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**REPORT:**

**Employment and Knee Replacement Surgery**

**Prepared for the Worker's Compensation Board of Manitoba**

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## **Executive Summary**

This study set out to determine employment characteristics in working-aged patients awaiting total knee replacement, as well as the impact of total knee replacement surgery on return to work. A total of 140 patients completed and returned pre-operative questionnaires; at the time of writing, 94 of these patients had been followed for at least 6 months post operatively.

About 1 in 5 working aged patients (20%) awaiting knee replacement surgery will be forced off work due to their knee condition. The likelihood of being off work prior to surgery appears to increase with worsening knee functional scores; patients with Oxford-12 knee scores worse than 15 appear to be at particularly high risk of being off work. Undertaking surgery in patients prior to work cessation is important: 84% of patients working prior to surgery return to work post-op, whereas only 41% of patients off work due to their knee returned to work following surgery. No differences appear to exist in terms of physical function, knee score, workplace physical demands or job flexibility between those who return to work and those who did not following surgery. However, those who return to work following surgery tend to report higher job satisfaction and household income than those who do not, illustrating the potential role psychosocial factors may play in resumption of employment after surgery. For those who do return to work following knee replacement surgery, they report improved ability to fulfill workplace physical demands, and a corresponding increase in workplace productivity.

# 1 Introduction

Arthritis commonly occurs in the knee and can be caused by osteoarthritis, inflammatory arthritis, sporting injuries, or workplace injuries. Unfortunately, the pain and dysfunction arising from arthritis can lead to individuals being unable to perform their regular workplace duties; this can result in work cessation and the need to collect disability payment. Total knee replacements (TKRs) are a common, cost-effective surgical procedure that can significantly reduce a person's pain and increase their function [1]. Commonly cited goals for TKR surgery include the ability to return to work, as well as improved ability to meet workplace functional requirements.

Patients under the age of 65 have had large increases in TKR procedures over the past five years; in the 55 to 65 age group men have increased by 14.5% and women by 16.0% [1]. Increasing obesity-linked arthritis as well as advancements in knee replacement technology has shifted the common age group seeking a TKR to younger patients whom are often more active [2]. Kurtz et al., reported that the demand for primary TKRs among young patients (<65 years) in the United States was predicted to exceed 50% of all arthroplasty recipients by 2016 and 55% by 2030 [3]. Furthermore, the future demand for TKRs is expected to increase the most between the ages of 45 and 54, at a rate of 17 times faster than the current rate [3]. As many of these young patients may participate in the work force, it is important to understand both their work capacity while awaiting knee replacement surgery, as well as the impact that TKR may have on their ability to return to work and perform work duties.

There are a few studies looking at the relationship between employment and TKR, with the majority being European studies [4, 5, 6, 7]. Several factors that have been previously investigated include: size of organization, association with job loss, level of physical disability, duration of symptoms, and employment circumstances at the time of surgery [5]. Saleh et al., found that only 24% of patients returned to their same occupation if they were on Worker's Compensation prior to surgery [7]. Foote et al., found that 82% of patients who were working pre-operatively returned to work if they received a TKR or unicompartmental replacement, but only 54% returned if they received a patellofemoral replacement [6]. A few additional studies have found that 70-82% of patients who had received a TKR returned to work if they were working pre-operatively, at a range of 4 - 56 weeks post-operation [8, 9, 10]. Information regarding the impact TKR has on a patients' ability to perform their work duties is also limited, however the desire to regain independence and return to work has been a strong incentive for undergoing TKR [2]. Two small studies have reported that 47-67% of patients who had a TKR returned to work at the same physical intensity as they performed pre-operatively [6, 11], while 56% of TKR patients reported post-operative improvements in their ability to work [6].

The objectives of this research are twofold: the first is to understand the employment characteristics and capacity in working aged patients awaiting TKR, and the second is to determine the impact of TKR on the ability to return to work post-operatively and perform their workplace duties.

This research is of importance to WCBs Research and Workplace Innovation Program and Manitoba employers for several reasons. It provides information on work capacity in patients awaiting TKR, it investigates the relationship between knee arthritis and work cessation/resumption, and it also examines work capacity following surgery. Accordingly, this research will provide WCB and employers with a better understanding of workplace expectations of knee arthritis patients who are treated with TKR.

## **2 Methods**

### **2.1. Study design**

This is a prospective study involving patients awaiting knee replacement surgery. Recruitment occurred between June 2011 and December 2015 involving patients primarily from the Concordia Joint Replacement Group's (CJRG) surgical waitlist in Winnipeg, Manitoba (Drs. Hedden, Bohm, Burnell, and Turgeon); these 4 surgeons are fellowship trained and specialize in primary and revision hip and knee replacement surgery, performing approximately 1400 cases per year. Patients of the CJRG slated for surgery were initially asked by phone to participate in the study followed by mailing of the consent form to these patients along with the pre-operative questionnaire package. To increase recruitment specifically of WCB patients awaiting surgery, patients from waitlists of community surgeons' Drs. Crosby, Balageorge and Kayler were also recruited. in a similar fashion. Only patients of working age (< 65 years) with a diagnosis of primary or post-traumatic osteoarthritis were included in the study. The exclusion criteria were unwillingness to participate, or an inability to comprehend written English. Employment status at the time of surgery was not an exclusion criterion because some may have ceased employment due to knee disability.

Data for this study was collected from self-reported patient questionnaire packages sent out to participants before and after TKR surgery. A description of the data collected, along with timelines, is outlined below. All patient characteristics, and employment details were measured using validated measures (see Appendix C for a full description) and then standardized to a scale of worst (0 score) to best (100 score). The factors examined in this study were based upon work done by the lead author in hip replacement patients [12, 13, 14] as well as input provided by Workers Compensation Board of Manitoba.

Approval was granted by the Biomedical Research Ethics Board at the University of Manitoba.

The pre-operative questionnaire package is provided in Appendix A and contains the following measures: age, gender, weight, height, marital status, education, alcohol use, smoking status, general physical health, medical history, musculoskeletal conditions, pain catastrophising, social support, number of dependents, employment status, availability of work modifications to allow return to work, retirement plans, workplace absences, duration of knee problem, disability

payment collection, personal and household income, work motivation, job description, workplace accommodation, workplace duties alteration, workplace duties modification, weekly hours of work, job tenure, job benefits, workplace physical demands, workplace productivity, job satisfaction, job flexibility, ability to meet workplace physical demands, plans for work resumption following surgery and questionnaire burden. Patients who were not working pre-operatively (related or unrelated to their knee) were asked to consider their last place of work while completing the employment related questions. Employment status was categorized into three main groups based on response options in the pre-operative questionnaire:

Working	Paid work for self or employer or unpaid work for a family business
Off work due to knee	Unemployed due to knee condition Retired due to knee condition On paid leave due to knee condition
Off work unrelated to knee	Unemployed not due to knee condition (seeking or not seeking employment) On paid leave not due to knee condition Homemaker Student Retired, not due to knee condition

The post-operative questionnaire was mailed out to the same group of participants at 3, 6, and 12 months after surgery. It contained similar questions to the pre-operative package, with additional questions pertaining to reasons for returning or not returning to work (see Appendix B). Patients who had returned to work were further asked about their work duties, modifications to their work duties as well as their current level of ability and ability to meet workplace demands. When assessing the impact of surgery on a patient's resumption of employment, we included only those who had returned either the 6 or 12 month questionnaire, as most patients are advised to remain off work for 3-4 months post-operatively.

## 2.2. Statistical analysis

Patients were stratified into 3 groups pre-operatively: a) Working, b) Off work due to knee condition, and c) Off work unrelated to knee condition. Post-operatively, patients who had indicated pre-operatively that they were considering returning to work following surgery were stratified into 2 groups: e) those who had returned to work, and f) those who had not returned to work. These groups were then compared using the appropriate statistical tests for the various measures looking for differences in patient and workplace characteristics. Only 4 patients collecting worker's compensation benefits were recruited for this study; due to privacy concerns and low statistical power due to the low number, they are not reported separately.

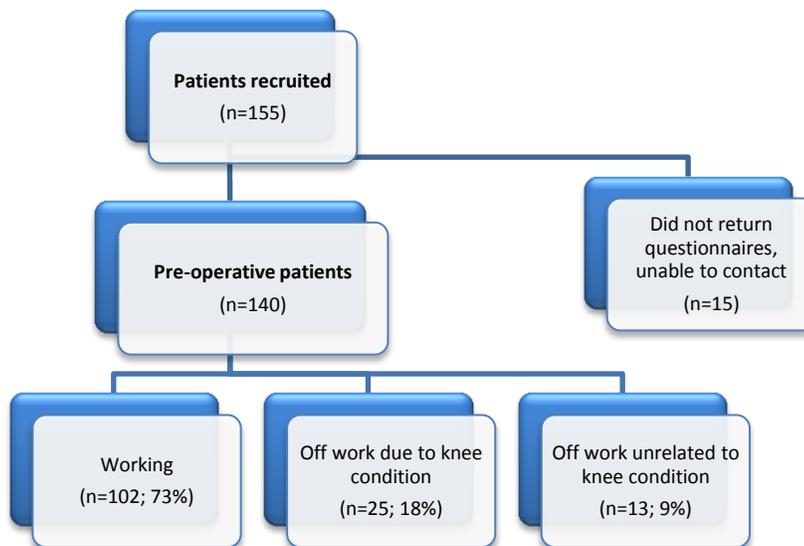
All questionnaire responses were entered into a Microsoft Access database followed by statistical analysis using SAS 9.3 software (SAS Institute Inc.). Continuous variables were plotted to access

normalcy and summary statistics were used to determine means and medians. Statistical comparisons of factors between the working group and non-working group related to knee condition among the pre-operative data either involved the application of a Student's T test or Wilcoxon (Mann-Whitney U) test to the continuous variables, while the Chi-square test was used for ordinal and dichotomous variables. The Fisher exact test was used as an alternative to the Chi-square test when  $n < 5$  in one or more of the categories being compared. Change in Oxford-12 knee scores were compared using a paired Student's T test, and only included the participants for whom we had data pre-operatively, and either at 6 or 12 months postoperatively. To assess the predictive relationship between pre-operative Oxford-12 score and work status, we used receiver operating characteristic (ROC) curves and logistic regression analysis. A significance level of 5% was used for all statistical testing.

### 3 Results

#### 3.1. Pre-operative findings

One-hundred and forty out of 153 patients (91.5%) returned completed pre-operative questionnaires. Of these, 102 (73%) were working pre-operatively and 25 (18%) were off work due to their knee condition. The remaining 13 (9%) were off work, but not because of their knee condition (Figure 1). Patients in this group were either: unemployed not because of their knee condition but available for work ( $n=2$ ), on paid leave unrelated to their knee condition ( $n=3$ ), or retired not due to their knee condition ( $n=8$ ). Loss to follow-up was due to non-returned pre-operative questionnaires despite repeated mail-out attempts as well as inability to contact these patients.



**Figure 1: Pre-operative flowchart of patient data collection and employment status grouping.**

**Table 1: Characteristics of working aged patients awaiting total knee replacement. Factors presented as “/100” are scored worst (0 score) to best (100 score).**

Factors	Working	Off work due to knee	P-value Comparison of Working to Off work due to knee	Question Completion Rate	Off work unrelated to knee
N patients	102/140 (73%)	25/140 (18%)	-	-	13/140 (9%)
Age (mean)	55 yrs	55 yrs	p=0.92	100%	58 yrs
Gender	54 F : 48 M	18 F : 7 M	p=0.08	100%	9 F : 4 M
Weight (mean)	92 kg (F) 107 kg (M)	101 kg (F) 121 kg (M)	p=0.26	100%	105 kg (F) 91 kg (M)
Height (mean)	162 cm (F) 180 cm (M)	163 cm (F) 173 cm (M)	p=0.65	100%	164 cm (F) 173 cm (M)
<b>BMI (mean)</b>	<b>36 kg/m<sup>2</sup> (F)</b> <b>34 kg/m<sup>2</sup> (M)</b>	<b>38 kg/m<sup>2</sup> (F)</b> <b>40 kg/m<sup>2</sup> (M)</b>	<b>p&lt;0.05</b>	100%	39 kg/m <sup>2</sup> (F) 30 kg/m <sup>2</sup> (M)
<b>Marital status (median)</b>	<b>Married/common law</b>	<b>Married/common law</b>	<b>p&lt;0.05</b>	100%	Married/common law
Education level (median)	Grad from technical college/trade school	Grad from technical college/trade school	p=0.54	100%	Some university/technical college/trade school
At risk of alcohol abuse (CAGE >2)	5%	8%	p=0.35	100%	0%
Smokers	7%	1%	p=0.41	100%	8%
<b>Pers. income (median)</b>	<b>\$45,000-49,999</b>	<b>\$35,000-39,999</b>	<b>p&lt;0.01</b>	95.3%	\$35,000-39,999
<b>House income (median)</b>	<b>\$70,000-79,999</b>	<b>\$40,000-49,999</b>	<b>p&lt;0.01</b>	95.3%	\$60,000-69,000
<b>Collecting disability</b>	<b>3%</b>	<b>56%</b>	<b>p&lt;0.001</b>	100%	23%
<i>Physical function (mean)</i>	<b>29 / 100</b>	<b>16 / 100</b>	<b>p&lt;0.01</b>	100%	31 / 100
<i>Oxford-12 score (mean)</i>	<b>35 / 100</b>	<b>26 / 100</b>	<b>p&lt;0.01</b>	63.0%	32 / 100
N – common health problems (median, range)	2, 0-9	3, 0-6	p=0.07	100%	3, 0-7
<b>N – musculoskeletal conditions (median, range)</b>	<b>3, 0-14</b>	<b>5, 1-18</b>	<b>p&lt;0.01</b>	100%	4, 1-11
<b>Presence of back pain</b>	<b>42%</b>	<b>72%</b>	<b>p&lt;0.05</b>	100%	62%
<b>Pain catastrophizing (mean)</b>	<b>25 / 100</b>	<b>44 / 100</b>	<b>p&lt;0.001</b>	100%	28 / 100
<i>Social support (mean)</i>	76 / 100	66 / 100	p=0.09	100%	63 / 100
Knee problem >1 year	100%	92%	-	-	100%
Work Motivation	53 / 100	61 / 100	p=0.15	100%	52 / 100
<b>Accommodated work duties</b>	<b>36%</b>	<b>24%</b>	<b>p&lt;0.01</b>	100%	23%
Paid hours/week (mean)	36.0 hrs	36.5 hrs	p=0.89	100%	32.5 hrs
Paid OT hours/week (mean)	1.4 hrs	1.7, 0-10 hrs	p=0.71	100%	0.2 hrs
<b>Unpaid hours/ week (mean)</b>	<b>4.5 hrs</b>	<b>1.2 hrs</b>	<b>p&lt;0.01</b>	100%	3.9 hrs
<b>Job tenure &gt;5 years</b>	<b>85%</b>	<b>64%</b>	<b>p&lt;0.05</b>	100%	85%
N - work benefits (median, range)	5, 0-12	5, 0-10	p=0.69	100%	8, 0-11
<i>Job satisfaction</i>	<b>48 / 100</b>	<b>39 / 100</b>	<b>p&lt;0.01</b>	100%	40 / 100
<i>Job flexibility</i>	<b>31 / 100</b>	<b>48 / 100</b>	<b>p&lt;0.05</b>	100%	32 / 100
<i>Workplace physical demands (mean)</i>	<b>47 / 100</b>	<b>32 / 100</b>	<b>p&lt;0.001</b>	100%	50 / 100
<i>Meeting workplace physical demands (mean)</i>	<b>68 / 100</b>	<b>33 / 100</b>	<b>p&lt;0.001</b>	100%	63 / 100
<b>Plan to return to work</b>	<b>93%</b>	<b>60%</b>	<b>p&lt;0.001</b>	100%	23%

Patient and employment characteristics for each group have been summarized along with statistical comparisons in Table 1. This study includes 81 females and 59 males with an average BMI of 38.5 kg/m<sup>2</sup> and 34.7 kg/m<sup>2</sup> respectively. Mean age in both the working and not working due to knee groups was the same (55 years), however people off work for reasons other than their knee tended to be a bit older (58).

When comparing working patients to patients off work due to their knee, we found no significant differences in marital status, education level, risk of alcohol abuse, smoking rates, number of health problems, social support, longevity of knee problem, paid hours per week (prior to stopping work in those off work due to their knee), number of work benefits or work motivation. However, several significant differences were found, working patients tended to have lower BMI, higher personal & household income, much lower rates of disability payment collection, better overall physical function, better Oxford-12 knee scores, a lower number of other musculoskeletal conditions, lower frequency of back pain, lower pain catastrophizing scores, higher frequency of accommodated work duties, work more unpaid hours per week (prior to stopping work in those off work due to their knee), have higher workplace physical demands – but were better able to meet them, have higher job satisfaction, have job tenure of over 5 years, better job flexibility, and were more likely to plan on returning to work following surgery.

Nearly 50% of working patients surgery missed at least 1 workday as a result of their knee condition in the 18 months prior to surgery. Table 2 stratifies the working days missed provided by 91 responses from the employed group.

**Table 2: Number of missed workdays in Working group within 18 months prior to surgery (n=91, 11 not completed).**

<b>Number of missed work days</b>	0 days	1-2 days	3-7 days	8-14 days	15-30 days	1 month	2 months	3-6 months	6-12 months	Over 1 year
<b>Proportion of working group</b>	50.1%	6.5%	17.6%	5.5%	9.9%	1.1%	3.3%	3.3%	0%	2.2%

Those who remained at work prior to surgery were more likely to be self-employed or work for private industry (p<0.05, Fisher’s exact test). Table 3 presents employer type by employment status.

**Table 3: Employer type and employment status.**

	<b>Working (n=102)</b>	<b>Off work due to knee (n=24, 1 not completed)</b>	<b>Off work unrelated to knee (n=12, 1 not completed)</b>
Self-employed	21.6%	12.5%	0%
Government/Public sector	32.4%	29.2%	66.7%
Private industry	30.4%	16.7%	25.0%
Non-profit organization	6.9%	8.3%	8.3%
Military	0%	0%	0%
Other	8.8%	33.3%	0%

An office/desk job was by far the most common among all employment environments, next to hospital and health care. There were no participants who worked in a laboratory or hospitality/service environment, and very few patients worked in a warehouse, correctional facility, daycare, or in agriculture (Table 4). Differences between the groups was significant at the  $p < 0.001$  level (Fisher's exact test).

Logistic regression and ROC curve revealed a relationship between pre-operative Oxford 12 knee score and employment status. Graphically, the ROC curve trends to the upper left corner and has a c-statistic of 0.718 (Figure 3), indicating moderate predictive ability. The logistic regression model (Figure 4) demonstrates that an Oxford-12 knee score of approximately 45 or better is associated with a 90% chance of remaining employed pre-operatively whereas a score of 15 or worse is associated with only a 60% chance of remaining employed while awaiting surgery.

**Table 4: Employment environment and status (%).**

	<b>Working (n=102)</b>	<b>Off work due to knee (n=24, 1 not completed)</b>	<b>Off work unrelated to knee (n=12, 1 not completed)</b>
Office/desk	46.1%	4.2%	58.3%
Warehouse	0%	8.3%	8.3%
Vehicle	4.9%	4.2%	0%
Construction/ building site/ road work	5.9%	4.2%	0%
Retail store	2.9%	8.3%	0%
Hospitality/ service environment	0%	0%	0%
Hospital/ health care environment	13.7%	29.2%	33.3%
Laboratory	0%	0%	0%
Manufacturing/ production	3.9%	8.3%	0%
Correctional facility/ daycare facility	2.9%	4.2%	0%
Agricultural indoor	1.0%	0%	0%
Agricultural outdoor	2.9%	0%	0%
Other	15.7%	29.2%	0%

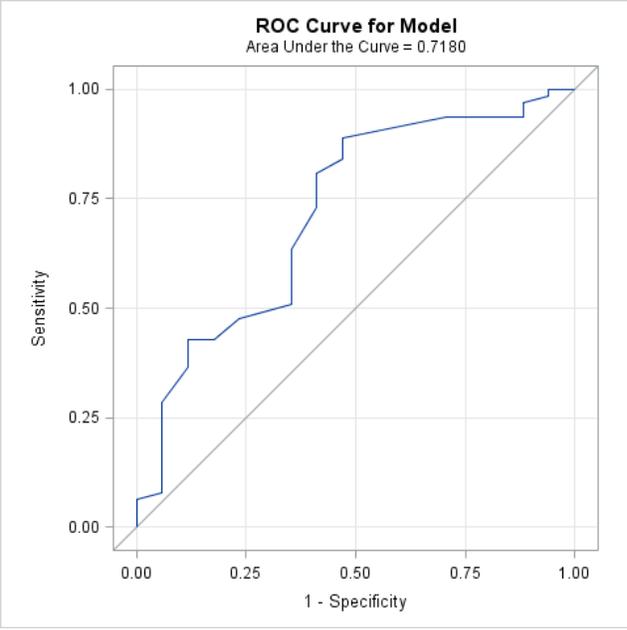


Figure 2: Receiver operating characteristic (ROC) curve examining the specificity and sensitivity of the Oxford-12 knee score.

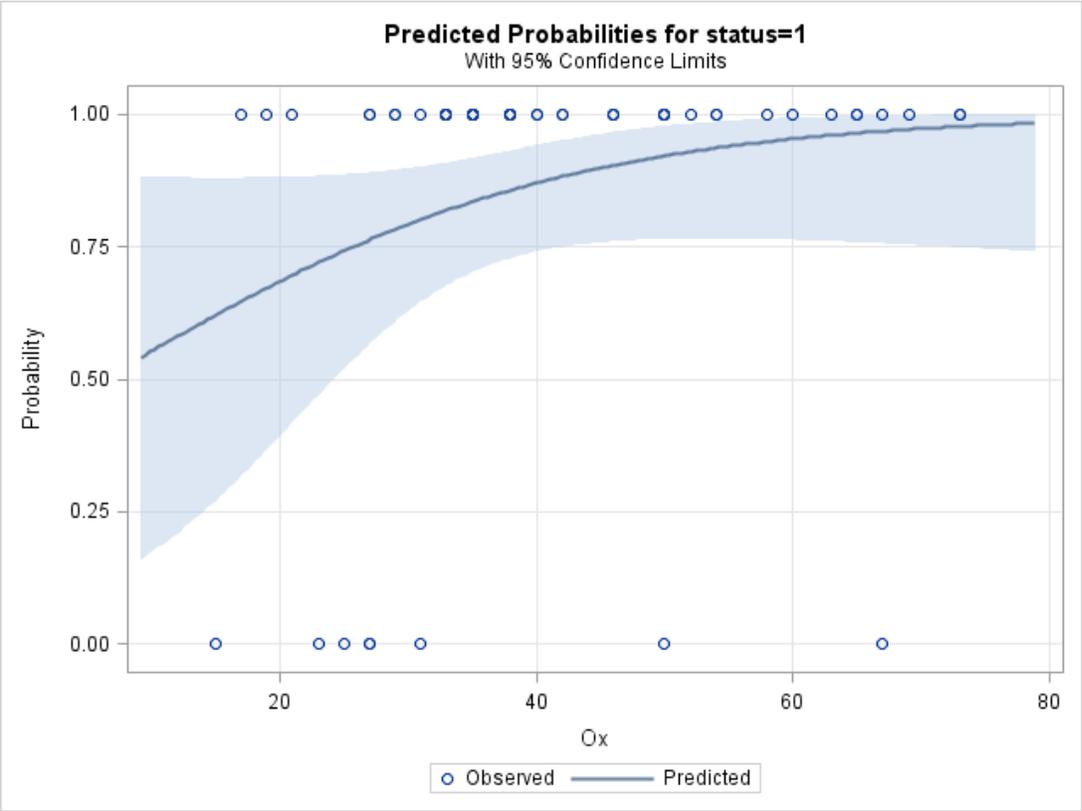


Figure 3: Probability plot displaying moderate predictive ability of the Oxford-12 knee score (0 = worst; 100 = best) for predicting employment status (1=working; 0=not working).

### 3.2 Post-operative findings

At the time of writing, there were 94 patients who returned their post-operative forms at either the 6- or 12-months follow-up (Figure 4). By 6 months post-operatively, 84% (56/67) of those working pre-operatively had returned to work, while only 41% (7/17) of those off work due to their knee prior to surgery had returned to work (Figure 5). Table 5 provides further detail on the 30 patients who have not yet returned to work, including when they intend to return to work and a summary of reasons for their delay in returning to work.

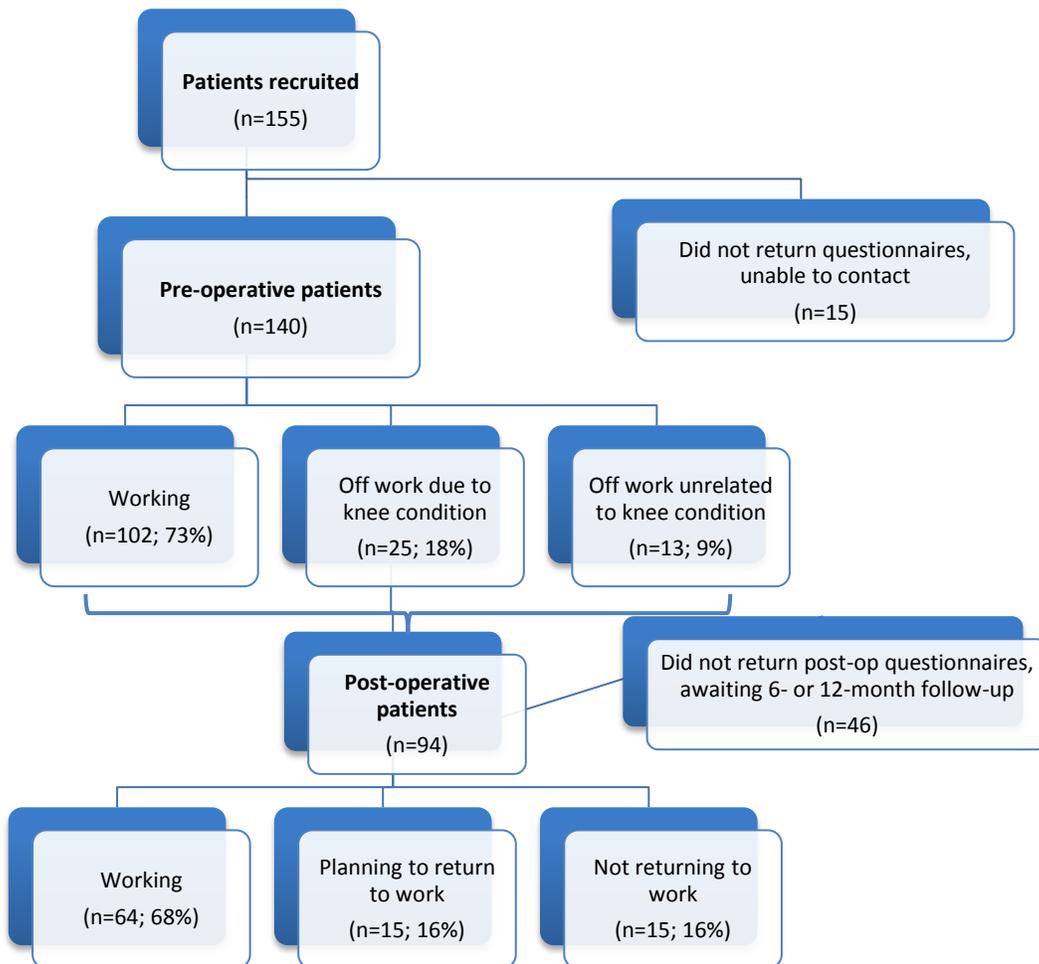
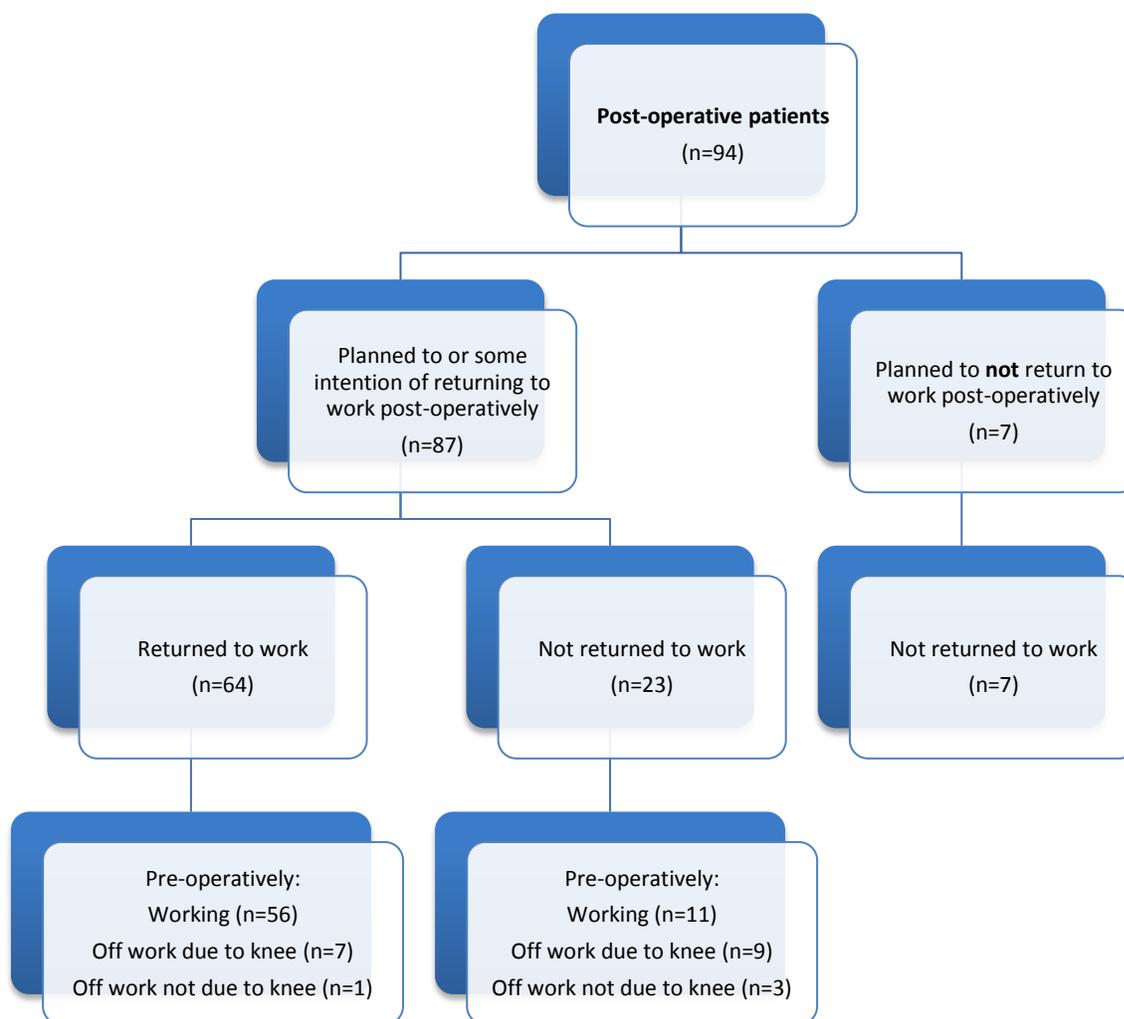


Figure 4: Post-operative flowchart of patient data collection and employment status grouping.



**Figure 5: Stratification of patients by pre-operative return to work intention**

**Table 5: Description of patients not yet returned to work. Patient-reported timeframe for return to work and reasons for delaying return to work.**

Group	N	Timeframe for return to work					Reasons for delay in returning to work
		<6 wks	<3 mo	<6 mo	<12 mo	Unsure	
Planning to return to work	15	8	2	1	1	3	Knee pain (n=5) Reduced movement/strength (n=5) Other knee replaced or awaiting (n=2) None given (n=3)
Not returning or unsure	8	-	-	-	-	5	Retired (n=1) Reduced movement/strength (n=3) Other (n=2) None given (n=2)

Table 6 summarizes the pre-operative characteristics of patients who returned and did not return to work post-operatively. Household income and job satisfaction were significantly higher in the group that returned to work following surgery.

**Table 6: Pre-operative characteristics of patients who returned to work post-operatively compared to those who have not yet returned to work.**

<b>Pre-Op Factors</b>	<b>Returned to work</b>	<b>Not returned to work</b>	<b>P-value</b>	<b>Completion rate</b>
N Patients	64/87 (74%)	23/87 (32%)	-	100%
% Working pre-operatively	87.5%	47.8%	-	-
Age (mean)	55 yrs	56 yrs	p=0.54	100%
Gender	36 F : 28 M	17 F : 6 M	p=0.14	100%
BMI (mean)	35.9 kg/m <sup>2</sup>	36.9 kg/m <sup>2</sup>	p=0.63	100%
Education level (median)	Grad from technical college/trade school	Some university, technical college/trade school	p=0.16	100%
At risk of alcohol abuse (CAGE>2)	5%	0%	p=0.86	100%
Smokers	3%	4%	p=1.00	100%
Physical function (mean)	28.6	23.9	p=0.36	100%
Oxford-12 score (mean)	65.9 / 100	71.1 / 100	p=0.11	71.3%
Pain catastrophizing (mean)	24.1 / 100	25.0 / 100	p=0.87	100%
Personal income (median)	\$45,000 - \$49,999	\$35,000 - \$39,000	p=0.10	72.4%
<b>Household income (median)</b>	<b>\$70,000 - \$79,000</b>	<b>\$55,000 - \$59,999</b>	<b>p=0.03</b>	<b>72.4%</b>
Work Motivation (mean)	54.7 / 100	56.9 / 100	p=0.69	100%
Job tenure (>5 yrs)	89%	80%	p=0.23	100%
<b>Workplace physical demands (mean)</b>	<b>54 / 100</b>	<b>63 / 100</b>	<b>p=0.04</b>	<b>100%</b>
<b>Job satisfaction (mean)</b>	<b>48.6 / 100</b>	<b>38.3 / 100</b>	<b>p=0.01</b>	<b>100%</b>
Job flexibility (mean)	41.7 / 100	39.6 / 100	p=0.81	100%
Meeting workplace physical demands (mean)	65.7 / 100	54.6 / 100	p=0.07	100%

Patients who returned to work following surgery were more likely to hold an office/desk job, while those who didn't return to work were more likely to work in a hospital or healthcare environment (table 7). These differences were significant at the p<0.05 level (Fisher's exact test).

Patients who returned to work following surgery demonstrated significant improvements in Oxford 12 knee score, physical function, ability to meet workplace demands and productivity. We did not find any changes in the number of hours worked per week and workplace demands appeared to stay constant (Table 8).

**Table 7: Pre-operative employment environment of patients who returned and did not return to work post-operatively.**

Work Environment	Returned to work (n=64)	Not returned to work (n=23)
Office/desk	48%	17%
Warehouse	3%	0%
Vehicle	8%	0%
Construction/ building site/ road work	5%	0%
Retail store	3%	4%
Hospitality/ service environment	0%	0%
Hospital/ health care environment	8%	43%
Laboratory	0%	0%
Manufacturing/ production	5%	4%
Correctional facility/ daycare facility	3%	0%
Agricultural indoor	1.5%	0%
Agricultural outdoor	3%	0%
Other	12.5%	30%

**Table 8: Improvement from pre-operative to post-operative for patients working or off work due to knee pre-operatively.**

Factors	Pre-Operative	Post-Operative	Change	P-Value	Completion Rate
<b>Oxford-12 knee score (mean)</b>	<b>35.7</b>	<b>78.7</b>	<b>+43.0</b>	<b>p&lt;0.05</b>	69.8%
<b>Physical function (mean)</b>	52.1	75.7	<b>+23.6</b>	<b>p&lt;0.001</b>	100%
Paid Hrs (mean)	38.0	36.6	-1.4	p=0.09	93.7%
Overtime Hrs/wk (mean)	1.1	1.2	+0.1	p=0.48	87.3%
Unpaid Hrs/wk (mean)	4.7	4.7	0	p=0.86	85.7%
Workplace demands (mean)	69.7	68.8	-0.9	p=0.93	95.2%
<b>Meeting workplace demands (mean)</b>	65.8	84.8	<b>+19.0</b>	<b>p&lt;0.001</b>	92.1%
<b>Productivity</b>	33.8	82.0	<b>+48.2</b>	<b>p&lt;0.001</b>	90.5%

## 4 Discussion

Using a self-reported postal survey in working-aged patients awaiting knee replacement surgery, we found that 73% of patients remain at working while awaiting surgery, 18% are forced off work due to their knee, and 9% classify themselves as not in the work force. Those who are off work because of their knee tend to be heavier (higher BMI), have poorer knee function and overall physical function scores, have higher rates of other musculoskeletal complaints (particularly back pain) and tend to catastrophize their pain more. Despite reporting higher job flexibility and lower workplace physical demands, those off work due to their knee reported a decreased ability to meet workplace physical demands compared to patients who remained at work. This may be reflected in the fact that those who remained at work most commonly worked in an office/desk job, while those who were off work most often worked in a hospital or healthcare environment. Interestingly, those off work due to their knee also reported lower job satisfaction.

While it is not possible to control for all possible confounding factors, it does appear that there is a relationship between pre-operative knee disease severity scores and work status. Our logistic modeling revealed that about 90% of patients with a pre-operative Oxford-12 score of 45 or better will still be working while awaiting surgery, however only about 60% of patients with an Oxford-12 score of 15 or worse will be working while awaiting surgery. It would therefore appear that timely surgery is important: knee function worsens over time while awaiting surgery, if it worsens to the point that it forces the patient off work, they only have an 41% rate of returning to work following surgery compared to a 84% rate of returning to work in those patients that were working prior to surgery. Furthermore, nearly 50% of patients reported missing work at some point in the 18 months prior to surgery due to their knee.

Following surgery, those who returned to work tended to have higher household income and job satisfaction compared to those who did not return to work. Interestingly, we did not detect any differences in physical function, Oxford-12 knee scores, workplace physical demands, work motivation or job flexibility between those who returned to work and those who did not following surgery. This illustrates the potential importance of psychosocial factors in resumption of employment after surgery. In those patients who returned to work following surgery, we noted (as expected) marked improvements in both physical function and Oxford-12 knee scores; this appeared to result in both an increased ability to meet workplace physical demands, and improved productivity.

We acknowledge limitations in this work. Of the 155 patients recruited, 140 (90%) returned the pre-operative questionnaire; it is possible that this resulted in a selection bias. Furthermore, we did not have 1 year follow up data for all patients and had to rely on some 6 month follow up data; this may have resulted in an under-reporting of return to work rates. Unfortunately, we only enrolled 4 patients who were collecting workers compensation; this small number did not allow for statistically meaningful analysis of this small subgroup.

## 5 Conclusions

About 1 in 5 working aged patients (20%) awaiting knee replacement surgery will be forced off work due to their knee condition. The likelihood of being off work prior to surgery appears to increase with worsening Oxford-12 knee score; patients with scores worse than 15 appear to be at particularly high risk of being off work. Undertaking surgery in patients prior to them stopping work is important; 84% of patients working prior to surgery return to work post-op, whereas only 41% of patients off work due to their knee returned to work following surgery. For those that did return to employment, knee replacement surgery was found to greatly improve their ability to fulfill the demands of their job as well as increase productivity in the workplace.

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## **Appendix A**

Pre-operative questionnaire package.

# **The impact of total knee replacement on resumption of employment**

Pre-Operative  
Questionnaire

## Vital Statistics

1. Study ID: \_\_\_\_\_

2. Your Date of Birth: \_\_\_\_\_ (day) \_\_\_\_\_ (month) \_\_\_\_\_ (year)

## Demographics

3. Your Gender:  MALE  FEMALE

4. Your Age: \_\_\_\_\_ years

5. Your weight? \_\_\_\_\_ lbs \_\_\_\_\_ kg

6. Your height? \_\_\_\_\_ feet/inches \_\_\_\_\_ cm

7. What is your marital status?

- Never legally married (single)
- Legally married/common law (not separated)
- Separated, but still legally married
- Divorced
- Widowed

8. How much formal education do you have? (check one)

- Never attended school
- Some elementary school (kindergarten to grade 8)
- Graduated from elementary school (graduated from grade 8)
- Some high school (grades 9 and above)
- Graduated from high school (includes CEGEP in Quebec)
- Some university, technical college or trade school
- Graduated from a technical college or trade school
- Graduated from university
- Some post-graduate degree education
- Post graduate degree

9. Alcohol consumption (check each answer)

a) Do you consume alcohol?  YES  NO

b) If yes, how many drinks per week do you normally consume? \_\_\_\_\_

c) Have you ever felt you should cut down on your drinking?  YES  NO

d) Have people annoyed you by criticizing your drinking?  YES  NO

e) Have you ever felt bad or guilty about your drinking?  YES  NO

f) Have you ever taken a drink first thing in the morning?  YES  NO

10. Smoking

a) Do you currently smoke cigarettes?  YES  NO

## General Physical Health

This section asks you general questions about your health, and helps us to understand how much you are limited by your knee or other medical problems.

11. Physical Function: The following items are activities you might do during a typical day. Does your health limit you in these activities? (circle one number on each line)

	Yes limited a lot	Yes limited a little	No not limited at all
a) <i>Vigorous activities</i> such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b) <i>Moderate activities</i> , such as moving a table, pushing a vacuum cleaner, bowling or playing golf	1	2	3
c) Lifting or carrying groceries	1	2	3
d) Climbing <i>several</i> flights of stairs	1	2	3
e) Climbing <i>one</i> flight of stairs	1	2	3
f) Bending, kneeling or stooping	1	2	3
g) Walking <i>more than one mile</i>	1	2	3
h) Walking <i>several blocks</i>	1	2	3
i) Walking <i>one block</i>	1	2	3
j) Bathing or dressing yourself	1	2	3

12. The following is a list of **common health problems**. In the first column, indicate with a check mark whether or not you have the condition. If you have any of the conditions, mark in the second column whether or not you receive treatment for it, and mark in the third column, whether or not the condition limits any of your activities.

Medical Condition:	Do you have condition?	If you have condition, do you receive treatment for it?	If you have condition, does it limit any of your activities?
Heart disease	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
High Blood Pressure	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Lung Disease	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Diabetes	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Ulcer or Stomach Disease	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Kidney Disease	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Liver Disease	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Anemia or other Blood disease	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Cancer	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Depression	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Osteoarthritis or Degenerative arthritis <b>other than your knee(s)</b>	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Back Pain	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO

Rheumatoid Arthritis	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Other medical problem: (specify)	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> YES	<input type="checkbox"/> NO
	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> YES	<input type="checkbox"/> NO	<input type="checkbox"/> YES	<input type="checkbox"/> NO

**Musculoskeletal conditions**

13.

For your **right side** please indicate those areas that bother you enough to limit your function.

For your **left side** please indicate those areas that bother you enough to limit your function.

Neck        Neck

Shoulder area        Shoulder area

Elbow/Forearm        Elbow/Forearm

Wrist/Hand        Wrist/Hand

Hip        Hip

Thigh        Thigh

Knee area        Knee area

Calf area        Calf area

Ankle/Foot area        Ankle/Foot area

14. For your **back** please indicate those areas that bother you enough to limit your function.

Neck

Upper Back

Lower Back

## **Pain**

15. Everyone experiences painful events at some point in their life, such as headaches, tooth pain, joint or muscle pain. We are also exposed to situations that may cause pain such as illness, injury, dental procedures or surgery. Using the following scale, please indicate the degree to which you have these types of thoughts or feelings when you are experiencing pain. (Circle one number on each line)

When I'm in pain.....	Not at all	To a slight degree	To a moderate degree	To a great degree	All the time
a) I worry all the time about whether the pain will end.	0	1	2	3	4
b) I feel I can't go on.	0	1	2	3	4
c) It's terrible and I think it's never going to get any better.	0	1	2	3	4
d) It's awful and I feel that it overwhelms me.	0	1	2	3	4
e) I feel I can't stand it anymore.	0	1	2	3	4
f) I become afraid the pain will get worse.	0	1	2	3	4
g) I keep thinking of other painful events.	0	1	2	3	4
h) I anxiously want the pain to go away.	0	1	2	3	4
i) I can't seem to get it off my mind.	0	1	2	3	4
j) I keep thinking about how much it hurts.	0	1	2	3	4
k) I keep thinking about how badly I want the pain to stop.	0	1	2	3	4
l) There's nothing I can do to reduce the intensity of the pain.	0	1	2	3	4
m) I wonder whether something serious may happen.	0	1	2	3	4

## **Social Support**

16. People sometimes look to others for companionship, assistance, or others types of support. How often are each of the following kinds of support available to you if you need it? (Circle one number on each line)

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
a) Someone to help you if you were confined to bed	1	2	3	4	5
b) Someone to take you to the doctor if you needed it	1	2	3	4	5
c) Someone to prepare your meals if you were unable to do it yourself	1	2	3	4	5
d) Someone to help with daily chores if you were sick	1	2	3	4	5
e) Someone you can count on to listen to you when you need to talk	1	2	3	4	5
f) Someone to give you good advice about a crisis	1	2	3	4	5
g) Someone to give you information to help you understand a situation	1	2	3	4	5
h) Someone to confide in or talk to about yourself or your problems	1	2	3	4	5
i) Someone who's advice you really want	1	2	3	4	5
j) Someone to share your most private worries and fears with	1	2	3	4	5
k) Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5
l) Someone who understands your problems	1	2	3	4	5

Number of Dependents

17. How many dependents do you have? (check one)

A dependant is someone who relies on you for food, clothing, shelter or financial support.

- 0             1             2             3 or more

**Job Characteristics**

18. Employment Status

What was your employment status during the week that you received this questionnaire? (check one)

- Employed *You did paid work for an employer or for yourself, or did unpaid work for a family business (farm, etc)*
- Unemployed because of your knee condition
- Retired because of your knee condition
- Unemployed *not* because of your knee condition, but available to work and looking for work.
- Unemployed *not* because of your knee condition and not looking for work.
- On paid leave because of your knee condition
- On paid leave unrelated to your knee condition (ex: maternity leave)
- On unpaid leave (ex: laid off)
- Homemaker
- Student
- Retired (not due to your knee condition)

19. If you are on some form of paid leave right now, but had the option to change to modified work, would that change the fact that you are off work right now? *Modified work includes tasks, function, hours, worksite, etc*

- Yes             No             Don't know yet             Not on paid leave             Does not apply

20. Are you planning on retiring within the next 12 months?

- Yes             No             Don't know yet             Already retired             Does not apply

21. How many *days* of work have you missed because of your knee condition during the past 18 months? (check one)

- 0 days             1-2 days             3-7 days             8-14 days             15-30 days             Does not apply
- 1 month             2 months             3-6 months             6-12 months             Over 1 year

22. How long have you had your knee problem? (check one)

- 0-1 weeks             1-2 weeks             3-4 weeks             4-5 weeks             6-8 weeks
- 9-12 weeks             3-6 months             6-9 months             9-12 months             Over 1 year

23. Are you collecting disability payments? (check one)             Yes             No

If yes, how do the disability payments compare to your usual employment income? (check one)

- Less than half of my usual employment income
- More than half, but less than all of my usual employment income
- Equal to my usual employment income

24. What is **your yearly income** from **your job**? (check one)

- |                          |               |                          |          |                          |          |
|--------------------------|---------------|--------------------------|----------|--------------------------|----------|
| <input type="checkbox"/> | Under \$2,000 | <input type="checkbox"/> | \$15,000 | <input type="checkbox"/> | \$45,000 |
|                          |               |                          | -        |                          | -        |
| <input type="checkbox"/> | \$ 2,000      |                          | \$19,999 |                          | \$49,999 |
|                          | \$ 4,999      | <input type="checkbox"/> | \$20,000 | <input type="checkbox"/> | \$50,000 |
| <input type="checkbox"/> | \$ 5,000      |                          | -        |                          | -        |
|                          | \$ 6,999      |                          | \$23,999 |                          |          |

25. What is your **yearly household income** (check one) *Household income includes all employment income, investment income, government transfer payments and any other sources of income*

- |                          |                     |                          |                     |                          |                      |
|--------------------------|---------------------|--------------------------|---------------------|--------------------------|----------------------|
| <input type="checkbox"/> | Under \$4,000       | <input type="checkbox"/> | \$30,000 - \$39,999 | <input type="checkbox"/> | \$ 90,000 - \$99,999 |
| <input type="checkbox"/> | \$ 4,000 - \$ 9,999 | <input type="checkbox"/> | \$40,000 - \$49,999 | <input type="checkbox"/> | \$100,000 -          |
| <input type="checkbox"/> | \$10,000 - \$13,999 |                          |                     |                          |                      |

**NOTE: The following questions ask you about your employment. If you are currently employed, please answer based on your current employment. If you not currently employed, please answer based on your most recent employment term.**

**Job Conceptualization**

26. Indicate how much you agree or disagree with each of the following statements by circling the appropriate number on each line.

	Strongly Agree	Agree	Disagree	Strongly Disagree
a) If I don't have a job, I don't feel right	1	2	3	4
b) A person should work in a job in order to keep the respect of family & friends	1	2	3	4
c) I really can't think well of myself unless I have a job	1	2	3	4
d) The most important things that happen to me involve work	1	2	3	4

**Your employment:**

27. For whom do you work? (check one)

- Self-employed
- Government/Public sector
- Private industry
- Non-profit organization
- Military
- Other: \_\_\_\_\_

28. What industry do you work in? (check one)

- |   |                          |                           |
|---|--------------------------|---------------------------|
| <input type="checkbox"/> Agriculture    | <input type="checkbox"/> | Law enforcement / Justice |
| <input type="checkbox"/> Child care     | <input type="checkbox"/> | Legal                     |
| <input type="checkbox"/> Communications | <input type="checkbox"/> | Manufacturing/ Production |
| <input type="checkbox"/> Construction   | <input type="checkbox"/> | Marketing                 |
| <input type="checkbox"/> Education      | <input type="checkbox"/> | Research                  |
| <input type="checkbox"/> Engineering    | <input type="checkbox"/> | Sales                     |
| <input type="checkbox"/> Finance        | <input type="checkbox"/> | Technology                |
| <input type="checkbox"/> Health care    | <input type="checkbox"/> | Transportation            |
| <input type="checkbox"/> Hospitality    | <input type="checkbox"/> | Other: _____              |

29. What type of work do you do? (check one)

- Professional / Legal/ Accounting etc.

- Administrative/ Management/ Research & Development
- Child care/ Teaching
- Emergency services/ Security
- Manual Labor/ Trades
- Health care/ Patient services
- Retail sales/services
- Service / Hospitality
- Transportation services
- Warehousing/ Distribution
- Other: \_\_\_\_\_

30. What is your employment environment? (check one)

- Office/desk
- Warehouse
- Vehicle
- Construction/ building site/ road work
- Retail store
- Hospitality/ service environment
- Hospital/ health care environment
- Laboratory
- Manufacturing/production
- Correctional facility/ Daycare facility
- Agricultural indoor
- Agriculture outdoor
- Other: \_\_\_\_\_

31. Is your employment:  Indoor  Outdoor  Indoor & outdoor (check one)

32. Have you been accommodated by your workplace?

*Accommodation includes any change to duties, reorganization or reduction of work hours, physical changes to work area, and/or changes in the use/type of equipment necessary*

- Yes, I have changed to accommodated duties
- No, I have not changed to accommodated my duties because I don't feel it is necessary
- No, I have not changed to accommodated my duties because it is not an option where I work

33. Have you altered your duties at your workplace?

*Alternate/alternative work is different than work performed prior to injury, but comparable in nature and earnings*

- Yes, I have changed to alternate/alternative duties
- No, I have not changed to alternate/alternative my duties because I don't feel it is necessary
- No, I have not changed to alternate/alternative my duties because it is not an option where I work

34. Have you modified your duties due to your knee condition?

*Modified duties includes modification of job, tasks, function, hours of work, worksite, etc*

- Yes, I have changed to modified duties
- No, I have not modified my duties because I don't feel it is necessary
- No, I have not modified my duties because it is not an option where I work

**Your hours of work**

35. Excluding overtime, on average, how many **paid hours** do you work per week? \_\_\_\_\_

36. On average, how many hours of **paid overtime** do you usually work per week? \_\_\_\_\_

37. On average, how many **unpaid hours** do you usually work per week? \_\_\_\_\_

**Job Tenure**

38. How long have you worked at your current job? (check one)

- Less than one year
- One to five years
- More than five years

39. Please mark all benefits that are provided for you at work: (check all that apply)

- Paid vacation
- Paid maternity leave
- Paid paternity leave
- Paid sick leave
- Free or subsidized child care
- Medical insurance
- Dental insurance
- Retirement savings plan that your employer contributes to
- Disability insurance
- Training programs
- Profit sharing plan
- Stock options
- Free or discounted merchandise, food or services

**Workplace Physical Demands**

40. Which of these things do you have to do as part of your essential duties? (check the most appropriate answer)

	yes, a lot	yes, sometimes	no, never
i) walk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii) Use stairs or inclines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii) Stand for long periods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv) Sit for long periods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
v) Stoop, crouch, or kneel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
vi) Reach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
vii) Use fingers to grasp or handle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
viii) Lift or carry weights as heavy as 50 lb (25 kg) (such as two car tires on rims)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ix) Lift or carry weights as heavy as 25 lbs (12kg) (such as two full bags of groceries)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
x) Lift or carry weights as heavy as 10 lbs (5 kg) (such as a 10lb bag of potatoes)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Productivity**

41. In the past 2 weeks, how much of the time did your physical health or emotional problems make it difficult for you to do the following? (if you were not working during the past 2 weeks, use the 2 most recent weeks that you were at work)  
(Mark one box on each line a. through e.)

	Difficult all of the Time (100%)	Difficult most of the Time	Difficult some of the Time (About 50%)	Difficult a Slight Bit of the Time	Difficult none of the Time (0%)	Does Not Apply to My Job
a. handle the workload	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. work fast enough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. finish work on time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. do your work without making mistakes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. feel you've done what you are capable of doing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### **Job Satisfaction**

42. a) All in all, how satisfied are/were you with your job?

- Very satisfied
- Somewhat Satisfied
- Not too Satisfied
- Not at all Satisfied

b) If you were free to go into any type of job you wanted, what would your choice be?

- The same job I have now
- Retire and not work at all
- A different job than the one I have now
- Does not apply

c) Knowing what you know now, if you had to decide all over again whether or not to take your current job, what would you decide?

- Decide without hesitation to take the same job
- Have some second thoughts
- Decide definitely not to take job

d) In general, how well does/did your job measure up to the sort of job you wanted when you took it?

- Very much like the job I wanted
- Somewhat like the job I wanted
- Not very much like the job I wanted

e) If a good friend told you they were interested in a job like yours (for your employer), what would you say?

- I would strongly recommend a job like mine
- I would have doubts about recommending a job like mine
- I would strongly advise them against a job like mine

### **Job Flexibility**

43. a) Suppose there were some particular essential duties on your job that you wanted changed. How hard would it be to get them changed?

- Not hard at all to get duties changed
- Not too hard to get duties changed
- Somewhat hard to get duties changed
- Very hard to get duties changed

b) How hard do you think it would be to get the days you worked changed permanently if you wanted them changed?

- Not at all hard to get the days changed
- Not too hard to get the days changed
- Somewhat hard to get the days changed
- Very hard to get the days changed

c) How hard do you think it would be to get the hours you begin and end work changed permanently if you wanted them changed?

- Not at all hard to get hours changed
- Not too hard to get hours changed
- Somewhat hard to get hours changed
- Very hard to get hours changed

**Meeting Workplace Physical Demands**

44. In the **past 2 weeks**, how much of the time were you **ABLE TO DO** the following **without difficulty** caused by physical health or emotional problems? (if you were not working during the past 2 weeks, use the 2 most recent weeks that you were at work) (Mark one box on each line a. through f.)

	Able to do all of the Time (100%)	Able to do most of the Time	Able to do some of the Time (About 50%)	Able to do a Slight Bit of the Time	Able to do none of the Time (0%)	Does Not Apply to My Job
a) walk or move around different work locations (ex: go to meetings)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) lift, carry, or move objects at work weighing <u>more than 10 lbs</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) sit, stand, or stay in one position for <u>longer than 15 minutes</u> while working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) repeat the same motions over and over again while working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) bend, twist, or reach while working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) use hand-held tools/equipment (ex: phone, pen, keyboard, computer mouse, drill, hairdryer, sander)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Returning to Work**

45. Do you plan on returning to work after surgery?  Yes  No  Don't know yet  Does not apply

46. If you plan on returning to work, do you have a return time in mind?

- Within 6 weeks

- Within 3 months
- Within 6 months
- Within 1 year
- After 1 year
- Does not apply

47. If you plan on returning to work, what level of work will you return to after surgery?

- Return to work with the same employer
- Return to the same work (modified) with the same employer
- Return to different work (alternate) with the same employer
- Return to similar work with a different employer
- Return to different work with a different employer
- Re-training / re-education
- Self-employment
- Does not apply/ Not returning to work

**Questionnaire Burden**

48. How long in total did you require to complete this questionnaire? \_\_\_\_\_

49. Did you require help from anyone to complete the questionnaires?  Yes  No

50. Do you have any comments that you would like to share? *Please use the back of this page*

## Oxford-12 Knee Score

### LEFT KNEE

During the past 4 weeks...					
1. How would you describe the pain you <u>usually</u> had from your <b>LEFT KNEE</b> ?	None [1]	Very Mild [2]	Mild [3]	Moderate [4]	Severe [5]
8. Have you been troubled by pain from your <b>LEFT KNEE</b> in bed at night?	No nights [1]	Only 1-2 nights [2]	Some nights [3]	Most nights [4]	Every night [5]
10. Have you felt that your <b>LEFT KNEE</b> might suddenly "give way" or let you down?	Rarely/ Never [1]	Some- times or just at first [2]	Often, not just at first [3]	Most of the time [4]	All of the time [5]

### RIGHT KNEE

During the past 4 weeks...					
1. How would you describe the pain you <u>usually</u> had from your <b>RIGHT KNEE</b> ?	None [1]	Very Mild [2]	Mild [3]	Moderate [4]	Severe [5]
8. Have you been troubled by pain from your <b>RIGHT KNEE</b> in bed at night?	No nights [1]	Only 1-2 nights [2]	Some nights [3]	Most nights [4]	Every night [5]
10. Have you felt that your <b>RIGHT KNEE</b> might suddenly "give way" or let you down?	Rarely/ Never [1]	Some- times or just at first [2]	Often, not just at first [3]	Most of the time [4]	All of the time [5]

### LEFT & RIGHT KNEES

During the past 4 weeks...					
2. Have you had any trouble with washing and drying yourself (all over) because of your knee(s)?	No trouble at all [1]	Very little Trouble [2]	Moderate trouble [3]	Extreme Difficulty [4]	Impossible To do [5]
3. Have you had any trouble getting in and out of your car or using public transportation because of your knee(s)?	No trouble at all [1]	Very little Trouble [2]	Moderate trouble [3]	Extreme Difficulty [4]	Impossible To do [5]
4. For how long have you been able to walk before <u>pain from your knee(s)</u> becomes severe (with or	No pain, More than 30	16-30 Min	5-15 Min	Around the house only	Not at all -pain severe on walking

without a cane)?	min [1]	[2]	[3]	[4]	[5]
------------------	------------	-----	-----	-----	-----

## LEFT & RIGHT KNEES

During the past 4 weeks...					
5. After a meal (sat at a table), how painful has it been for you to stand up from a chair because of your knee(s)?	Not at all painful [1]	Slightly painful [2]	Moderately painful [3]	Very painful [4]	Unbearable [5]
6. Have you been limping when walking because of your knee(s)?	Rarely/ Never [1]	Sometimes or just at first [2]	Often, not just at first [3]	Most of the time [4]	All of the time [5]
7. Could you kneel down and get up afterwards?	Yes, easily [1]	With little Difficulty [2]	With Moderate Difficulty [3]	With Extreme Difficulty [4]	No, Impossible [5]
9. How much has pain from your knee(s) interfered with your usual work (including housework)?	Not at all [1]	A little bit [2]	Moderately [3]	Greatly [4]	Totally [5]
11. Could you do household shopping <u>on your own</u> ?	Yes, easily [1]	With little difficulty [2]	With moderate difficulty [3]	With extreme difficulty [4]	No, impossible [5]
12. Could you walk down one flight of stairs?	Yes, easily [1]	With little Difficulty [2]	With Moderate Difficulty [3]	With Extreme Difficulty [4]	No, Impossible [5]

You have now completed the questionnaire.

## **Appendix B**

Post-operative questionnaire package.

# **The impact of total knee replacement on resumption of employment**

Post-Operative  
Questionnaire

## Vital Statistics

1. Study ID: \_\_\_\_\_

2. Your Date of Birth: \_\_\_\_\_  
Day Month Year

3. Your Gender:  MALE  FEMALE

## General Physical Health at this point after surgery

This section asks you general questions about your health, and helps us to understand how much you are limited by your knee or other medical problems, at this point after surgery.

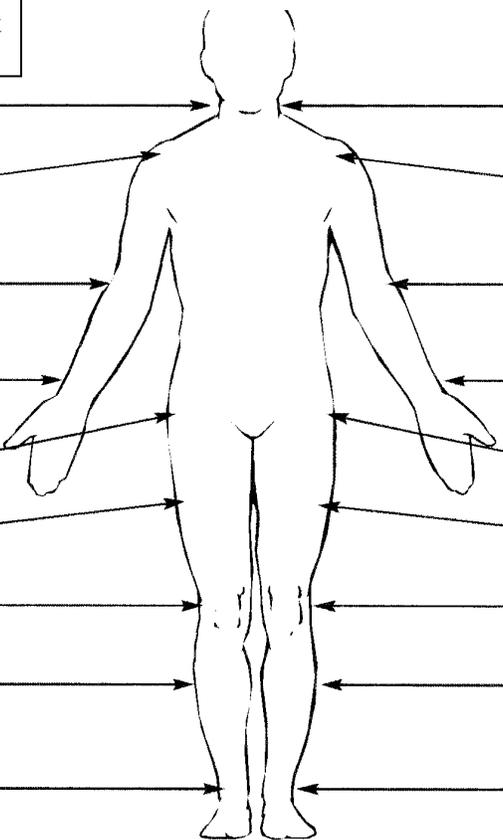
4. Physical Function: The following items are activities you might do during a typical day. At this point after surgery, does your health limit you in these activities? (circle one number on each line)

	Yes limited a lot	Yes limited a little	No not limited at all
a) <i>Vigorous activities</i> such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b) <i>Moderate activities</i> , such as moving a table, pushing a vacuum cleaner, bowling or playing golf	1	2	3
c) Lifting or carrying groceries	1	2	3
d) Climbing <i>several</i> flights of stairs	1	2	3
e) Climbing <i>one</i> flight of stairs	1	2	3
f) Bending, kneeling or stooping	1	2	3
g) Walking <i>more than one mile</i>	1	2	3
h) Walking <i>several blocks</i>	1	2	3
i) Walking <i>one block</i>	1	2	3
j) Bathing or dressing yourself	1	2	3

5. Musculoskeletal conditions at this point after surgery:

For your **right side** please indicate those areas that bother you enough to limit your function

For your **left side** please indicate those areas that bother you enough to limit your function



Neck        Neck

Shoulder area        Shoulder area

Elbow/Forearm        Elbow/Forearm

Wrist/Hand        Wrist/Hand

Hip        Hip

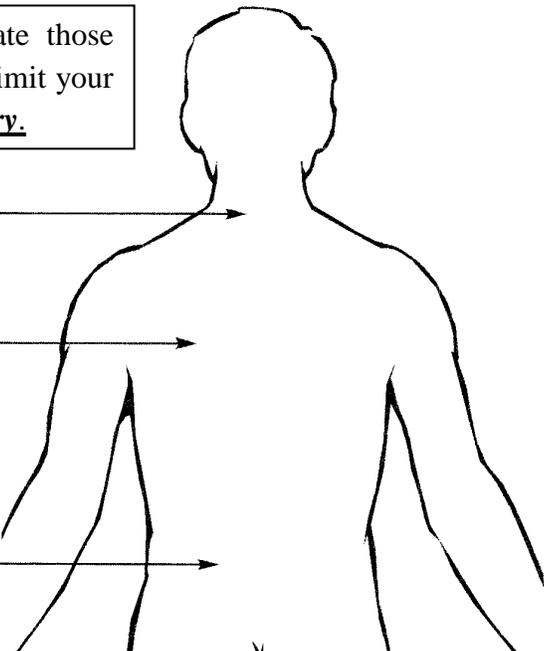
Thigh        Thigh

Knee area        Knee area

Calf area        Calf area

Ankle/Foot area        Ankle/Foot area

6. For your **back** please indicate those areas that bother you enough to limit your function at this point after surgery.



Neck

Upper Back

Lower Back

7. Social Support at this point after surgery

People sometimes look to others for companionship, assistance, or others types of support. How often is each of the following kinds of support available to you if you need it? (Circle one number on each line)

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
a) Someone to help you if you were confined to bed	1	2	3	4	5
b) Someone to take you to the doctor if you needed it	1	2	3	4	5
c) Someone to prepare your meals if you were unable to do it yourself	1	2	3	4	5
d) Someone to help with daily chores if you were sick	1	2	3	4	5
e) Someone you can count on to listen to you when you need to talk	1	2	3	4	5
f) Someone to give you good advice about a crisis	1	2	3	4	5
g) Someone to give you information to help you understand a situation	1	2	3	4	5
h) Someone to confide in or talk to about yourself or your problems	1	2	3	4	5
i) Someone who's advice you really want	1	2	3	4	5
j) Someone to share your most private worries and fears with	1	2	3	4	5
k) Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5
l) Someone who understands your problems	1	2	3	4	5

### **Job Characteristics**

#### 8. Employment Status *at this point after surgery*

What was your employment status during *the week that you received this questionnaire?* (check one)

- Employed *You did paid work for an employer or for yourself, or did unpaid work for a family business (farm, etc).*
- Unemployed because of your knee condition
- Retired because of your knee condition
- Unemployed *not* because of your knee condition, but available to work and looking for work.
- Unemployed *not* because of your knee condition and not looking for work.
- On paid leave because of your knee condition
- On paid leave unrelated to your knee condition (ex: maternity leave)
- On unpaid leave (ex: laid off)
- Homemaker
- Student
- Retired (not due to your knee condition)

#### 9. Are you collecting disability payments? (check one) Yes No

If yes, how do the disability payments compare to your usual employment income? (check one)

- Less than half of my usual employment income
- More than half, but less than all of my usual employment income
- Equal to my usual employment income

**If you have not returned to work, but may in the future, please go to question #10**

*or*

**If you have returned to work, please go to question #20**

**Returning to Work**

10. Do you plan on returning to work *now that you have had surgery*?

- Yes    No    Don't know yet

11. If you plan on returning to work, do you have a return time in mind?

- Within 6 weeks  
 Within 3 months  
 Within 6 months  
 Within 1 year  
 After 1 year  
 Don't know yet

12. Are you doing a graduated return to work? *Graduated return to work is working for limited hours or limited duties as part of a plan leading to full time employment.*

- Yes    No    Don't know yet

13. **At this point after surgery**, how you **feel** about your ability to return to work? (check one)

- Feel like I could return to my pre-surgery work and perform essential duties at my regular hours/days  
 Feel like I could return to modified work at my regular hours/days  
 Feel like I could return to similar work at my regular hours/days  
 Feel like I could return to different work at my regular hours/days  
 Feel like I could return to my pre-surgery work and perform essential duties at a decreased amount of hours/days  
 Feel like I could return to modified work at a decreased amount of hours/days  
 Feel like I could return to similar work at a decreased amount of hours/days  
 Feel like I could return to different work at a decreased amount of hours/days  
 Feel unable to return to work in any capacity

14. If you plan on returning to work, what **type** of work **will** you return to after surgery?

- Return to the same work (same essential duties) with the same employer  
 Return to the same work (modified duties) with the same employer  
 Return to the similar work (alternative duties) with the same employer  
 Return to different work (alternate work) with the same employer  
 Return to the same work (same essential duties) with the different employer  
 Return to similar work with a different employer  
 Return to different work with a different employer  
 Re-training / re-education  
 Self-employment  
 Don't know yet

**If you are not currently retired and have not returned to work, but may in the future:**

15. What reasons, relating to your knee replacement surgery, would you say are important in your decision to remain off work?

16. What reasons, relating to your employment conditions, would you say are important in your decision to remain off work?

17. If you were given the option to return to **alternate work**, would you consider returning to work at this point after surgery? *Alternate work is a job or position that is **different** than the one performed before surgery*

Yes  No  Does not apply

18. If you were given the option to return to **alternative work**, would you consider returning to work at this point after surgery? *Alternative work is a job or position that is **comparable** to the one performed before surgery*

Yes  No  Does not apply

19. If you were given the option to return to **modified work**, would you consider returning to work at this point after surgery? *Modified work included job, task, function, hours, worksite, etc to the one performed before surgery*

Yes  No  Does not apply

## **If you have returned to work:**

Please answer the following questions based on your condition and status **at this point after your surgery.**

20. In what capacity have you returned to work?

- Return to work with the same employer
- Return to the same work (modified) with the same employer
- Return to different work (alternate) with the same employer
- Return to similar work with a different employer
- Return to different work with a different employer
- Re-training / re-education
- Self-employment
- Does not apply/ Not returning to work

21. How long has it been since you returned to work? \_\_\_\_\_

### **Your employment:**

22. For whom do you work? (check one)

- Self-employed
- Government/Public sector
- Private industry
- Non-profit organization
- Military
- Other: \_\_\_\_\_

23. What industry do you work in? (check one)

- |   |  |
|---|--|
| <input type="checkbox"/> Agriculture    | <input type="checkbox"/> Law enforcement / Justice |
| <input type="checkbox"/> Child care     | <input type="checkbox"/> Legal                     |
| <input type="checkbox"/> Communications | <input type="checkbox"/> Manufacturing/production  |
| <input type="checkbox"/> Construction   | <input type="checkbox"/> Marketing                 |
| <input type="checkbox"/> Education      | <input type="checkbox"/> Research                  |
| <input type="checkbox"/> Engineering    | <input type="checkbox"/> Sales                     |
| <input type="checkbox"/> Finance        | <input type="checkbox"/> Technology                |
| <input type="checkbox"/> Health care    | <input type="checkbox"/> Transportation            |
| <input type="checkbox"/> Hospitality    | <input type="checkbox"/> Other: _____              |

24. What type of work do you do? (check one)

- Professional / Legal/ Accounting etc.
- Administrative/ Management/ Research & Development
- Child care/ Teaching
- Emergency services/ Security
- Manual Labor/ Trades
- Health care/ Patient services
- Retail sales/services
- Service / Hospitality
- Transportation services
- Warehousing/ Distribution
- Other: \_\_\_\_\_

25. What is your employment environment? (check one)

- Office/desk
- Warehouse
- Vehicle
- Construction/ building site/ road work
- Retail store
- Hospitality/ service environment
- Hospital/ health care environment
- Laboratory
- Manufacturing/production
- Correctional facility/ Daycare facility
- Agricultural indoor
- Agriculture outdoor
- Other: \_\_\_\_\_

26. Is your employment:  Indoor  Outdoor  Indoor & outdoor (check one)

**Your hours of work at this point after surgery**

27. Excluding overtime, on average, how many **paid hours** do you work per week? \_\_\_\_\_

28. On average, how many hours of **paid overtime** do you usually work per week? \_\_\_\_\_

29. On average, how many **unpaid hours** do you usually work per week? \_\_\_\_\_

**Workplace Physical Demands**

30. **At this point after surgery**, which of these things do you have to do as part of your essential duties? (check the most appropriate answer)

	yes, a lot	yes, sometimes	no, never
i) walk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii) Use stairs or inclines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii) Stand for long periods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv) Sit for long periods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
v) Stoop, crouch, or kneel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
vi) Reach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
vii) Use fingers to grasp or handle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
viii) Lift or carry weights as heavy as 50 lb (25 kg) (such as two car tires on rims)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ix) Lift or carry weights as heavy as 25 lbs (12kg) (such as two full bags of groceries)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
x) Lift or carry weights as heavy as 10 lbs (5 kg) (such as a 10lb bag of potatoes)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

31. At this point after surgery, how much of the time were you **ABLE TO DO** the following without difficulty caused by physical health or emotional problems? (Mark one box on each line a. through f.)

	Able to do all of the Time (100%)	Able to do most of the Time	Able to do some of the Time (About 50%)	Able to do a Slight Bit of the Time	Able to do none of the Time (0%)	Does Not Apply to My Job
a) walk or move around different work locations (ex: go to meetings)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) lift, carry, or move objects at work weighing <u>more than 10 lbs</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) sit, stand, or stay in one position for <u>longer than 15 minutes</u> while working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) repeat the same motions over and over again while working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) bend, twist, or reach while working	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) use hand-held tools/equipment (ex: phone, pen, keyboard, computer mouse, drill, hairdryer, sander)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Productivity**

32. At this point after surgery, how much of the time did your physical health or emotional problems make it difficult for you to do the following? (if you were not working during the past 2 weeks, use the 2 most recent weeks that you were at work) (Mark one box on each line a. through e.)

	Difficult all of the Time (100%)	Difficult most of the Time	Difficult some of the Time (About 50%)	Difficult a Slight Bit of the Time	Difficult none of the Time (0%)	Does Not Apply to My Job
a. handle the workload	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. work fast enough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. finish work on time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. do your work without making mistakes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. feel you've done what you are capable of doing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Questionnaire Burden**

33. How long in total did you require to complete this questionnaire? \_\_\_\_\_

34. Did you require help from anyone to complete the questionnaires?  Yes  No

35. Do you have any comments that you would like to share? *Please use the back of this page*

## Oxford-12 Knee Score

### LEFT KNEE

During the past 4 weeks...					
1. How would you describe the pain you <u>usually</u> had from your <b>LEFT KNEE</b> ?	None [1]	Very Mild [2]	Mild [3]	Moderate [4]	Severe [5]
8. Have you been troubled by pain from your <b>LEFT KNEE</b> in bed at night?	No nights [1]	Only 1-2 nights [2]	Some nights [3]	Most nights [4]	Every night [5]
10. Have you felt that your <b>LEFT KNEE</b> might suddenly "give way" or let you down?	Rarely/ Never [1]	Some- times or just at first [2]	Often, not just at first [3]	Most of the time [4]	All of the time [5]

### RIGHT KNEE

During the past 4 weeks...					
1. How would you describe the pain you <u>usually</u> had from your <b>RIGHT KNEE</b> ?	None [1]	Very Mild [2]	Mild [3]	Moderate [4]	Severe [5]
8. Have you been troubled by pain from your <b>RIGHT KNEE</b> in bed at night?	No nights [1]	Only 1-2 nights [2]	Some nights [3]	Most nights [4]	Every night [5]
10. Have you felt that your <b>RIGHT KNEE</b> might suddenly "give way" or let you down?	Rarely/ Never [1]	Some- times or just at first [2]	Often, not just at first [3]	Most of the time [4]	All of the time [5]

### LEFT & RIGHT KNEES

During the past 4 weeks...					
2. Have you had any trouble with washing and drying yourself (all over) because of your knee(s)?	No trouble at all [1]	Very little Trouble [2]	Moderate trouble [3]	Extreme Difficulty [4]	Impossible To do [5]
3. Have you had any trouble getting in and out of your car or using public transportation because of your knee(s)?	No trouble at all [1]	Very little Trouble [2]	Moderate trouble [3]	Extreme Difficulty [4]	Impossible To do [5]
4. For how long have you been able to walk before <u>pain from your knee(s)</u> becomes severe (with or without a cane)?	No pain, More than 30 min [1]	16-30 Min [2]	5-15 Min [3]	Around the house only [4]	Not at all -pain severe on walking [5]

## LEFT & RIGHT KNEES

During the past 4 weeks...					
5. After a meal (sat at a table), how painful has it been for you to stand up from a chair because of your knee(s)?	Not at all painful [1]	Slightly painful [2]	Moderately painful [3]	Very painful [4]	Unbearable [5]
6. Have you been limping when walking because of your knee(s)?	Rarely/ Never [1]	Sometimes or just at first [2]	Often, not just at first [3]	Most of the time [4]	All of the time [5]
7. Could you kneel down and get up afterwards?	Yes, easily [1]	With little Difficulty [2]	With Moderate Difficulty [3]	With Extreme Difficulty [4]	No, Impossible [5]
9. How much has pain from your knee(s) interfered with your usual work (including housework)?	Not at all [1]	A little bit [2]	Moderately [3]	Greatly [4]	Totally [5]
11. Could you do household shopping <u>on your own</u> ?	Yes, easily [1]	With little difficulty [2]	With moderate difficulty [3]	With extreme difficulty [4]	No, impossible [5]
12. Could you walk down one flight of stairs?	Yes, easily [1]	With little Difficulty [2]	With Moderate Difficulty [3]	With Extreme Difficulty [4]	No, Impossible [5]

You have now completed the questionnaire.

## Appendix C

Category, descriptions, and source references for study measures.

### Pre-Operative:

Q#	Section	Topic	Source
1	Vital Statistics	ID	Generic
2	Vital Statistics	Date of birth	Generic
3	Demographics	Gender	Generic
4	Demographics	Age	Generic
5	Demographics	Weight	Generic
6	Demographics	Height	Generic
7	Demographics	Marital status	Canadian Population Census
8	Demographics	Education	Canadian Population Census (modification)
9	Other Information	Alcohol Use	CAGE
10	Other Information	Smoking	Generic
11	General Physical Health	General physical function	MOS Physical Function Scale
12	General Physical Health	Comorbidities	PCQ
13	General Physical Health	Limitation from musculoskeletal co-morbidities	AAOS MSK Co-morbidities
14	General Physical Health	Limitation from musculoskeletal co-morbidities	AAOS MSK Co-morbidities
15	PCS	Pain Catastrophizing	Sullivan
16	Other Information	Social Support	MOS Social Support Scale
17	Other Information	Number of Dependents	Oleinick Number of Dependents Scale
18	Job characteristics	Employment Status	AAOS Employment Status
19	On paid leave?	Modified work option?	Expert panel
20	Retirement	Retirement in 12m?	Expert panel
21	Job Characteristics	Days off work	Orebro MSK Pain
22	Job Characteristics	Duration of pain problem	Orebro MSK Pain
23	Job Characteristics	Disability Payments	Jom Disability Income Classification (modification)
24	Job Characteristics	Income	Canadian Population Census
25	Job Characteristics	Household income	Canadian Population Census (modification)
26	Job Characteristics	Job motivation	MacKenzie Job Motivation
27	Job Characteristics	Employer	LFS (modification)
28	Job Characteristics	Employment industry	LFS (modification)
29	Job Characteristics	Employment type	LFS (modification)
30	Job Characteristics	Employment environment	LFS (modification)
31	Job Characteristics	Employment environment	LFS (modification)
32	Job Characteristics	Accommodated duties	WCB definitions
33	Job Characteristics	Alternative duties	WCB definitions
34	Job Characteristics	Modified duties	WCB definitions
35	Job Characteristics	Paid hours of work	LFS
36	Job Characteristics	Paid OT	LFS
37	Job Characteristics	Unpaid hours	LFS
38	Job Characteristics	Tenure	MacKenzie Job Tenure Scale
39	Job Characteristics	Benefits	QES
40	Job Characteristics	Workplace physical demands	SSA
41	Job Characteristics	Productivity	WLQ
42	Job Characteristics	Satisfaction	QES
43	Job Characteristics	Job flexibility	QES
44	Job Characteristics	Ability to meet workplace physical demands	WLQ
45	Returning to work	Return to work?	Expert panel
46	Returning to work	Estimate return time	Expert panel
47	Returning to work	Return to work?	WCB Hierarchy of vocational objectives
48	Questionnaire burden	Time	Expert Panel
49	Questionnaire burden	Help	Expert Panel
50	Questionnaire burden	Comments	Expert Panel
51	Oxford-12	Knee specific score	Oxford-12

## Post-Operative:

Q#	Section	Topic	Source
1	Vital Statistics	Initials	Generic
2	Vital Statistics	Date of birth	Generic
3	Demographics	Gender	Generic
4	General Physical Health	General physical function	MOS Physical Function Scale
5	General Physical Health	Limitation from musculoskeletal co-morbidities	AAOS MSK Co-morbidities
6	General Physical Health	Limitation from musculoskeletal co-morbidities	AAOS MSK Co-morbidities
7	Other information	Social Support	MOS Social Support Scale
8	Job Characteristics	Employment Status	AAOS
9	Job Characteristics	Disability Payments	Jom Disability Income Classification (modification)
10	Have not returned to work	Return to work?	Expert panel
11	Have not returned to work	Estimate return time	Expert panel
12	Have not returned to work	Graduated return?	WCB definition
13	Have not returned to work	Feel about return to work?	Expert panel
14	Have not returned to work	Level of work returning to?	Modification of WCB Hierarchy of vocational objectives
15	Have not returned to work	Knee reasons to remain off work?	Short answer
16	Have not returned to work	Employment conditions?	Short answer
17	Have not returned to work	Alternate work?	WCB definition
18	Have not returned to work	Alternative work	WCB definition
19	Have not returned to work	Modified work?	WCB definition
20	Have returned to work	Ability	Modification of WCB Hierarchy of vocational objectives
21	Have returned to work	Time since return	Expert panel
22	Have returned to work	Employer	LFS (modification)
23	Not working at this point	Employment industry	LFS (modification)
24	Not working at this point	Employment type	LFS (modification)
25	Returned to work	Employment environment	LFS (modification)
26	Returned to work	Employment environment	LFS (modification)
27	Returned to work	Paid hours of work	LFS
28	Returned to work	Paid OT	LFS
29	Returned to work	Unpaid hours	LFS
30	Returned to work	Workplace physical demands	SSA
31	Returned to work	Ability to meet workplace physical demands	WLQ
32	Returned to work	Productivity	WLQ
33	Questionnaire burden	Time	Expert Panel
34	Questionnaire burden	Help	Expert Panel
35	Questionnaire burden	Comments	Expert Panel
36	Oxford-12	Knee specific score	Oxford-12

## **List of Scales (source references below)**

**AAOS Employment status** – a generic classification of employment status utilized by the American Academy of Orthopedics Surgeons in their hip and knee baseline questionnaire [1].

**AAOS MSK Co-morbidities** – American Academy of Orthopedic Surgeons musculoskeletal disability scale; contained in their hip and knee baseline questionnaire [1].

**CAGE** – a four-item scale for assessing the risk of alcoholism [2]. Widely accepted and utilized in clinical medicine.

**Canadian Population Census** – refers to the questions or scales used by Statistics Canada to measure and disseminate the information gathered with the Canadian Population Census (<http://www.statscan.ca/>).

**Jom Disability Income Classification** – simple classification of disability income as a fraction of normal employment income proposed by Jom et al [3].

**LFS** – Labour Force Survey, conducted by Statistics Canada.

**MacKenzie Job Motivation** – a four item job motivation scale. MacKenzie et al, used the 1977 Quality of Employment Survey [4] and the Survey of Disability and Work [5] to develop and validate their own scale for job motivation.

**MacKenzie Job Tenure Scale** – a classification of length of employment utilized by MacKenzie et al in their study on return to work in trauma patients [6].

**MOS Physical Function Scale** – Medical Outcomes Study physical function scale, developed by Stewart et al [7] and contained in the SF-36 questionnaire [8]. Permission to use this scale granted by John E. Ware.

**MOS Social Support Scale** – Medical Outcomes Study social support survey, developed by Sherbourne et al [9]. Permission to use this scale granted by Cathy Sherbourne.

**Oleinick's Number of Dependents Scale** – a heckmark scale of the number of dependents, utilized by Oleinick et al [10].

**Oxford-12** – A twelve item hip specific questionnaire developed by Dawson et al [11].

**QES** – US Quality of Employment survey, 1977 [4].

**SF-36** – Short Form 36 [8]; a generic quality of life questionnaire.

**SSA** – Social Security Administration Work Disability Survey [5, 12].

**WLQ** – Work Limitations Questionnaire. A twenty five item, four dimension questionnaire that assesses the “on-the-job impact of chronic health conditions” [13].

### **References for the above Scales:**

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