# Primary Hip and Knee Replacements in Scotland

## Analysis of 6 years of operations on NHS patients April 1996 - March 2002

### 1. Introduction

The Scottish Arthroplasty Project uses the SMR01 dataset held by ISD as the source for all data analysis. This dataset contains demographic and clinical information, which is recorded each time a patient is admitted to hospital. The data in SMR01 is submitted to ISD by NHSScotland Trusts, who are responsible for the coding of each patient episode. This system therefore relies on hospital coding systems and variations in any of the final figures represented in this report may in some cases be related to local coding issues. Hospitals are responsible for correcting identified errors and resubmitting the correct data to ISD.

The SMR01 records are linked by ISD to Scottish Cancer Registry records, psychiatric admissions and the General Registrar's Office death records. This enables analysis of the whole patient journey, from admission for surgery through perhaps several transfers to different hospitals and ultimately discharge home. If a patient is readmitted to hospital for further treatment or dies (at home or in hospital), this information is also recorded and collated.

The Scottish Arthroplasty Project identifies all patients on the SMR01 dataset who have undergone surgery for joint replacement (primary or revision surgery), with the exception of those patients undergoing emergency hemi-arthroplasty. Hemi-arthroplasty of the hip is usually carried out for fracture and has not been included in these figures.

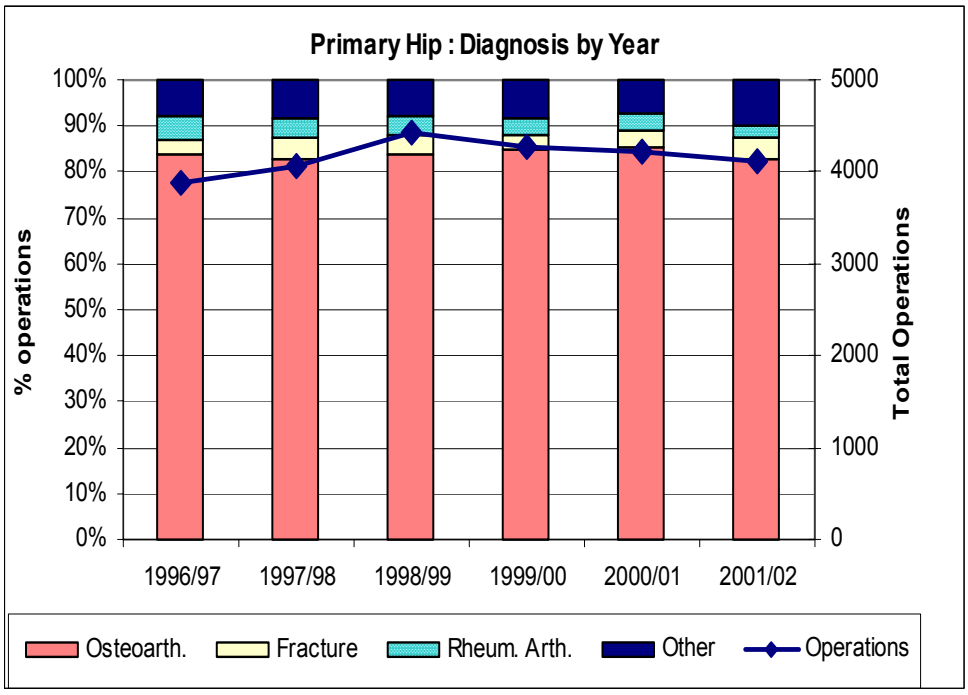
## 2. Epidemiology of Primary Hip and Knee Replacements

### 2.1 Primary Hip Replacements: Diagnosis

There were 24,983 primary hip replacements carried out in the six year period April 1996 – March 2002. The number of primary hip replacements per year has been falling since 1998/99, and for the year ending March 2002 the number recorded was just over 4000.

Osteoarthritis is the main diagnosis recorded in patients undergoing primary hip replacement. Just over 80% of primary hip replacements are performed due to osteoarthritis. This figure has remained fairly constant over the years but is higher than the 75% quoted by the Swedish National Hip Arthroplasty Register[1]. There has been a slight increase in fracture and a slight decrease in rheumatoid arthritis over the six year period.

Figure 2.1 Primary hip replacement: Diagnosis by year.



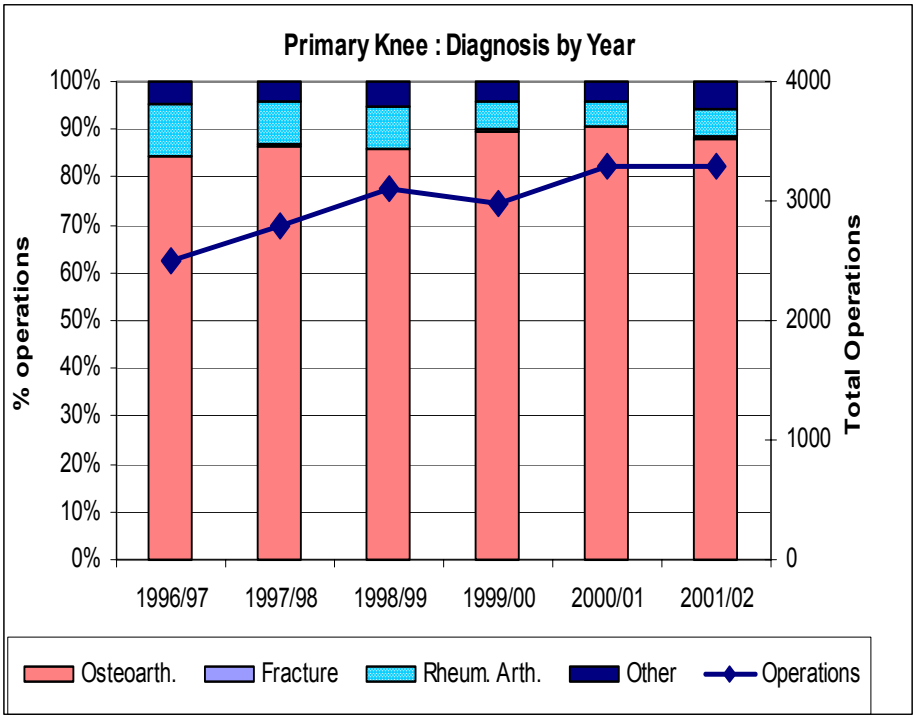

[1]Prognosis of Total Hip Replacement: Update of Results and Risk-Ratio Analysis for Revision and Re-revision from the Swedish National Hip Arthroplasty Register 1979-2000, Department of Orthopaedics, Gothenburg University, Sweden

## 2.2 Primary Knee Replacements: Diagnosis

There were 17,933 primary knee replacements carried out in the six year period April 1996 – March 2002. The number per year has been generally rising since 1998/99. For the year ending March 2002, the number recorded was just over 3000.

As in primary hip replacement, osteoarthritis is the main diagnosis recorded in patients undergoing primary knee replacement. Rheumatoid arthritis has been decreasing but is more common in knee patients than in hip patients.

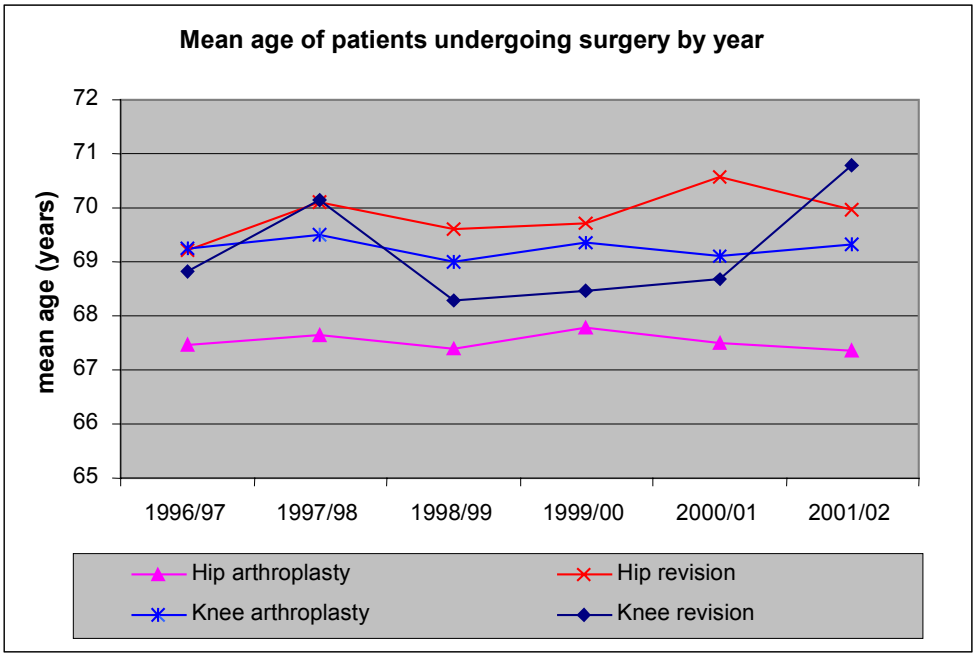
Figure 2.2 Primary knee replacement: Diagnosis by year.



## 2.3 Primary Hip and Knee Replacement: Age distribution

There has not been much change over the years in the mean age of patients undergoing hip and knee surgery. The mean age of patients undergoing primary hip has remained constant at 67 and lower than the mean age reported by Swedish Registry[1] of 70.

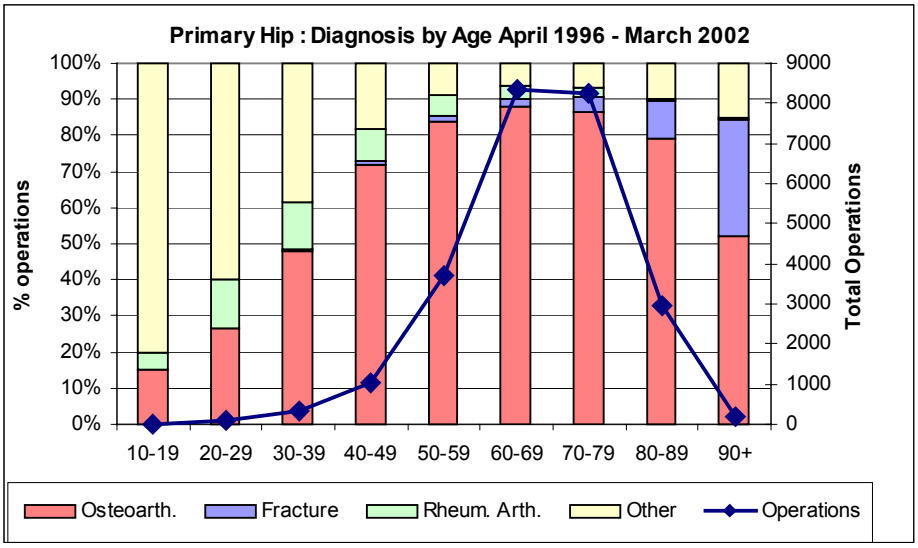
Figure 2.3 Mean age distribution



## 2.4 Primary Hip and Knee Replacement: Diagnosis by Age

The majority of patients undergoing primary hip replacement are aged between 60 and 70. Rheumatoid arthritis is more common in the younger patients, disappearing completely in the older patients. Osteoarthritis is by far the most common diagnosis in older patients, with fracture becoming more common with increasing age. The distribution pattern is similar to that reported by the Swedish Registry[1] except that the proportions of rheumatoid patients is lower. This could be due to coding differences.

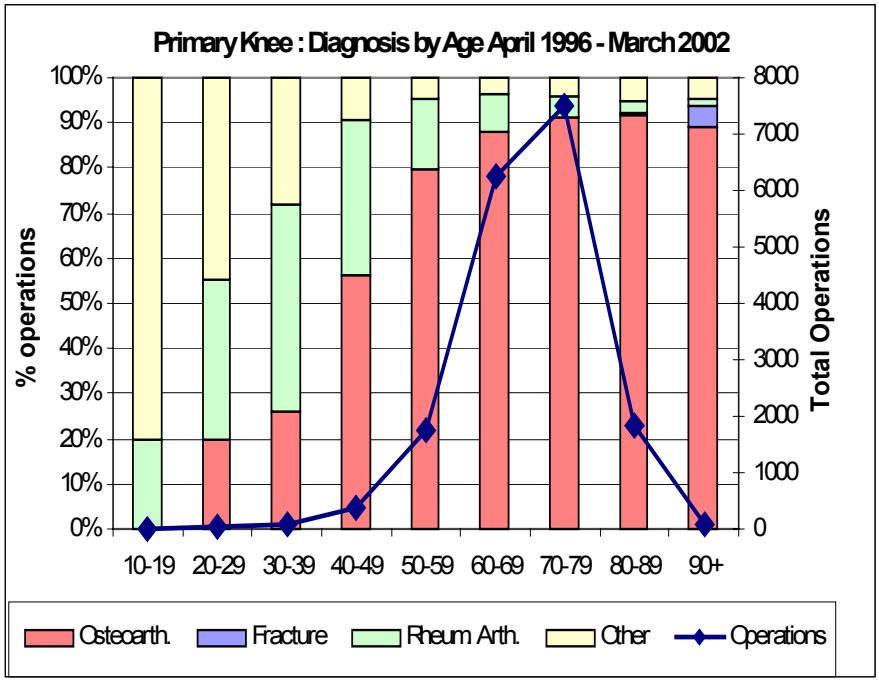
Figure 2.4 Primary Hip Replacement :Diagnosis by age



## 2.5 Primary Knee Replacement: Diagnosis by Age

Patients undergoing primary knee replacement are slightly older than those undergoing primary hip replacement; the mean age is 70 there is higher proportion of older patients. Rheumatoid arthritis is more common in the younger knee patients than in the younger hip patients. Fracture is much less common and osteoarthritis is again by far the most common diagnosis in older patients

Figure 2.5 Primary knee replacement: diagnosis by age



## 3. Survival of primary hip and knee replacements

As the SMR01 dataset is a linked dataset, it is possible to link primary hip and knee replacements to future revisions. All primary hip and knee replacements carried out between April 1996 and March 2002 have been analysed to look at the effect of age and diagnosis on the time to first revision. Kaplan-Meier survival analysis has been used to do this and the survival rate takes account of deaths in the time period.

### 3.1 Survival Rates of Hip and Knee Replacement by Age

Figure 3.1.1 Hip replacement survival by age

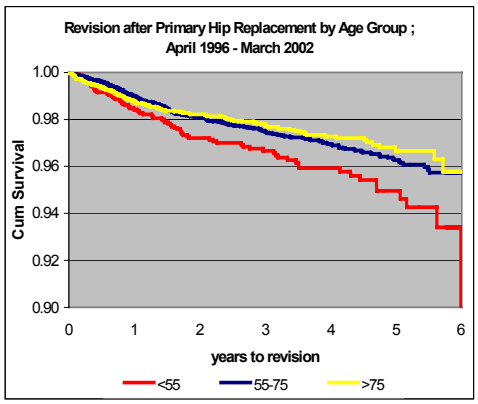
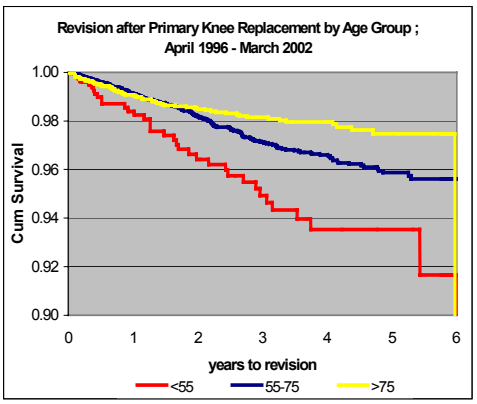



Figure 3.1.2 Knee replacement survival by age

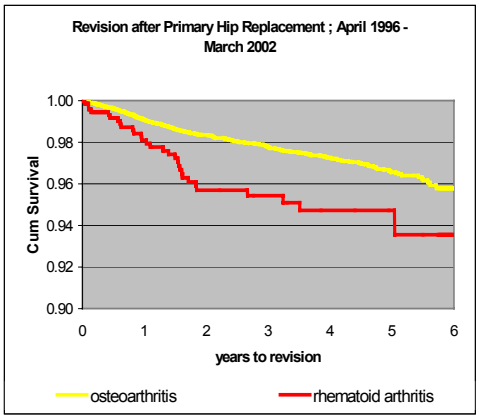



As was found by the Swedish Registry[1], younger patients, ie those less than 55, have significantly (log rank test, $p<0.05$) higher failure rates for hips, with 10% being revised within 6 years. This is similar to the figure in Sweden where the survival rate after six years is about 93%. There is not much difference in the survival rates for the two older age groups (55-75 and >75), although the Swedish Registry found that the survival was better in patients aged >75 (deaths were not taken into account).This was more marked after 7-9 years.

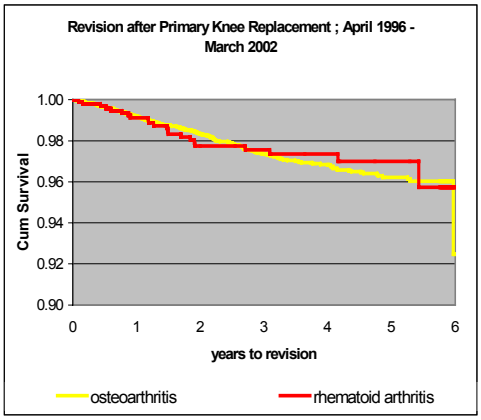
For patients undergoing primary knee replacement there is a significant difference in survival rates between the three age groups (log rank test, $p<0.005$). Survival rates are higher in the older patients and worse in the younger patients.

3.2 Comparative survival rates for hip and knee replacements in osteoarthritis and rheumatoid arthritis patients.

3.2.1 Hip replacement survival

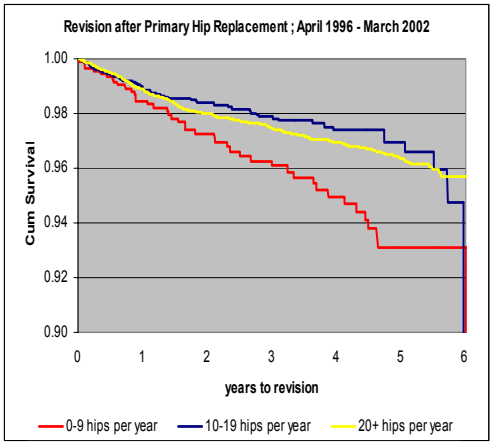



3.2.2 Knee replacement survival




Looking at the difference in survival rates between osteoarthritis and rheumatoid arthritis, significant differences exist only for primary hip replacements (log rank test, $p<0.005$). The failure rate is worse in rheumatoid arthritis patients where 6% of primary hips were revised within 6 years.

3.3 Comparative survival rates for hip replacements by average number of procedures performed.




Consultants were split into three groups based on the average number of primary hips they performed in a year. Consultants who did on average less than 10 primary hips in a year had a significantly worse failure rate than those consultants who did more than 10. There were no differences in the rates for knees.