

# Early postoperative mortality after insertion of hip and knee prostheses

S.A. Lie<sup>1</sup>, L.B. Engesaeter<sup>2</sup>, L.I. Havelin<sup>2</sup>, and O. Furnes<sup>2</sup>  
1 Section for Epidemiology and Medical Statistics, University of Bergen  
2 Orthopaedic Department, Haukeland University Hospital

**Objective:** We have previously shown that there is an increased mortality for the first 20 postoperative days after insertion of total hip prosthesis (THA) and that the mortality is normalized after 70 days (Lie 2002). In this study we compare the increased early mortality after THA with that after total knee prostheses (TKA).

**Patients and Methods:** We selected the 53,469 patients with hip and the 9,136 patients with knee prostheses, between 50 and 75 years of age reported to the Norwegian Arthroplasty Register. 70 % of the patients were women, both for the THA and the TKA patients.

**Statistical Methods:** Early postoperative mortality (for the first four postoperative months) was studied with smoothed intensity (hazard) curves (Figure 1A and 1B), and a nonparametric proportional hazards model was applied to study differences in early postoperative mortality between hip and knee prosthesis patients (Figure 2). Calculation of the 'basic mortality' for the hip- and knee- patients separately was based on the average mortality between day 200 and 300.

**Results:** The early postoperative mortality was highest just after the operation with approximately 1.5 deaths per day per 10.000 patients, both for hip- and knee- prosthesis patients. The operation risk (excess risk associated with the operation) for the first 20

## Conclusion:

- Mortality after joint replacement operations is generally very low (< 1 %)
- Immediately after the operation the mortality is similar for knee- and hip- prosthesis patients.
- The mortality persist slightly longer after hip prosthesis operations (~3-9 weeks) than after knee prosthesis operations (~3 weeks)

days was 0.18 % for hip- (Figure 1A) and 0.12 % for knee- prosthesis patients (Figure 1B). After the first 20 days the mortality was very low. The differences between the smoothed intensity curves, was verified in the nonparametric proportional hazards model, adjusted for age, gender and diagnosis (Figure 2).

**Discussion:** It is impossible to draw conclusions on how long the increased mortality persist based on survival curves (Figure 3) or preset cut-points (like 60 or 90 days postoperatively). These simple methods will show accumulated mortality and not change in mortality. Therefore we applied more sophisticated methods in this study. We have shown that there is an increased mortality after prosthesis operations, both for hip and knee patients and with a slightly higher mortality for the hip patients. After the first 20 postoperative days we found a marginal increase in mortality only for the hip prosthesis patients.

Smoothed intensity curves (with 95 % confidence limits) for early postoperative mortality, with calculation of excess risk for 20-day categories

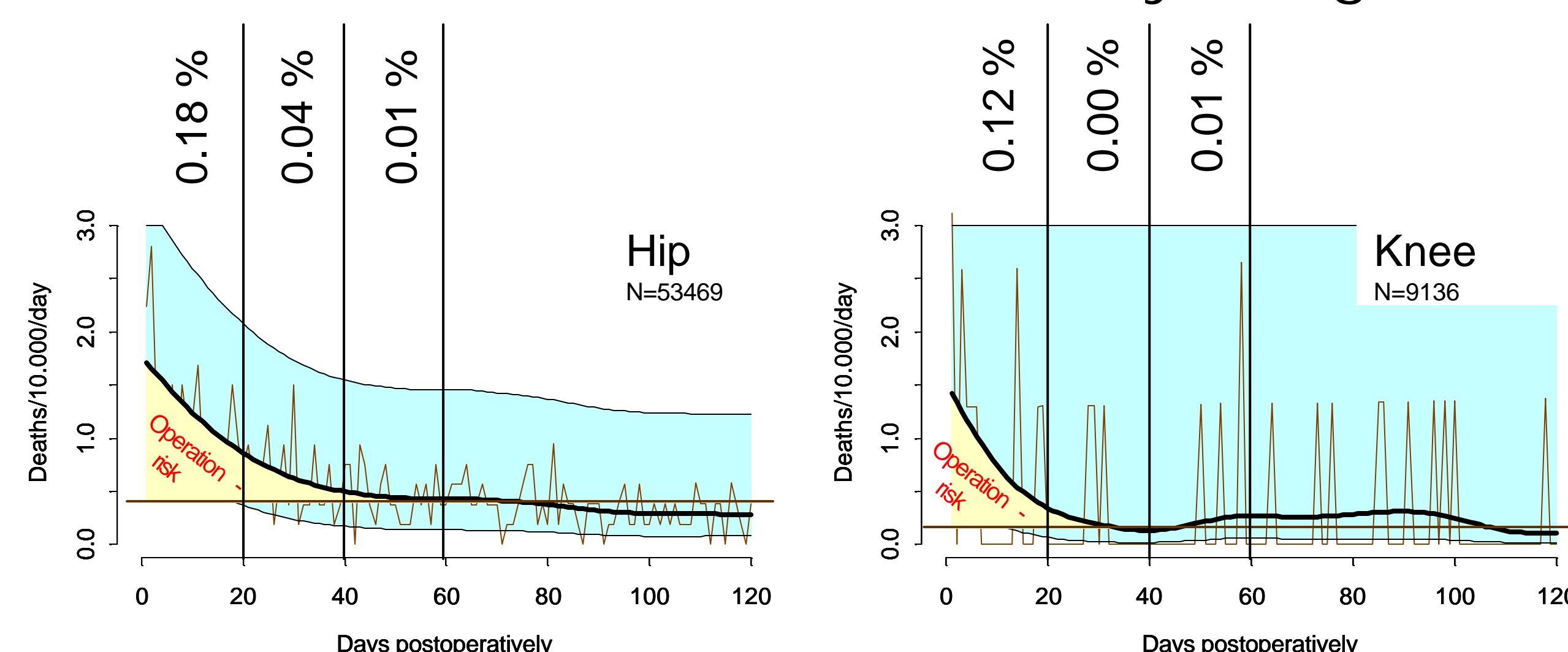


Figure 1A

Figure 1B

— "Basic mortality" = Average mortality between day 200 and 300 (for patients 50-75 years)

Non-parametric effect for difference in early postoperative mortality for hip- compared to knee- patients

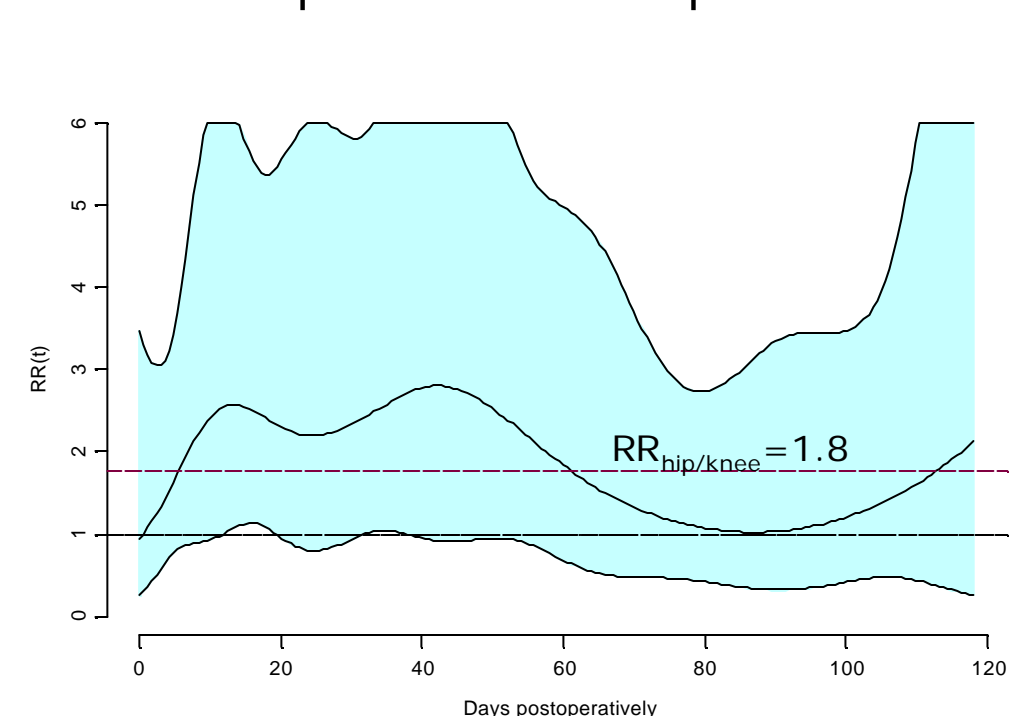


Figure 2

Survival curves shows accumulated (cumulative) survival. It is impossible to visual interpret how the mortality changes

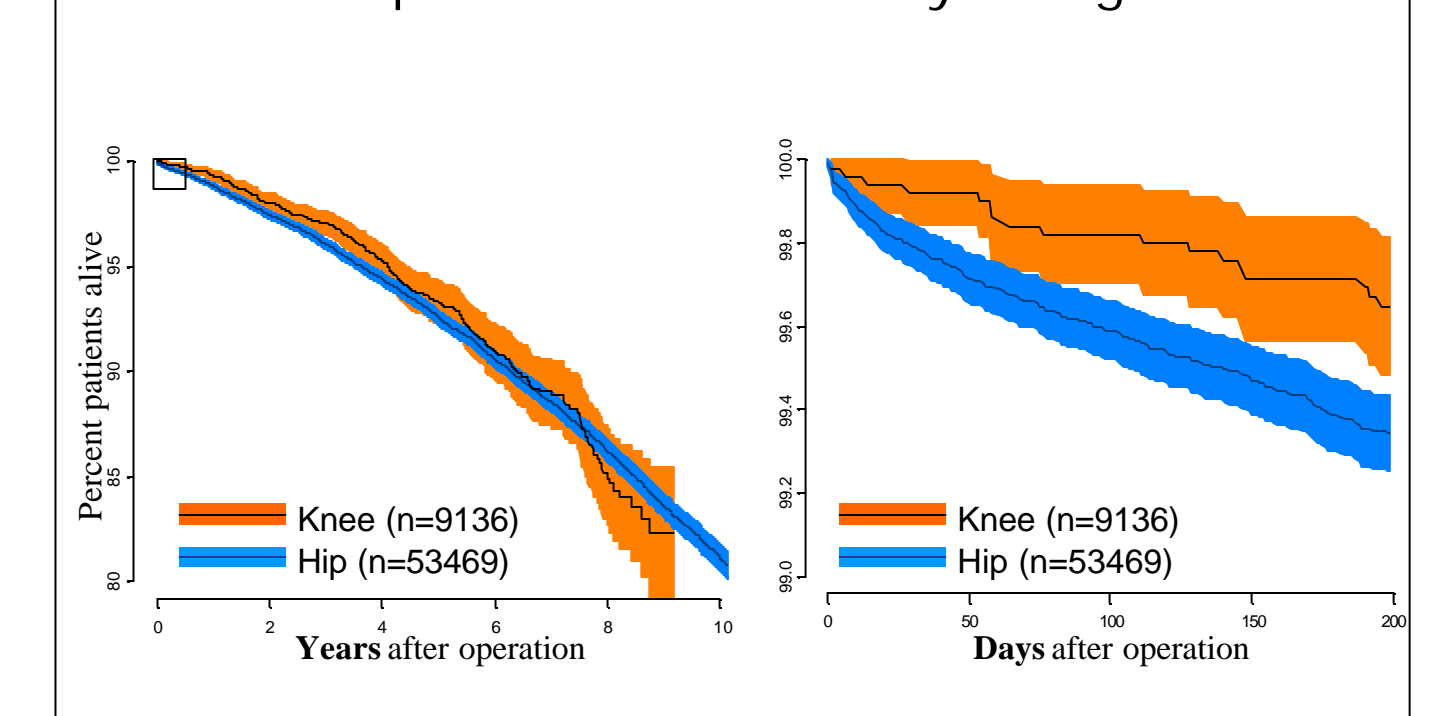


Figure 3



Stein Atle Lie, MSc, PhD  
<http://www.uib.no/People/mse1>  
University Of Bergen  
Section for Epidemiology and Medical Statistics  
Locus for Registry-based epidemiology  
Department of Public Health and Primary Health Care  
Kalfarveien 31  
N-5018 BERGEN  
NORWAY

## References:

Lie S.A. et al. Early postoperative mortality after 67,548 total hip replacements - Causes of death and thrombosis prophylaxis in 68 Norwegian hospitals from 1987 to 1999. *Acta Orthop. Scand.* 2002; 73(4): 392-399