

Less Than 6-Week Intervals Are Associated With Higher Recurrent Infection Risk After Two-Stage Exchange

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Background

- No professional society specifies an interstage interval. The 2018 International Consensus Meeting declined to recommend a duration.
- The IDSA 4–6 week recommendation refers to antimicrobial duration, not the surgical interval, though it is often applied as if it did.

- Published series have asked almost exclusively whether waiting longer is harmful. Few contain enough patients reimplanted within 6 weeks to analyze early reimplantation as an exposure.

Aim

- Determine whether interval to second-stage reimplantation is associated with reinfection risk nationally, and whether the association holds in both hips and knees.

Methods

- PearlDiver Mariner all-payer claims database, 2010–2023
- Stage-1 resection code (CPT 27090/27091 hip; 27488 knee) with same-day PJI diagnosis (ICD-9 996.66; ICD-10 T84.51–54).
- Excluded simultaneous bilateral resection (n = 66) and prior amputation (n = 35).
- Interval: <6 weeks, 6–24 weeks (reference), >24 weeks.
- Multivariable binomial logistic regression adjusting for age, sex, Elixhauser index, payer, region, and joint. Hip and knee models prespecified.
- Primary outcome: reinfection requiring surgery, 14–365 days after reimplantation (repeat infection-related procedure with same-day PJI diagnosis)
- Secondary outcomes: ED visit and inpatient encounter at 90 days and 1 year; interstage spacer-related complication; amputation at 1 year

Results

2.08

adjusted odds ratio for recurrent infection

95% CI 1.68–2.56 P < .001

interval < 6 weeks vs 6–24 weeks

Patient Characteristics

33,190 Stage-1 resections for chronic PJI

14,566 Reimplanted within 2 years (43.9%)

13,232 With 1 year of follow-up — analytic sample

1,364 Recurrent infections (10.3%)

4,800 Total hips

8,452 Total knees

6.9 ± 4.4 Mean Elixhauser Comorbidity Index at resection

50.6%

of patients with a year of follow-up after resection had not been reimplanted at 1 yr (P<0.001)

Knee 53.9% · Hip 43.6%

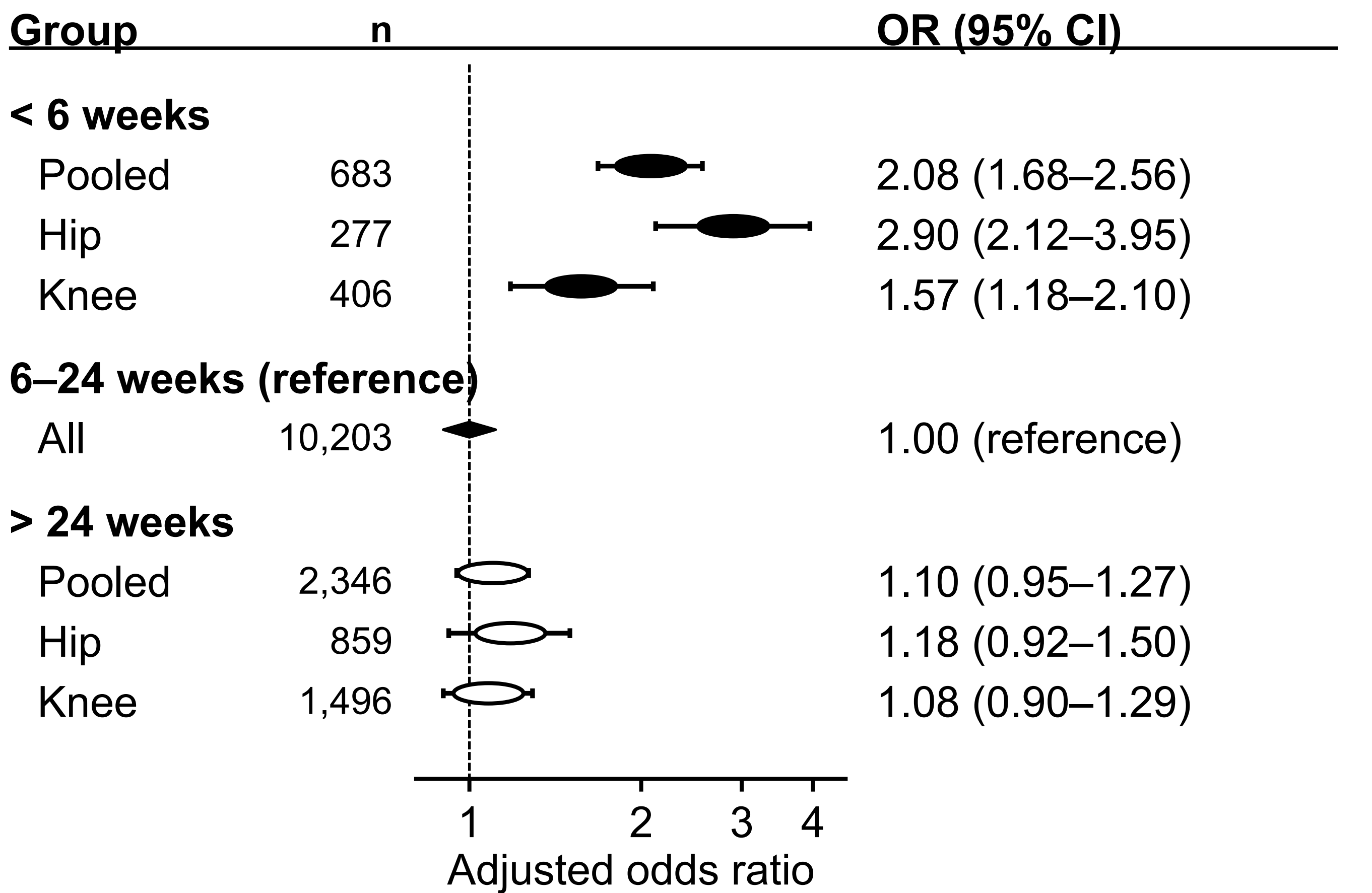
Table 1. Secondary outcomes within 1 year		
Outcome	< 6 wk	> 24 wk
Emergency dept, 90 d	1.39*	1.10
Emergency dept, 1 y	1.22*	1.02
Inpatient, 90 d	1.25*	0.99
Inpatient, 1 y	1.31*	1.03
Spacer complication	1.46*	1.77*
Amputation, 1 y	1.88	1.92*
Abbreviations: wk, weeks; d, days; y, years; dept, department		

Recurrent infection rates were nearly identical

Hip 485 / 4,800 (10.1%) Knee 890 / 8,452 (10.5%)

Adjusted hip vs knee OR 0.94 (0.84–1.06), P = .33

Figure 1. Adjusted odds of reinfection requiring surgery within 1 year, by interval to reimplantation



● interval < 6 weeks ○ interval > 24 weeks.
◆ Reference group 6–24 weeks (n = 10,203; 77.1% of cohort).
Error bars are 95% CI.
Logistic regression adjusted for age, sex, Elixhauser index, joint, insurance and region.

Limitations

Claims data cannot identify organism, host grade, or spacer type.
Interval reflects an unobserved clinical decision.
Follow-up limited to 1 year.

Conclusions

- Reimplantation within 6 weeks was associated with twice the odds of recurrent infection, in both hips and knees.
- Beyond 24 weeks gave no reduction in recurrence, with excess spacer and limb-loss morbidity.
- These data support a lower boundary near 6 weeks and do not support a 3-month threshold.

TAKE HOME POINTS

Short intervals: Raised recurrent infection, post-reimplantation healthcare use, and spacer complications.

Long intervals: Showed no infection penalty, but the highest rates of spacer complications and amputation.

A 6-24 week window carried the lowest combined risk across all endpoints examined.

References

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