

# The effect of a definition change on arthroplasty surgical site infection rates in Western Australia

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## Introduction

Healthcare Infection Surveillance Western Australia (HISWA) is a state-wide surveillance program for monitoring healthcare associated infection data, including surgical site infection (SSI) following hip and knee arthroplasty. <sup>1</sup> All public and private hospitals performing these procedures in Western Australia (WA) submit data to HISWA.

## Background

HISWA uses the definitions outlined in the *CDC/NHSN Patient Safety Component Manual – Chapter 17 Surveillance Definitions for Specific Types of Infections*. <sup>2</sup> In July 2014, HISWA reduced the surveillance period for deep SSI following arthroplasty from 365 to 90 days post procedure in line with changes made to the CDC/NHSN definitions. Retrospective data held by HISWA were not amended to reflect the change.

## AIMS

The aims of this study were to measure the effect of a reduced surveillance period on arthroplasty SSI rates in WA and to identify any significant changes pre and post definition change.

## Method

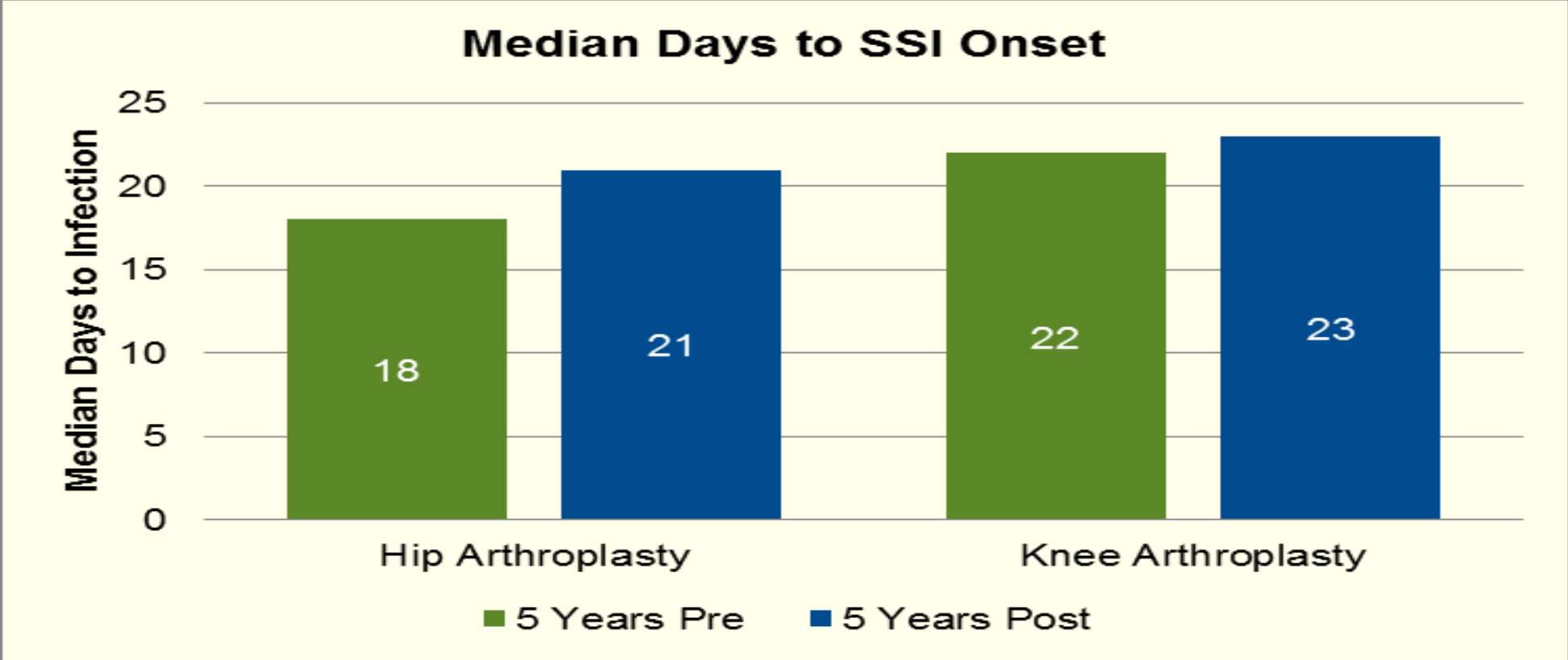
Data was extracted from HISWA Database for the time period between 01/07/2005 and 30/06/2019. Data has been analysed for the 5 year period (01/07/2010 to 30/06/2014) pre definition change and for the 5 year post definition change (01/07/2014 to 30/06/2019). All SSIs following hip and knee arthroplasty were extracted from the HISWA database. Comparison of median time to infection and SSI rates pre and post definition change were analysed. For the purpose of clarity both deep incisional and organ / space SSIs are referred to as deep SSI. All graphs include SSI identified >90 days in the pre definition change period.

## Results

There were 150 primary hip, 39 revision hip, 196 primary knee and 39 revision knee arthroplasties performed in the 5 year pre definition change period. There were 145 primary hip, 48 revision hip, 166 primary knee and 33 revision knee arthroplasties performed in the 5 year post definition change period.

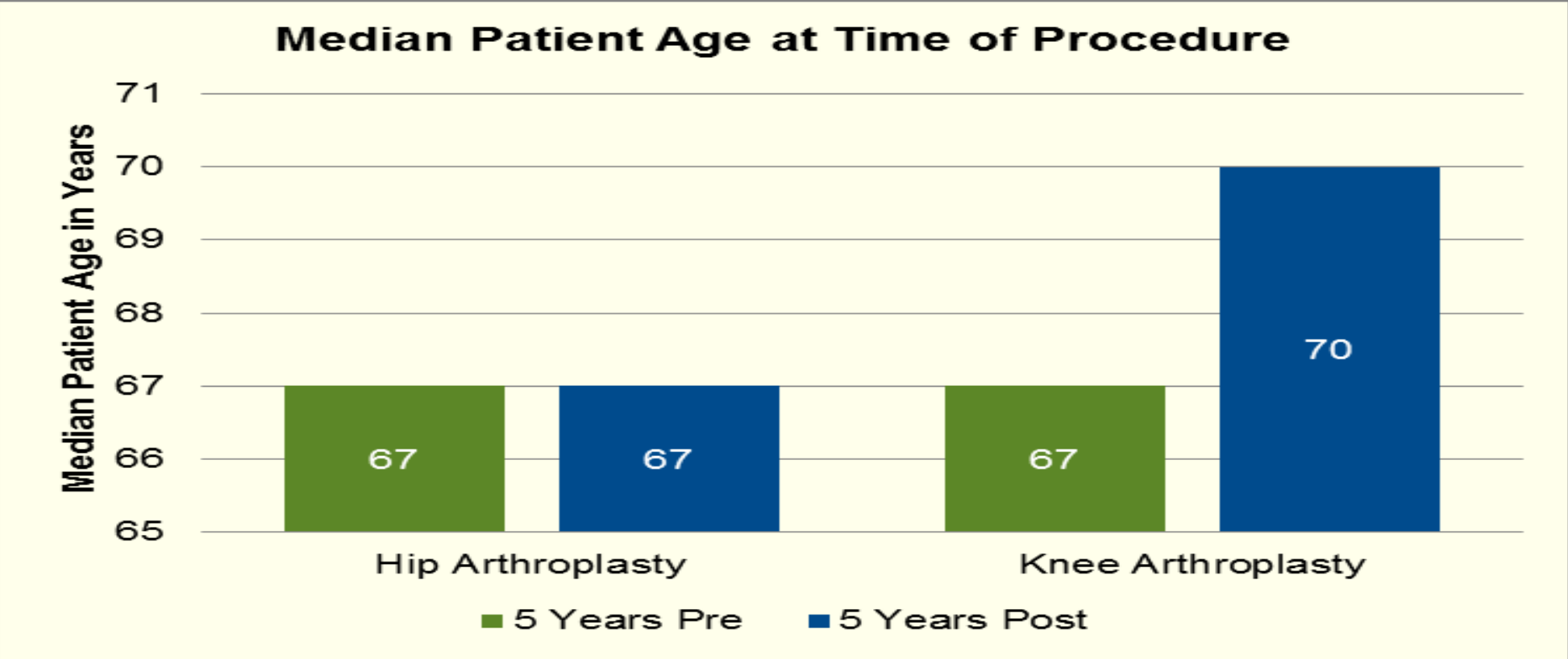
The median days to onset of the SSI (Figure 1) was 18 and 22 days for hip and knee arthroplasty respectively pre definition change. Post definition change the median time to infection was 21 and 23 days for hip and knee arthroplasty respectively.

Figure 1



The median patient age at time of procedure (Figure 2) remained unchanged at 67 years for hip arthroplasty pre and post definition change. The median age for knee arthroplasty increased from 67 years pre definition change to 70 years post definition change.

Figure 2



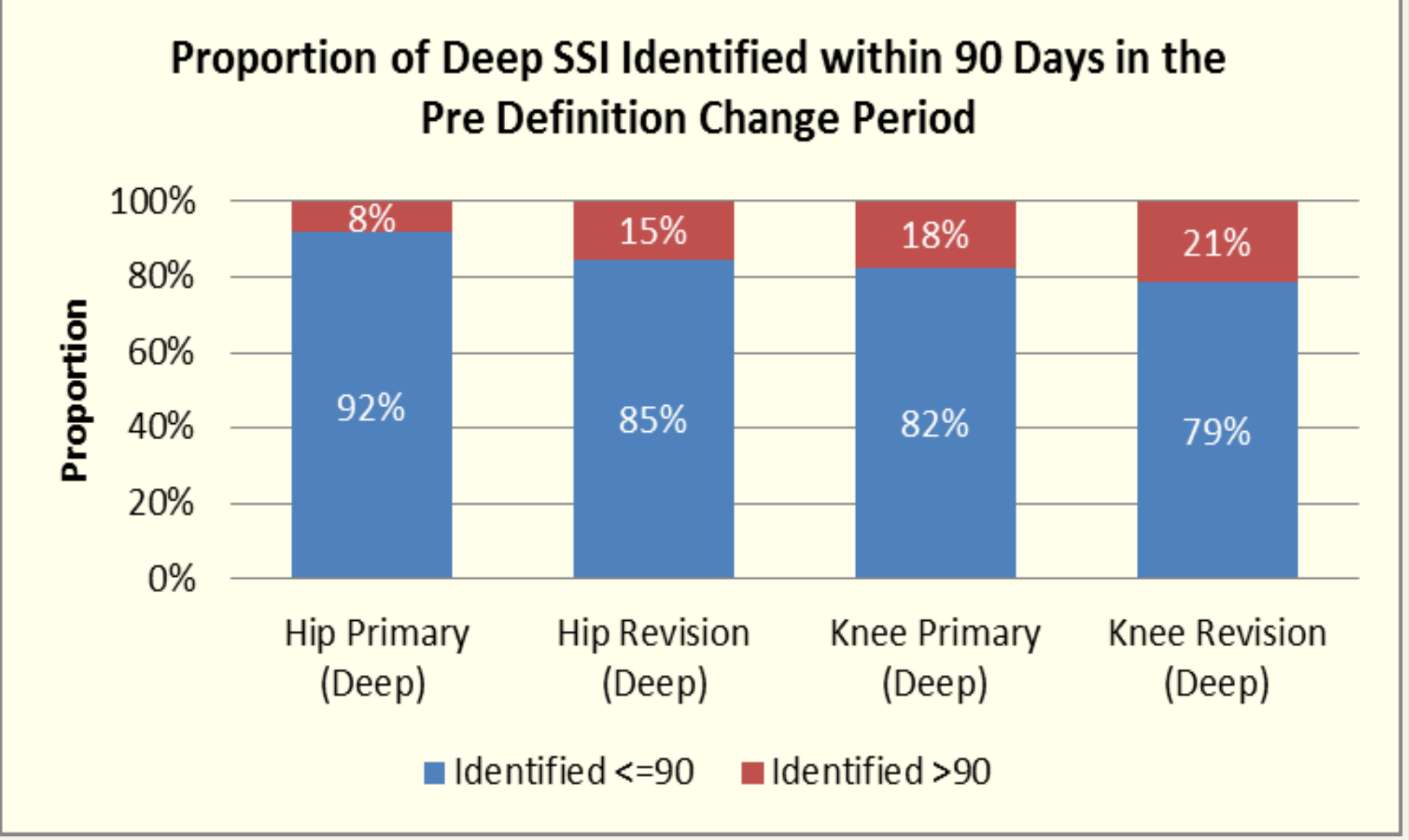
## References

1 Healthcare Associated Infections Unit. HISWA Healthcare Infection Surveillance Western Australia Surveillance Manual: Version 6. Perth; 2014.

2 The National Healthcare Safety Network (NHSN). CDC/NHSN surveillance definitions for specific types of infections. National Healthcare Safety Network (NHSN) Patient Safety Component Manual: Centers for Disease Control and Prevention; 2019.

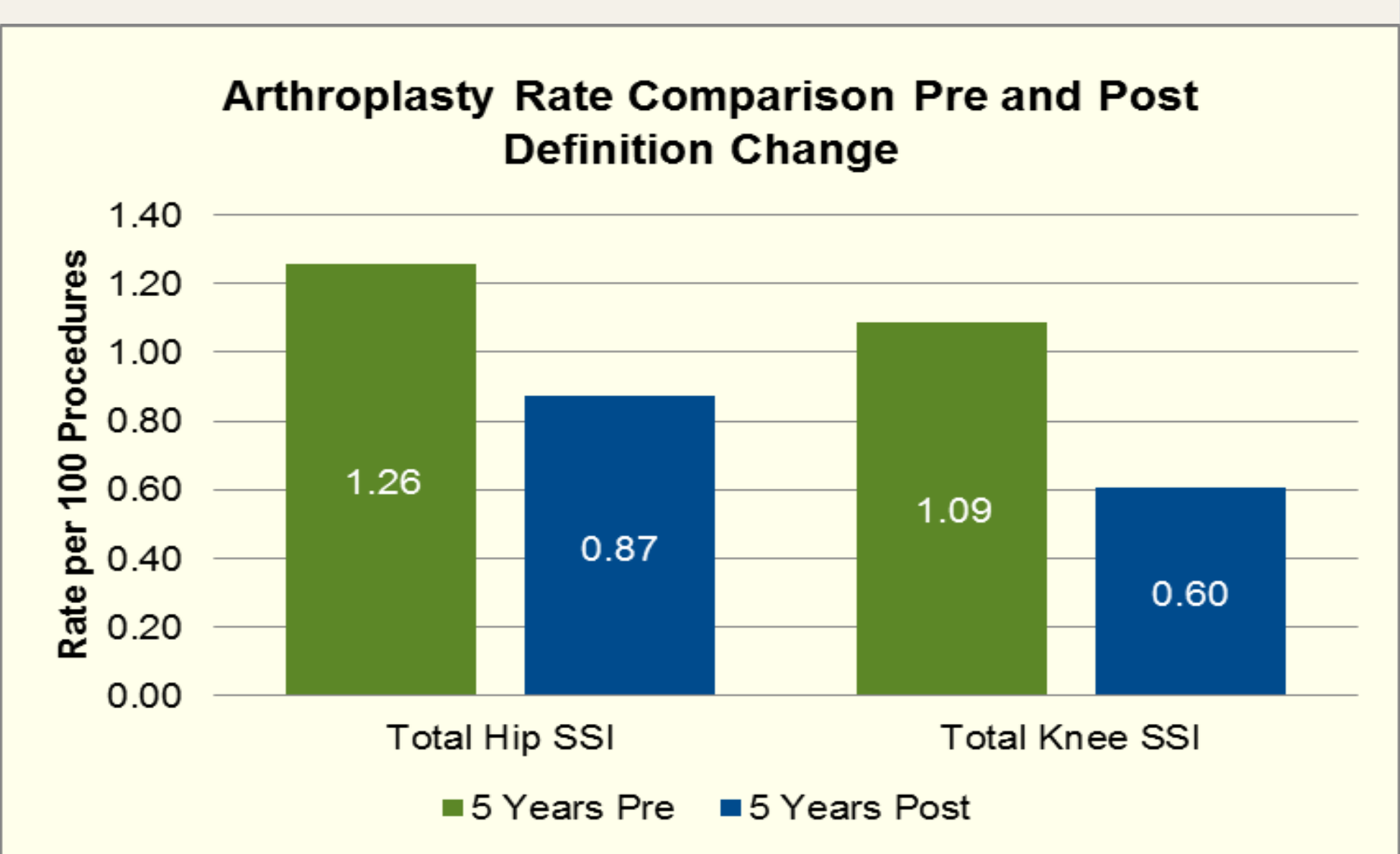
In the 5 year pre-definition change period, the majority of all deep SSIs following hip and knee arthroplasty were identified within 90 days of the procedure (Figure 3). The highest proportion (92%) detected was following primary hip arthroplasty and the lowest (79%) was following revision knee arthroplasty.

Figure 3



Initial data analysis included both superficial and deep SSIs (Figure 4). The SSI rate during the five year pre-definition change period for hip and knee arthroplasty was 1.26 and 1.09 infections per 100 procedures respectively. The SSI rate during the 5 year post-definition change period for hip and knee arthroplasty was 0.87 and 0.60 infections per 100 procedures respectively. This was a statistically significant ( $p < 0.05$ ) reduction in both hip and knee SSI rates.

Figure 4



The SSI rate for hip (Figure 5) and knee (Figure 6) arthroplasty pre definition change was separated into infections identified up to 365 days and infections identified up to 90 days.

Figure 5

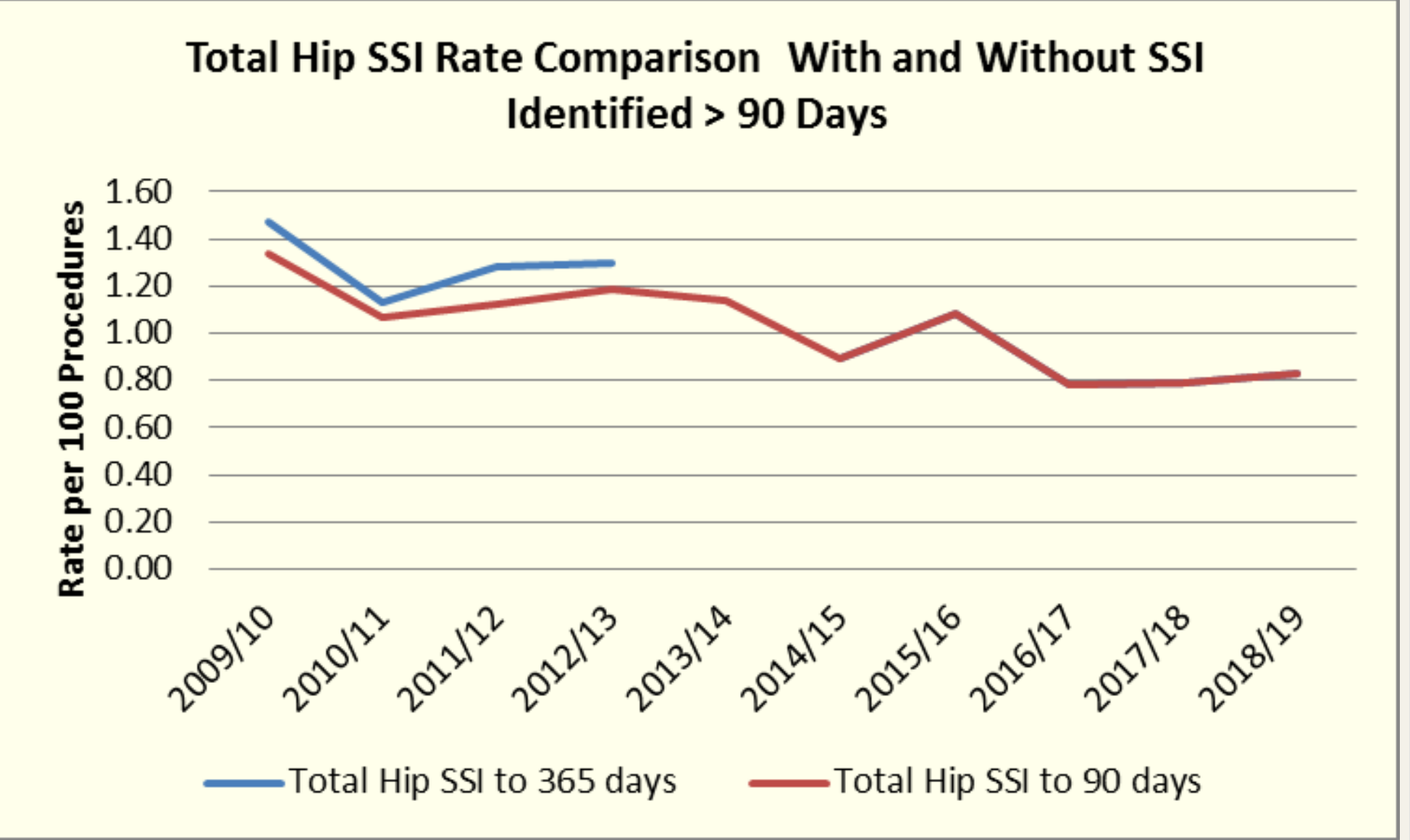
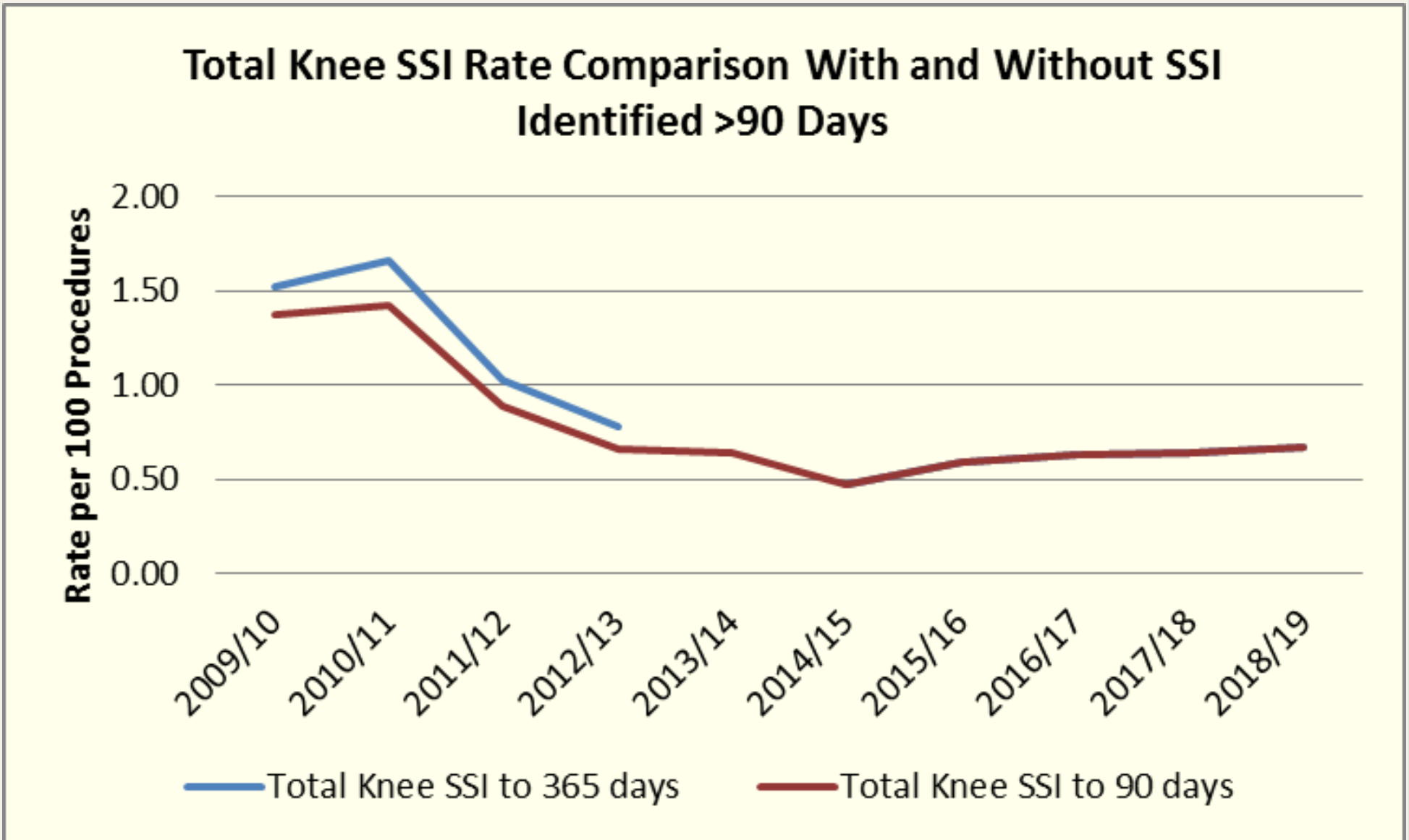


Figure 6



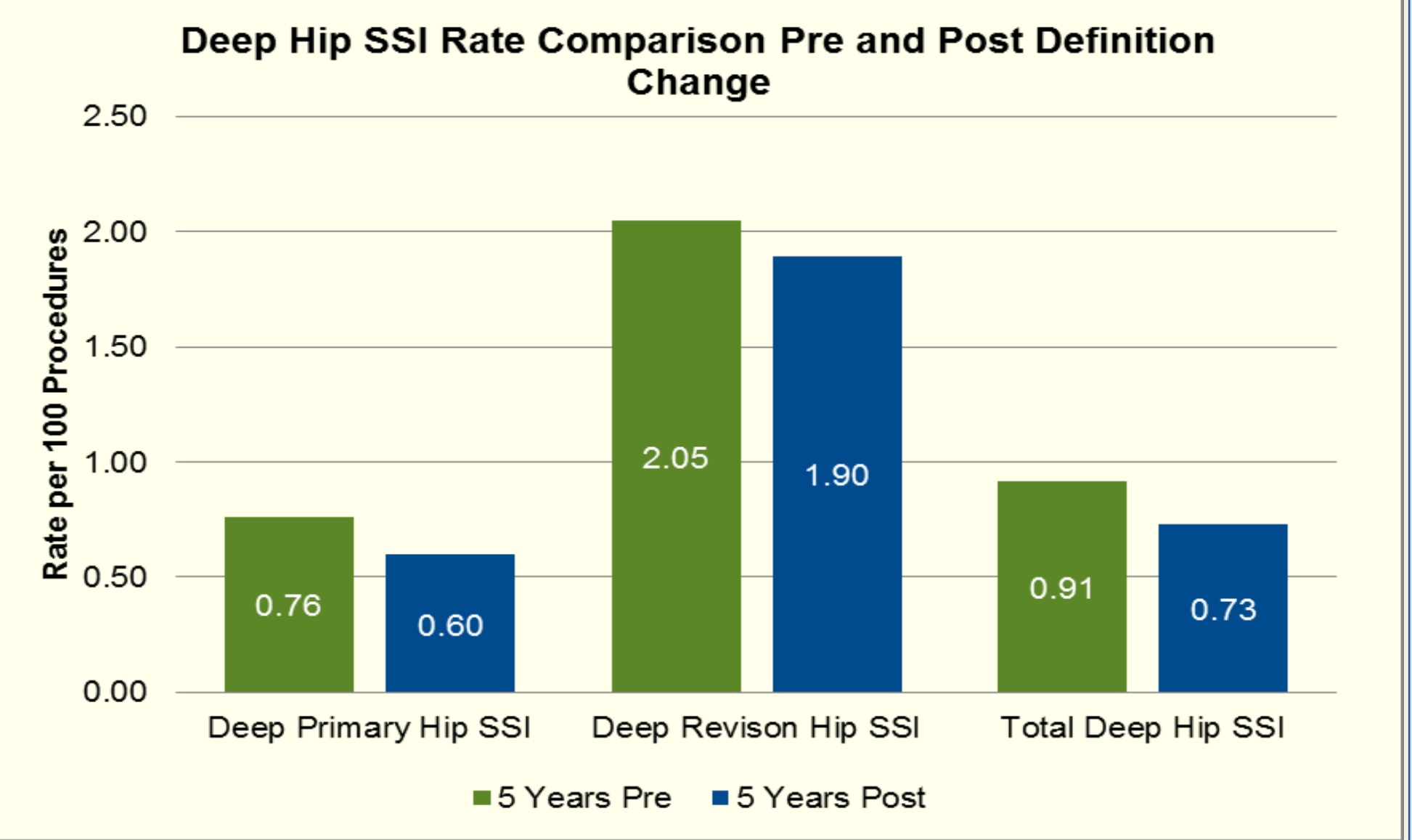
## Data Caveats

Data was extracted from the HISWA Database on 28/06/2019. As HISWA data is subject to ongoing validation, all data is subject to change.

## Comparison of Deep SSI Rate Pre and Post Definition Change

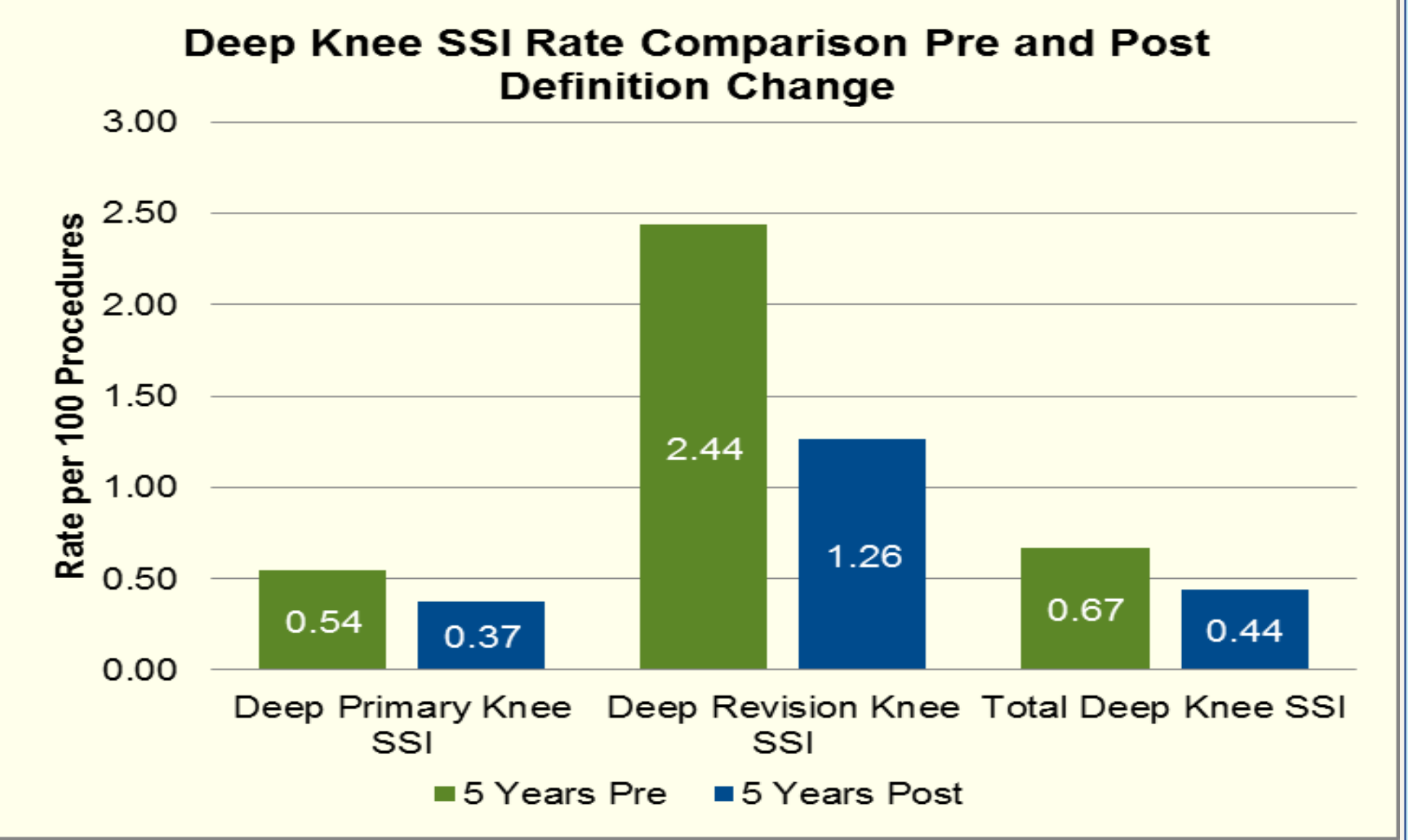
The HISWA definition <sup>1</sup> for SSI specifies the surveillance period for superficial SSI is 30 days, thus the definition change does not impact the superficial SSI rate, therefore only deep incisional and organ / space SSI were analysed further. There was a reduction in the deep SSI rate for primary and revision hip arthroplasty (Figure 7), however, this reduction was not statistically significant.

Figure 7



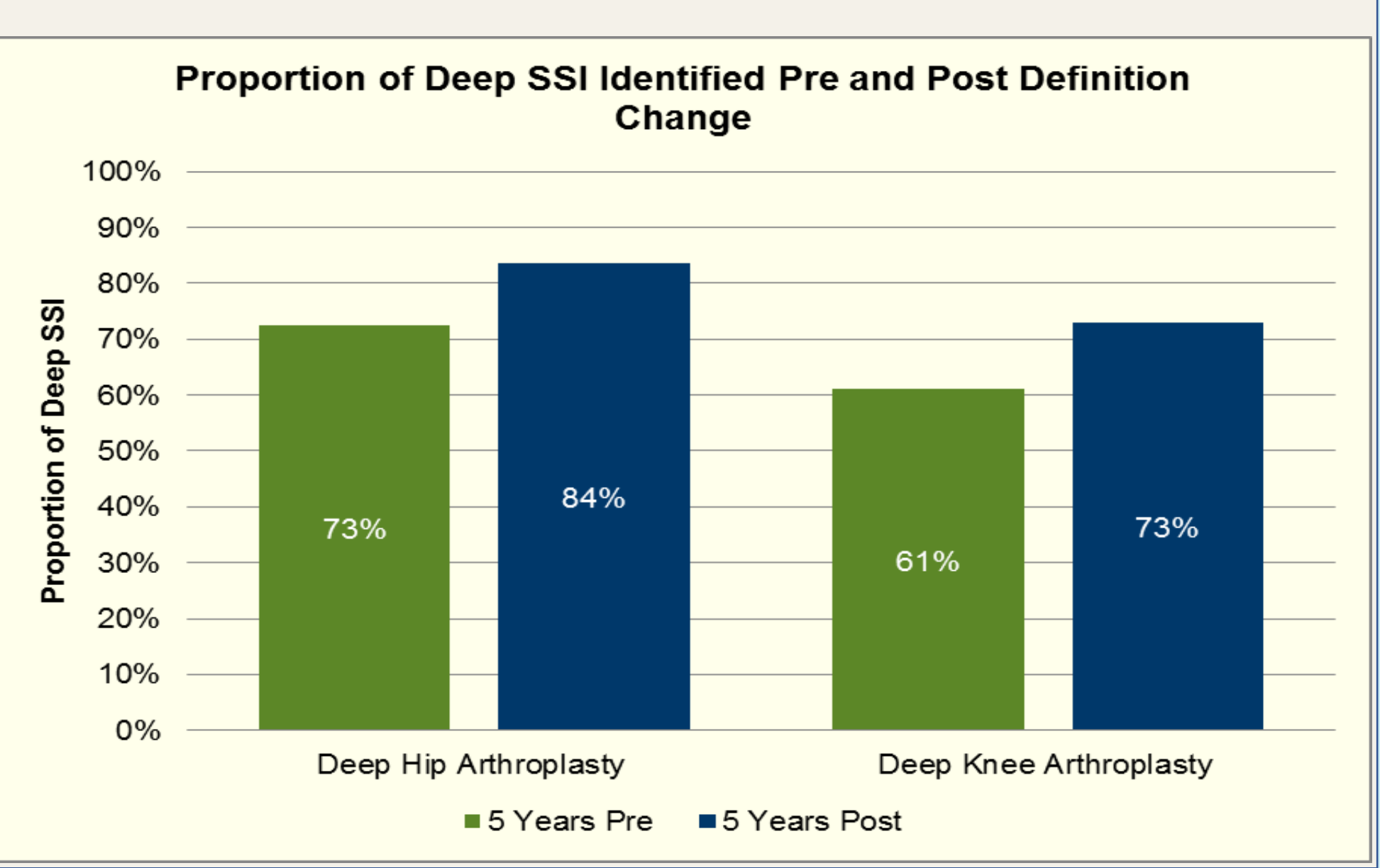
There was a reduction in the deep SSI rate for primary and revision knee arthroplasty (Figure 8) and this reduction was statistically significant ( $p < 0.05$ ) for revision knee arthroplasty and knee arthroplasty overall but not statistically significant for primary knee arthroplasty.

Figure 8



There was an increase in the proportion of SSIs identified as deep post definition change (Figure 9) but this was not statistically significant.

Figure 9



## Conclusion

There was no change to superficial SSI definitions, thus interpretation of longitudinal HISWA superficial SSI rates is not impacted. Deep SSI rates were impacted by the definition change. The definition change had the largest impact on revision knee arthroplasty deep SSI rate. There was a statistically significant reduction in the deep SSI rate for revision knee arthroplasty procedures. Caution needs to be taken when interpreting longitudinal HISWA deep SSI data, especially revision knee arthroplasty.

## Contact Information

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