

**Physician Assistants Making a Difference:**

**A Retrospective Study on Discharge Times in Community Orthopedics**

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## **Abstract**

Intro: Physician Assistants (PAs) have been key components to health care teams around the world for quite some time now. In Canada PAs have been utilized very effectively in the Canadian Forces (CF) and are now transitioning to become integral members in civilian health care across the country, with Manitoba and Ontario leading the way. Doctors are seeing the many potential benefits of PAs but it is not always clear how best to utilize their unique skill sets and talents. Looking at how discharge times are affected is one way to analyze their effectiveness in practice. The purpose of this was paper was to look at a community orthopedic surgery service and investigate how hiring a PA affected discharge times postoperatively.

Methods: 120 systematic chart reviews were completed at the health records office of the community health care center. Dates ranged from 6 months prior and 1 year after the PA was hired. To keep the sample size simple, one surgeon was chosen who specialized in total hip arthroplasties and total knee arthroplasties, with no bias being given to age or sex of the patient.

Results: The first data set looked at 6 months prior to the PA starting. 45 cases were reviewed and the total length of stay for all cases was averaged and found to be 8.2 days postop. The next data set looked at 75 cases up to 1 year after the PA was hired. The average length of stay again was averaged and found to be 5.2 days postop. This shows that with the addition of one PA to the orthopedic team, they were able to decrease length of stay by, on average, 3 days.

Conclusion: This data set proves that PAs are an effective member of the health care team and when used successfully, have dramatic positive benefits to the patients and the health care system as a whole. Not only do they increase effectiveness and efficiency of their supervising physicians, but also with reducing discharge times they are able to reduce costs to the medical system associated with longer hospital stays and associated medical resources.

**Table of Contents**

<b>Title Page .....</b>	<b>1</b>
<b>Abstract.....</b>	<b>2</b>
<b>Table of Contents .....</b>	<b>3</b>
<b>Intro.....</b>	<b>4</b>
<b>History Of Physician Assistants in Canada.....</b>	<b>5</b>
<b>The Role of a PA in Rural Community Orthopedics .....</b>	<b>7</b>
<b>Methods .....</b>	<b>9</b>
<b>Results .....</b>	<b>10</b>
<b>Discussion and Interpretation .....</b>	<b>11</b>
<b>Conclusions .....</b>	<b>14</b>
<b>Acknowledgments.....</b>	<b>15</b>
<b>Bibliography .....</b>	<b>15</b>
<b>Appendices .....</b>	<b>16</b>

## **Intro**

It is well known that Canada has an aging population and getting access to medical care can often be tedious involving substantial wait times especially when trying to access specialty services. One of the main reasons for this is due to physician shortages across Canada. In 2004 a meeting on the future of healthcare in Canada took place and resulted in two major initiatives to improve health care across the country. The first was a 10 year plan involving \$41 billion of federal government funding to provinces to improve access to cardiology, oncology, diagnostic imaging, ophthalmology, and orthopedic services. The second involved \$5.5 billion to reduce wait times for medical services. (1) One of the ways to combat the shortage of physicians and reduce medical service wait times is using a new approach of implementing the Physician Assistant (PA) role. PAs are starting to appear in hospitals and clinics all across Canada, ranging from primary care to specialty roles like surgery and acute care. Despite being used in the military for years, many civilians still do not know what a PA is and do not know what they are capable of when it comes to delivering health care. So what is a PA? They are academically prepared and highly skilled healthcare professionals educated in the medical model to practice medicine within a physician directed and patient-centered health care team. PAs work in any setting providing the medical care extends physician services. Under physician supervision, PAs practice medicine which includes obtaining medical histories and performing physical exams, ordering laboratory and diagnostic tests, provide therapeutic procedures, prescribe medications, and educate/counsel patients. (2) Physician Assistants have been a key component to the United States health care system since the 1960's. (3) In Canada, PA's have been utilized very effectively in the military and are now transitioning to become integral members in civilian health care across the country, with Manitoba and Ontario leading the way. Doctors are seeing

the many potential benefits of PA's but it is not always clear how best to utilize their unique skill sets and talents. Looking at how discharge times are affected is one way to analyze their effectiveness in practice. The purpose of this was paper was to look at a community orthopedic surgery service and investigate how hiring a PA affected discharge times postoperatively.

### **History of Physician Assistants in Canada**

To look at Canada's PA history, one must understand that PAs were first created in the United States in the 1960's. (3) The first PAs created were military medics following the Vietnam War who had no equivalent work in civilian life and were trying to transition away from the military. The PA role flourished and expanded quickly in the US eventually leading to now having over 173 accredited programs across the country and 90,000 practicing PAs. (1)(2) The Canadian Forces (CF) followed this US trend starting in 1984 by graduating the first formally trained Physician Assistants from the Medical Services school in Ontario. The program was designed to give senior medical assistants additional training to expand their role as a health care provider. Unfortunately at this time, many of the CF trained PAs quickly discovered that there was no role for them outside of the military after they retired. This resulted in many of these highly trained and experienced PAs to look elsewhere for employment outside of the medical field. However after expressing increased frustration about this, a group of senior PAs from the Canadian Forces used their personal resources in 1999 to fund the development of CAPA (Canadian Association of Physician Assistants) with the intent of utilizing PAs in a civilian role as well. (4) Following this Manitoba and Ontario began developing their own civilian based Physician Assistant education programs. The programs had to be developed in accordance to the Canadian Medical Association (CMA) standard in order to be accredited. In 2002 the Canadian Forces redesigned their program following a structure from the University of Nebraska, to permit for CMA

accreditation. This allowed two important events to occur, first in 2003 the CMA recognized Physician Assistants as health care professionals, and second, in 2004 the Canadian Forces PA program became the first Canadian program to be accredited by the CMA. Four years later in 2008, the University of Manitoba (U of M) and McMaster University out of Ontario launched their own civilian PA programs which became accredited by the CMA as well. The Master of Physician Assistant Studies (MPAS) program out of the U of M is currently the only master's level PA education available in Canada. (2) (5) Since opening these programs the number of PAs in Canada continues to rise. Table 1 refers to the number of practicing PAs in Canada for 2010. That number has substantially grown within in the last 5 years. There are more than 400 active practicing PAs across Canada now with 250 working in Ontario alone.

**Table 1. Number of PAs working in Canada as of 2010. Source: (4)**

<b>Physician Assistants</b>	<b>Number</b>
Active Duty Canadian Forces	143
Manitoba Registered PAs/CAs	60
Ontario PAs	67
Nonregulated ex-military PAs working under delegated physician orders	15

At this time the legislation and regulation for PAs across Canada varies from the provinces that employ PAs. Currently 3 out of the 5 provinces have a regulated PA profession and the other 2 do not. In Manitoba, the government in 1999 initially passed the Clinical Assistant (CA) registration amendment under the medical act to allow for the licensing of CAs. Later in 2009 this was changed to include the licensing of physician assistants as well under the same act. New Brunswick followed a similar path as Manitoba, in 2009 the College of Physicians and Surgeons of New Brunswick amended the medical act to include PAs in their health care model to allow for licensing. In Alberta the Council of the College of Physicians and Surgeons of Alberta

(CPSA) passed a bylaw allowing PAs to work under the responsibility of a regulated member. Then later in 2013 an application to regulate PAs was submitted to the Minister of Health and was found to be in favour of regulating the profession under the CPSA. In British Columbia there are currently no legislations or regulations in place for PAs, however there have been policy papers and statements written in support of using PAs in the province, but no new developments have occurred since. Ontario via the Ministry of Health and Long Term Care started introducing PAs to the provincial health system in 2006 to combat the physician shortages. Even though the province was on board for introducing PAs, they currently remained unregulated. In 2012, CAPA submitted an application to the Health Professions Regulatory Advisory Council (HPRAC) for regulation of PAs to strengthen the PA profession in Ontario and ensure that all PAs have met common entry-to-practice requirements and continuing education. Unfortunately, the Ministry of Health decided against the regulation of PAs based on the HPRAC recommendation that the current model of supervision under a licenced physician is sufficient. (2) (5)

### **The Role of a PA in Rural Community Orthopedics**

The role of PA can be very diverse and constantly evolving as new skills and experience are acquired. The relationship between a supervising physician and PA is one of the biggest factors that affect the PAs role. As a physician becomes more comfortable with a PA, it is likely that they will be delegated more responsibility and have a bigger role in their position. This is the case for a PA in rural community orthopedics. The PA has a very large and diverse set of responsibilities that the orthopedic surgeons rely on to increase their productivity in surgery and also on the ward for pre and postoperative care. Some of the responsibilities include; assisting in all orthopedic surgeries (total joints, sports medicine, ORIFs, spinal surgery, bunions etc.).

Providing ward specific care for post-operative patients including pain management, electrolyte monitoring, wound care and dressing changes, co-morbid disease management (diabetes, hypertension, chronic obstructive pulmonary disease, etc.) often requiring medication adjustment and blood product administration. Providing support to the emergency department, psychiatry department, and surrounding smaller health center referrals with orthopedic consultations. Other duties include performing history and physicals for new admissions, dictating discharge summaries, assembling necessary information for patient transfers to other facilities, consulting specialty services if needed, and taking 24 hour call shifts weekly.

It is quite evident that the role of a PA in rural community orthopedics is very diverse and important to patient care. By looking at other research papers involving Orthopedic PAs there is a significant difference in the role that a PA can play. The Concordia Joint Replacement Group (CJRG) in Winnipeg had three PAs hired at the time the research paper was written. Their duties included taking first call with their supervising physician, providing first assist in the operating room, writing postoperative orders and surgical notes, and completing discharge summaries on patients. (6) Another paper looking at an orthopedic service in the United States stated that PA responsibilities are governed by state laws and/or hospital regulations. The PAs at this institution were responsible for assisting in OR cases, attending daily rounds, coordinate patients for discharge, and dictate discharge summaries. However at this institution the PAs are not allowed to dictate admission history and physicals, write admission orders, and perform invasive procedures like traction pin placements or lines. (7) Across Canada and the US, the roles and responsibilities of a PA can vary from location to location. Nevertheless, the goal of implementing a PA remains the same, which is increasing the efficiency and productivity of the



supervising physicians, increasing satisfactory patient care, and saving costs to the medical system.

## **Methods**

The methods that were used to collect the data included a systematic review of 120 charts over an 18 month period from the health records office of the regional community hospital. Data collection was limited to 1 orthopedic surgeon, and the cases that were reviewed included total hip arthroplasties, total knee arthroplasties, knee and hip arthroplasty revisions, and also hemi-hip arthroplasties. The one surgeon that was chosen worked the closest in conjunction with the orthopedic physician assistant. This was done to reflect the most accurate information collected when reviewing how discharge times were affected when the physician assistant was hired. The orthopedic PA was hired in April 2012. Therefore the first data set prior to the PA being hired included looking at 45 cases between November 2011 and April 2012. The second data set included 75 cases after hiring the PA from April 2012 to April 2013. The purpose for reviewing cases 1 year after being hired is to account for the learning curve of a new work environment and to give enough time for them to become comfortable in their role. If the time period after being hired was too brief, it could have skewed the results in the wrong direction and inadequately reflected the true impact that they made on discharge times. The data capture sheets included the age, sex, admission diagnosis, operating room procedure performed, the length of stay postoperatively, and any complications that occurred postoperatively. The charts were pulled at random and did not include any gender or age bias. Approval for this data collection and research paper was reviewed and granted by the University of Manitoba Bannatyne Campus Research Ethics Board. Refer to the appendix section of this paper for the data capture sheets.

## **Results**

Many studies have shown that the use of PA significantly decreases the length of stay in hospitals.(7) (8) Specifically to orthopedics, the length of stay is often prolonged due to waiting for medical equipment to be ordered and delivered (wheelchairs, crutches, canes, etc.), management of anticoagulation, physiotherapy delays, coordinating discharge services such as home care or transferring back to referring facility. (7) For this study the length of stay referred to the time period that the patient stayed on the ward postoperatively under the care of orthopedics until discharged from the service. Discharged from service either meant the patient was ready to be sent home or transfer of care to another service or facility. There were some cases that had to be removed from data collection due to the patient being delayed transfer to either another service or facility from bed shortages. These cases would have artificially increased the length of stay for their respective time periods as the patient was technically cleared from orthopedic care. Referring to Table 2 results, there is clear difference in length of stay postoperatively from when the physician assistant was hired. The six months prior to the PA being hired, the average length of stay was found to be 8.2 days with a high of one case lasting 29 days and a low of one case lasting only 2 days. For this time period the most common length of stay appeared to be between 6 to 10 days for a total hip or total knee arthroplasty. Moving forward to April 2012 when the service hired one PA, the average length of stay for 75 cases over the year came to be only 5.2 days. There was a high of one case lasting 10 days and a low of multiple cases requiring only 3 days before discharge. Again for this next time period the most common length of stay for a total hip or total knee arthroplasty lasted between 4 to 6 days. Table 3 refers to another data collection piece taken into consideration. The postop complications included issues that developed postoperatively such as pneumonia, anemia and low hemoglobin

levels, hyponatremia, infections, and slow physiotherapy progress for examples. These cases were kept for data collection if the patient care remained under the orthopedic service and the complications were managed by the house staff or they required consults from other services for suggestions and help with management. For the first time period 9 out of the 45 cases had documented postoperative complications, which equaled to about 20% of the cases. For the next time period there was a significant increase in the number of documented postop issues. 23 out of the 75 cases, or 31%, had documentation of this. Data that was collected but not used for any results included the age and sex of the patient. No correlation or interpretation of these variables was done for this study.

**Table 2. The difference in orthopedic postoperative length of stay by implementing a PA to the service**

	<b>November 2011 – April 2012</b>	<b>April 2012-2013</b>
<b>Number of Cases Performed by surgeon</b>	45	75
<b>Averaged Length of Stay (days)</b>	8.2	5.2

**Table 3. Number of cases with documented postoperative complications**

	<b>November 2011 – April 2012</b>	<b>April 2012-2013</b>
<b>Number of cases with documented postoperative complications</b>	9	23
<b>Percentage of cases</b>	20%	31%

### **Discussion and Interpretation**

The results from the data collection show a substantial impact that a physician assistant had on the postoperative length of stay for patients. On average there was a 3 day earlier discharge compared to when there was no PA on the orthopedic service. This number on its own may not seem like much of a change, but looking at it as a whole and over many years, the positive

impact gets multiplied. The attending surgeon performed approximately 400 surgeries a year prior to having a PA on the service. Discharging patients 3 days earlier not only saves the hospital money for less bed costs and resources but also allows the surgeon to book more cases due to a higher turnover rate on the ward. So there are benefits for not only the patient with receiving better and optimized care but also for the ward managers and surgeon having increased bed turn over and increased number of surgical cases per year. Of note, if just one PA can make this big of a difference, it would be interesting to see the outcome if an additional PA was added to the same service. To look at the financial aspect of these results, an example of using ward bed costs was done. On average in Canada the cost of hospital bed ranges from \$850 to \$1000 a day for a general ward. Using the lower end of the bed cost range (\$850) results in a savings of \$2550 for the hospital for just one surgical case. Applying this to the surgeon's approximate original case number per year (400), results in a total savings of around \$1 million just in bed costs alone (400 cases multiplied by \$2550 in savings per case equals \$1,020,000). It is important to note that although these numbers refer to just one attending surgeon, the PA also works with 2 other orthopedic surgeons. Although no formal data collection was done with the other surgeons, it is logical to assume that the PA had similar effects on their cases as well. When taking this into consideration it could be stated that hiring one PA resulted in saving the hospital over \$1 million annually in bed costs alone, freeing up these finances to be used elsewhere. Another interesting observation that appeared on these results was that there were more documented postoperative complications after the PA was hired. Examples of some postop complications during the first time period included a variety of illnesses and acute changes with differing levels of severity. Pneumonia with oxygen desaturation requiring oral antibiotics and supplemental oxygen, pleural effusions and atelectasis requiring chest physiotherapy and

supplemental oxygen, and low hemoglobin levels requiring postop transfusions or iron supplements were some of the complications that occurred during that time period. The next time period involving the PA also had a wide variety of different postop complications ranging from life threatening to minor issues. Some of these complications included postop surgical infections (cellulitis or hardware infection) requiring intravenous antibiotics and/or debridement, electrolyte disturbances often requiring consults to internal medicine for suggestions of management, postoperative delirium in the elderly patients requiring increased length of stay in order to return to baseline, and again low hemoglobin levels after surgery requiring blood transfusions or iron supplements like ferrous gluconate. It is difficult to say with certainty what the reason for the increased percentage of postop complications was due to. It could have been based on more time for proper chart documentation or it just could have been the unfortunate luck of the patients for that time period. Nevertheless based on these results the PA had to manage more postoperative complications and still for the time period had quicker discharge times overall. One possibility to account for this observation was that the PA had more time on the wards to manage these patients than the surgeon. By spending more time on the wards they would be able to round daily on these patients, keep close watch on bloodwork and test results, follow up with consults that were sent, monitor how physiotherapy was progressing, and be close by if any acute changes were to happen. By relieving the surgeon from ward duties it would allow them to have more time in the OR and to be in clinic consulting new patients.

There are limitations to this study that need to be addressed and acknowledged that were evident from the start of data collection. The limitations resulted mostly from time constraints around deadlines and ability to collect data at the health records office. If time allowed, it would have been better to increase the time period for the entire data collection to allow for an increased

number of cases both before and after the PA was hired. This would have given a more accurate average of the length of stay postoperatively. Another limitation to this study was that only cases from one surgeon were looked at. Even though the PA worked closest with the one surgeon, collecting data on all of the orthopedic surgeon cases for a specified time period should have been done. This data could have been used to compare and contrast how the PA affected the patients of each surgeon and if there were any trends detectable in each of the different surgeon cases.

### **Conclusions**

A physician assistant is a highly trained and skilled medical expert used to increase the effectiveness and extend the services of their supervising physician. The result of this is to allow the doctor more time with complicated cases, more time in surgery, and increase patient throughput and care. This study set out to investigate how adding a physician assistant to a community orthopedic service affected the discharge times on patients postoperatively. The results obtained from this data collection show that by adding a PA to the service, there was a significant reduction in the postop length of stay by an average of 3 days. This study adds to the building research that PAs do in fact make a substantial contribution to the medical teams that they are part of. For example both in the United States and Canada PAs are making significant impacts on emergency departments in rural and urban centers. By having PAs perform history and physicals, performing certain procedures and using ultrasound, admitting patients, and acting as liaisons between the emergency department and primary care providers they are able to decrease the wait times and increase patient satisfaction in the emergency departments. (9)

Another example comes from a study done in Pittsburgh, Pennsylvania on how PAs affected a general surgery service. The main role for the PAs on this service was to reduce workloads of

resident doctors. The study found that the physician assistants allowed for increased educational opportunities because fewer residents had to leave rounds and conferences to attend to acute issues on the ward, and also that resident scores on the American Board of Surgery In-Training Examination substantially increased. (10) The PA role in Canada and other parts of the world has a bright future as wait times and physician shortages continue to be recurrent problems. PAs are an effective and economical solution to these problems and their role will continue to expand and become a central part of medical teams as the profession grows.

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## Appendices

**Table 1. Data capture sheet for November 2011 - April 2012**

Patient Number	Admission Date	Discharge Date	Length of Stay	Diagnosis	Procedure	Age	Sex	Complications
2	16/01/2012	19/01/2012	3	R Knee Osteoarthritis	R TKA	60	M	
3	19/12/2011	24/12/2011	5	L Hip Osteoarthritis	L THA	70	M	
4	31/10/2011	04/11/2011	4	L Knee Osteoarthritis	L TKA	56	F	
5	23/01/2012	27/01/2012	4	R Knee Osteoarthritis	R TKA	56	F	
6	02/03/2012	09/03/2012	7	R Knee Osteoarthritis	R TKA	67	M	
8	28/12/2011	03/01/2012	6	R Hip Osteoarthritis	R THA	61	M	
10	09/01/2012	16/01/2012	7	L Hip Osteoarthritis	L THA	68	F	
13	30/11/2011	12/12/2011	13	L Hip Osteoarthritis	L THA	80	M	Ischemic heart disease, Congestive heart failure, Cognitive Deficit
15	04/01/2012	08/01/2012	4	R Knee Osteoarthritis	R TKA	69	M	
17	21/03/2012	30/03/2012	9	L Hip #	L Hemi-HA	79	F	
18	15/02/2012	21/02/2012	6	R Hip Osteoarthritis	R THA	54	F	
19	14/11/2011	22/11/2011	8	R Hip Osteoarthritis	R THA	81	M	
24	18/01/2012	26/01/2012	8	L TKA Revision	L TKA	88	F	ICU-Hypoxia
25	02/11/2011	28/11/2011	26	R Hip Osteoarthritis	R THA	84	F	Hyponatremia
29	24/12/2011	30/12/2011	6	L Hip #	L Hemi-HA	91	F	
34	01/02/2012	07/02/2012	6	L Hip Osteoarthritis	L THA	59	F	
35	18/01/2012	30/01/2012	12	R Hip #	R Hemi-HA	83	F	Atelectasis, pleural effusion



38	12/03/2012	19/03/2012	7	L Knee Osteoarthritis	L TKA	73	M	
44	22/02/2012	06/03/2012	13	R Knee Osteoarthritis	R TKA	76	F	
45	12/12/2011	17/12/2011	5	L Knee Osteoarthritis	L TKA	63	F	
48	16/11/2011	21/11/2011	5	L Knee Osteoarthritis	L TKA	76	F	
53	28/11/2011	02/12/2011	4	L Knee Osteoarthritis	L TKA	43	F	
56	14/03/2012	22/03/2012	8	R Hip Osteoarthritis	R THA	63	M	
57	25/11/2011	28/11/2011	3	Failed Medial Arthrotomy Closure	L TKA revision	82	F	
58	21/02/2012	29/02/2012	8	L Knee Osteoarthritis	L TKA	77	F	
59	07/03/2012	30/03/2012	23	R Hip Osteoarthritis	R THA	60	F	Chronic Schizophrenia
60	21/03/2012	28/03/2012	7	L Knee Osteoarthritis	L TKA	68	F	
62	19/10/2011	24/10/2011	5	L Hip Rheumatoid Arthritis	L THA	56	F	
63	22/11/2011	21/12/2011	29	Draining L THA wound	L THA Stage 1 Revision	56	F	Long term IV Abx
64	07/11/2011	17/11/2011	10	L Knee Osteoarthritis	L TKA	81	M	Pneumonia
65	12/10/2011	17/10/2011	5	L Hip Osteoarthritis	L THA	52	F	
66	28/03/2012	02/04/2012	5	Failed L TKA	L TKA revision	85	M	
73	30/11/2011	06/12/2011	6	L Knee Osteoarthritis	L TKA	79	F	
75	14/11/2011	18/11/2011	4	L Knee Osteoarthritis	L TKA	57	F	
78	11/01/2012	15/01/2012	4	L Knee Osteoarthritis	L TKA	55	F	
81	30/01/2012	03/02/2012	4	R Hip Osteoarthritis	R THA	80	M	
83	23/03/2012	03/04/2012	11	L Hip #, L Hip OA	L THA	54	F	
85	16/03/2012	22/03/2012	6	L Knee Osteoarthritis	L TKA	71	F	
92	17/02/2012	23/02/2012	6	L Hip Osteoarthritis	L THA	70	F	
93	30/01/2012	05/02/2012	6	R Knee Osteoarthritis	R TKA	74	F	
94	14/12/2011	16/12/2011	2	R Knee Osteoarthritis	R TKA	65	F	Transferred to home hospital
95	06/01/2012	19/01/2012	13	R Hip Osteoarthritis	R THA	82	M	Pneumonia
98	23/11/2011	08/12/2011	15	R Hip Osteoarthritis	R THA	89	M	Low Hgb
99	26/12/2011	10/01/2012	15	R THA Dislocation	R THA revision	89	M	
101	05/03/2012	10/03/2012	5	L Knee Osteoarthritis	L TKA	75	F	

Table 2. Data capture sheet for April 2012 - 2013

Patient Number	Admission Date	Discharge Date	Length of Stay	Diagnosis	Procedure	Age	Sex	Complications
1	16/05/2012	20/05/2012	4	L Hip Osteoarthritis	L THA	70	F	
7	13/08/2012	20/08/2012	7	L Hip Osteoarthritis	L THA	71	F	
9	16/04/2012	21/04/2012	5	L Knee Osteoarthritis	L TKA	70	F	
11	01/10/2012	05/10/2012	4	R Hip Osteoarthritis	R THA	68	F	
12	30/01/2013	08/02/2013	9	L Knee Osteoarthritis	L TKA	51	M	Cellulitis
14	02/01/2013	06/01/2013	4	R Knee Osteoarthritis	R TKA	67	M	
16	18/06/2012	21/06/2012	3	L Hip Osteoarthritis	L THA	64	F	
20	23/06/2012	27/06/2012	4	R Hip #	R Hemi-HA	79	F	
21	15/08/2012	21/08/2012	6	R Knee Osteoarthritis	R TKA	49	F	
22	02/04/2012	07/04/2012	5	R Knee Osteoarthritis	R TKA	64	F	
23	30/07/2012	05/08/2012	6	R Hip Osteoarthritis	R THA	73	F	
26	31/10/2012	06/11/2012	6	R TKA revision 1	R TKA	77	M	
27	27/12/2012	01/01/2013	5	R TKA revision 2	R TKA	77	M	
28	11/02/2013	15/02/2013	4	Infected R TKA	R TKA revision	77	M	
30	23/01/2013	27/01/2013	4	R Knee Osteoarthritis	R TKA	69	F	
31	30/04/2012	06/05/2012	6	L Knee Osteoarthritis	L TKA	69	F	
32	17/04/2013	21/04/2013	4	R Knee Osteoarthritis	R TKA	59	F	
33	28/06/2012	02/07/2012	4	L Hip #	L Hemi-HA	81	F	
36	12/09/2012	17/09/2012	5	L Knee Osteoarthritis	L TKA	48	F	
37	12/04/2013	15/04/2013	3	R Knee Osteoarthritis	R TKA	49	F	
39	04/01/2013	14/01/2013	10	R Knee Osteoarthritis	R TKA	73	M	GI Bleed
40	04/03/2013	12/03/2013	8	R Knee Osteoarthritis	R TKA	74	M	Esophageal and Duodenal Ulcers
41	30/04/2012	04/05/2012	4	L Hip Perthes Disease	L Hemi-HA	68	M	
42	29/08/2012	05/09/2012	7	L Hip Osteoarthritis	L THA	89	F	Low Hgb, delayed DC
43	25/06/2012	02/07/2012	7	L Hip Osteoarthritis	L THA	83	M	Low Hgb, delayed DC
46	01/10/2012	09/10/2012	8	L TKA Revision	L TKA	75	M	prosthesis infection
47	13/03/2013	17/03/2013	4	L Knee Osteoarthritis	L TKA	61	M	
49	27/04/2012	01/05/2012	4	R Hip Osteoarthritis	R THA	57	M	
50	24/10/2012	28/10/2012	4	L Hip Osteoarthritis	L THA	57	M	

51	03/10/2012	06/10/2012	3	R Hip Osteoarthritis	R THA	59	F	
52	10/04/2013	15/04/2013	5	L Knee Osteoarthritis	L TKA	85	F	Low Hgb, pleural effusion
54	09/07/2012	14/07/2012	5	L Hip Osteoarthritis	L THA	62	M	Incision swelling and erythema
55	07/05/2012	15/05/2012	8	L Hip Osteoarthritis	L THA	78	F	Intra-op femoral artery bleed, needing post op ICU
61	09/01/2013	12/01/2013	3	R Knee Osteoarthritis	R TKA	69	F	
67	02/04/2012	05/04/2012	3	L Hip #	L Hemi-HA	94	M	
68	10/10/2012	16/10/2012	6	L Knee Osteoarthritis	L TKA	61	F	
69	09/05/2012	16/05/2012	7	L Knee Osteoarthritis	L TKA	72	F	Severe Nausea
70	09/07/2012	14/07/2012	5	R Knee Osteoarthritis	R TKA	67	M	
71	20/06/2012	28/06/2012	8	R Knee Osteoarthritis	R TKA	69	F	Delirium / Confusion
72	19/12/2012	24/12/2012	5	R Knee Osteoarthritis	R TKA	68	F	
74	11/02/2013	15/02/2013	4	R Knee Osteoarthritis	R TKA	59	F	
76	04/04/2012	09/04/2012	5	L Hip Osteoarthritis	L THA	74	F	
77	10/10/2012	18/10/2012	8	L Hip Osteoarthritis	L THA	77	F	Hyponatremia
79	12/09/2012	20/12/2012	8	L Hip Osteoarthritis	L THA	86	F	Hypokalemia, Hypertension
80	26/09/2012	01/10/2012	5	L Hip Osteoarthritis	L THA	61	M	
82	25/04/2012	03/05/2012	8	L Knee Osteoarthritis	L TKA	69	M	SBO, C. diff
84	24/10/2012	27/10/2012	3	L Knee Osteoarthritis	L TKA	59	M	
86	04/07/2012	10/07/2012	6	Infected L TKA	L TKA revision	71	F	
87	07/05/2012	10/05/2012	3	L Knee Osteoarthritis	L TKA	62	F	
88	17/09/2012	24/09/2012	7	R Hip Osteoarthritis	R THA	73	F	Slow Rehab
89	07/11/2012	12/11/2012	5	L Knee Osteoarthritis	L TKA	56	F	
90	26/11/2012	30/11/2012	4	L Knee Osteoarthritis	L TKA	71	M	
91	28/05/2012	01/06/2012	4	R Hip Osteoarthritis	R THA	54	M	
96	10/09/2012	14/09/2012	4	L Knee Osteoarthritis	L TKA	57	F	
97	11/04/2013	15/04/2013	4	R Hip Osteoarthritis	R THA	57	M	
100	15/10/2012	24/10/2012	9	L Hip Osteoarthritis	L THA	80	F	UTI, Hypokalemia, Rash
102	02/05/2012	06/05/2012	4	R Knee Osteoarthritis	R TKA	67	F	
103	14/05/2012	22/05/2012	8	L Hip Osteoarthritis	L THA	78	M	Hyponatremia

104	25/07/2012	31/07/2012	6	L Hip Osteoarthritis	L THA	82	M	Slow Rehab
105	26/09/2012	30/09/2012	4	R Knee Osteoarthritis	R TKA	63	F	
106	11/07/2012	16/07/2012	5	L Knee Osteoarthritis	L TKA	82	M	Low Hgb
107	10/12/2012	17/12/2012	7	L Knee Osteoarthritis	L TKA	79	F	Post-op Dementia and slow rehab
108	24/09/2012	27/09/2012	3	R Knee Osteoarthritis	R TKA	74	F	
109	03/04/2013	07/04/2013	4	R Knee Osteoarthritis	R TKA	76	F	
110	29/10/2012	01/11/2012	3	R Knee Osteoarthritis	R TKA	69	F	
111	27/03/2013	30/03/2013	3	L TKA Instability	L TKA revision	59	F	
112	16/01/2013	22/01/2013	6	R Knee Osteoarthritis	R TKA	84	F	Slow rehab, required OT
113	25/07/2012	28/07/2012	3	R Knee Osteoarthritis	R TKA	68	M	
114	24/04/2013	27/04/2013	3	L Knee Osteoarthritis	L TKA	68	M	
115	17/10/2012	21/10/2012	4	L Knee Osteoarthritis	L TKA	60	M	
116	13/06/2012	16/08/2012	3	L TKA Instability	L TKA revision	56	F	
117	30/07/2012	08/08/2012	9	R Knee Osteoarthritis	R TKA	82	F	Incision Infection
118	18/06/2012	21/06/2012	3	R Knee Osteoarthritis	R TKA	64	F	
119	25/06/2012	29/06/2012	4	L Knee Osteoarthritis	L TKA	81	M	
120	27/04/2012	02/05/2012	5	L Knee Osteoarthritis	L TKA	57	F	