintained and all parties are accountable.
Communication & Feedback	Key contacts are needed to assist with cross-portfolio reporting and accountability.	Local and provincial project coordinator providing clarification, communication, and dissemination of project findings to staff involved or impacted.
Staff Education	Appropriate education for all staff, on an ongoing basis, is needed.	Formal education process and standardized orientation packages will support the education needs of new and current staff when established as a priority.
Data Collection	Electronic data bases are needed to support data collection and sustainability.	Methods to integrate data collection systems that encompass a minimum data set from the entire care path from referral to home care must be determined.
Reporting	Methods to collect data for internal and external reporting are needed.	Establish agreed upon reporting requirements and performance indicators that are important to physicians regions, and government and can be collected. Refine local reporting to provide information to decision-makers.

3.4 Key Success Factors

- The creation of a provincial coordinating and steering body composed of regional health authority, physician and Alberta Health and Wellness representatives.
- The development of a new care path from referral to recovery that had the support of all the partners and included a redesigned patient flow, a new standardized clinical path, and clear definitions of accountability and responsibility.
- The creation of centralized assessment clinics where patients are assessed and received their pre and post-operative care from an integrated team of professionals.
- A transfer of services from the regional health authorities to the orthopaedic surgeons including pre-operative assessment and post-operative clinic. The team managing the care path shared responsibility and accountability for physical and occupational therapy.
- The use of dedicated clinic, operative, inpatient, and sub-acute care resources based on planned volumes. This also included the advance booking of resources to prevent delays in access and discharge.
- Agreement and processes were established to merge patient data and information from different sources to support the planning process, but also to enable an evaluation of all parties by an independent third party evaluator.
- Primary care physicians agreed on a standardized approach to patient referral and shared care medical management.
- The development of a patient contract that clearly specified the patient's responsibilities related to managing their own living (functional, medical and social) circumstances. It also identified surgeon and regional health authority responsibilities to provide the necessary treatments and resources to specify times and dates.

Recommendations for future care path reforms were provided by referring physicians, project surgeons, other health care providers and members of the committees involved in overseeing various aspects of the project (Table 17). Surveys and focus groups were used to collect the recommendations (response rate = 39%).

Table 17. Recommendations for future projects

Component	Recommendation
Initiation	Develop an overall vision with commitment by all involved parties.
	Establish committees with appropriate stakeholder representation.
	Develop partnerships between physicians, surgeon, regional health authorities, and government.
	Dedicate resources for project planning and management.
	Engage referring physicians, regional health authorities and government at the beginning of the process.
	Identify a project manager.
Planning	Develop detailed timelines and operational work plan for the project.
	Develop the project based on clinical operational requirements rather than research protocols.
	Involve project surgeons directly to improve acceptance of the care path and optimization process.
	Involve primary care, community care, anesthesia, internal medicine, etc. in the planning phase.
	Educate all parties that will be involved or impacted by the project.
	Develop plans for information sharing among groups.
	Develop and test templates prior to implementation.
	Establish roles and responsibilities.
	Establish mechanisms to support data access and collection.
Implementation	Increase communication with physicians about community services.
	Increase capacity for each segment of the care path in stages.
	Allocate workload to provide appropriate time and support to implementation.
	Monitor progress and make improvements.
Training	Test processes that will be implemented with staff and refine as needed.
	Training and orientation must include all functional areas and health professionals along the entire care path.
Evaluation	Use an evaluation framework that has multiple dimensions of quality.

4. Conclusions

The new care path had benefits for patients and providers.

Conclusions

This project, which aimed to evaluate a new care path for hip and knee replacement surgery, supports the following conclusions:

1. The new care path had several benefits for patients and providers, related to improved management and greater certainty about when and how services will be provided. These benefits are due to a collaborative approach to care delivery with greater focus on care standards, use of case management, and the centralization of patient intake, assessment, and measurement of outcomes.
2. Failure to identify issues among key stakeholders prior to the start of the project initially delayed the project and impacted relationships. This project reinforced the need to engage key practitioners along the continuum of care in the planning.
3. Research must be sensitive to the perspective of patients. Some patients assigned to the control group in a research design will feel that they have been disadvantaged unfairly. The impact of these types of studies on the control group must be taken into account and the project needs to assume accountability for patient issues created by the study design.
4. With dedicated funding and resources, it was possible to reduce wait times for selected patients receiving hip and knee replacement surgery. However, these results were achieved in a separate research environment. Patients requiring revisions take longer to move through the system because they require more resources. It will not be possible to realize the very short wait times achieved for patients in this study when the new care path is integrated into the broad context of the entire health system without additional capacity.
5. Improvements to the quality of the patient journey in one area of service delivery can be accomplished by realigning resources within that service area through collaboration and cooperation amongst stakeholders.
6. The new care path demonstrated that reorganization and alignment of services does not necessarily increase costs in the system. Costs were primarily shifted within the new care path to improve the patient journey.
7. Standardized measurement is critical in the evaluation of strategies to improve access to services and clinical utilization.

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