Te Tāhū Hauora
Health Quality & Safety Commission

Surgical Site Infection Improvement Programme

Champions webinar

28 November 2023

SSII Surgical Site Infection Improvement Programme

Agenda

11.00	Welcome and introduction Opening karakia	Sue Atkins – IPC specialist Jeanette Bell – Senior project manager
11.05	SSI dashboard update	Alexis Wevers – Senior analyst
11.15	National monitor	Michelle Taylor – National Monitor
11.30	Case study	Angie Foster – IPC nurse South Canterbury
11.50	Clinical update	Arthur Morris – SSIIP clinical lead
12.00	Close Closing karakia	Sue Atkins Jeanette Bell

SSI dashboard update

Alexis Wevers

SSI dashboard refresh

Aims:

- more clearly display information
- reduce confusion
- add more useful displays
- make debugging/problem solving/checking easier (this has been very time consuming)

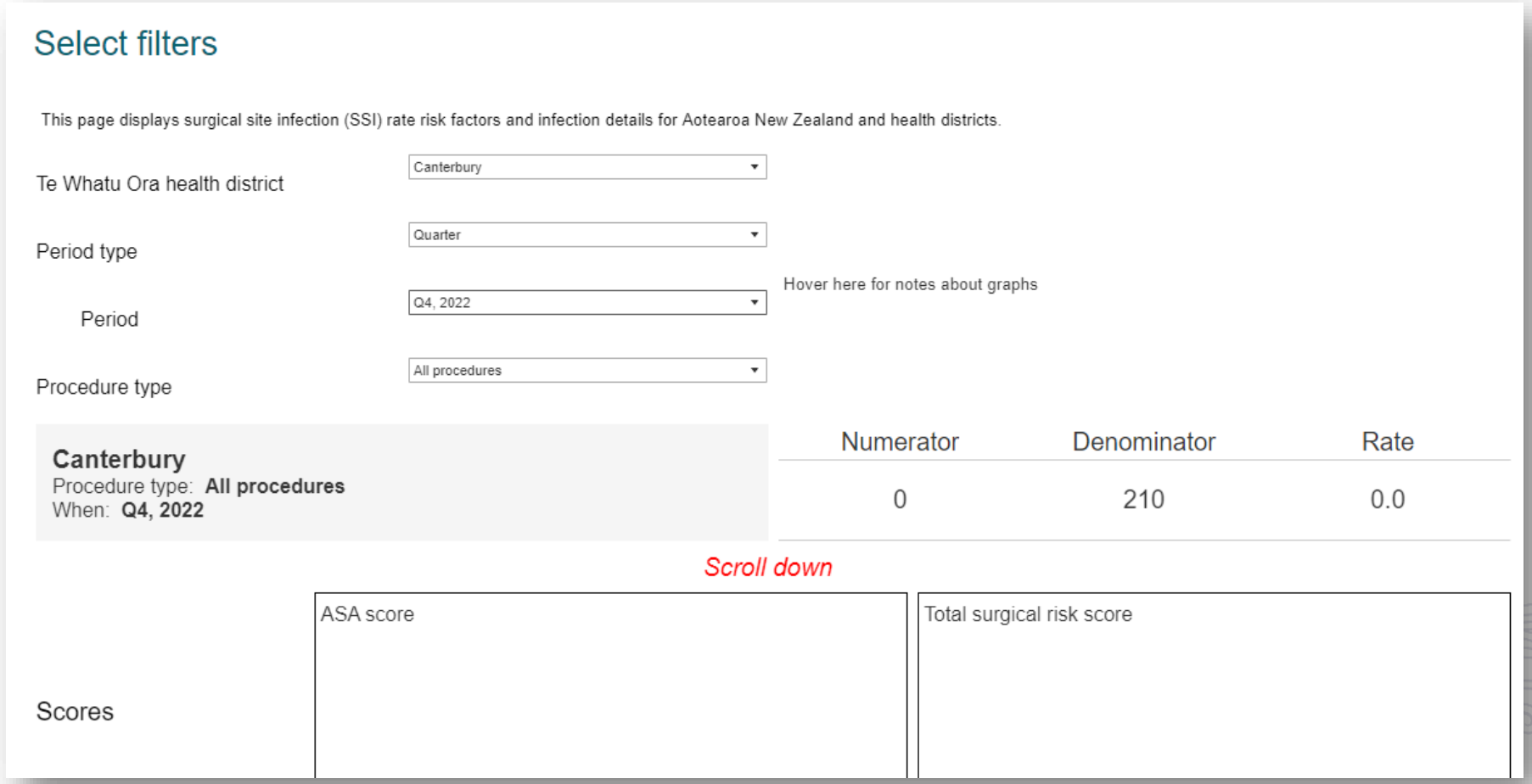
Changes

- Combined tabs
  - ‘risk factor summary’: two tabs have been combined
- Added tabs
  - SSI – light surveillance only
  - SSI process measure analysis

Reorganising risk factor summary tab

Previously	Now
Districts that have switched to light surveillance were on a separate tab from the others	They are on the same tab, but time period selections and graph displays are now limited
Notes pop up to explain different combinations	Notes are fixed and available on hover. Additional information is available on the definitions and resources page
Layout is complicated	Layout is simpler
Displayed results on light surveillance	Light surveillance results has its own tab
Both rates and counts were displayed	Only rates are displayed

New display


Select filters
This page displays surgical site infection (SSI) rate risk factors and infection details for Aotearoa New Zealand and health districts.
Te Whatu Ora health district
Canterbury
Period type
Quarter
Period
Q4, 2022
Hover here for notes about graphs
Procedure type
All procedures
Canterbury
Procedure type: All procedures
When: Q4, 2022
Numerator
Denominator
Rate
0
210
0.0
Scroll down
Scores
ASA score
Total surgical risk score

New – hover text

Results may not be displayed for one of the following reasons:

Light surveillance

- Results may not be displayed because most districts switched to light surveillance from 1 October 2020. The only measures collected in light surveillance are age groups and infection details, so these are the only results displayed.
- Results from before the switch to light surveillance are available for all measures.
- Refer to the table of district by light surveillance model on the SSIIP orthopaedic surgery page to see when districts shifted to light surveillance.

Auckland outsourced procedures

Because data from outsourced orthopaedic procedures between July 2017 and December 2018 at Te Toka Tumai Auckland is incomplete, we have made the following changes to the SSI reporting.

- When 'all procedures' is selected, the graphs showing risk factors (ie, ASA score, risk score, BMI, emergency, age group and gender) do not include data from Te Toka Tumai Auckland.
- For 'type of infection', 'microbiology', 'numerator', 'denominator' and 'rate', the number of total procedures is increased because it includes data for both Te Toka Tumai Auckland and the outsourced procedures.
- When a procedure type is selected (eg, hip (revision)), no data is included for Te Toka Tumai Auckland.
- This affects data for all periods encompassing July 2017 to December 2018 and for all of Aotearoa New Zealand.

Unknown values

- If ASA score, emergency or gender were 'unknown', results are included in aggregated totals but not displayed in the graphs.

Capital & Coast quarter 3, 2020

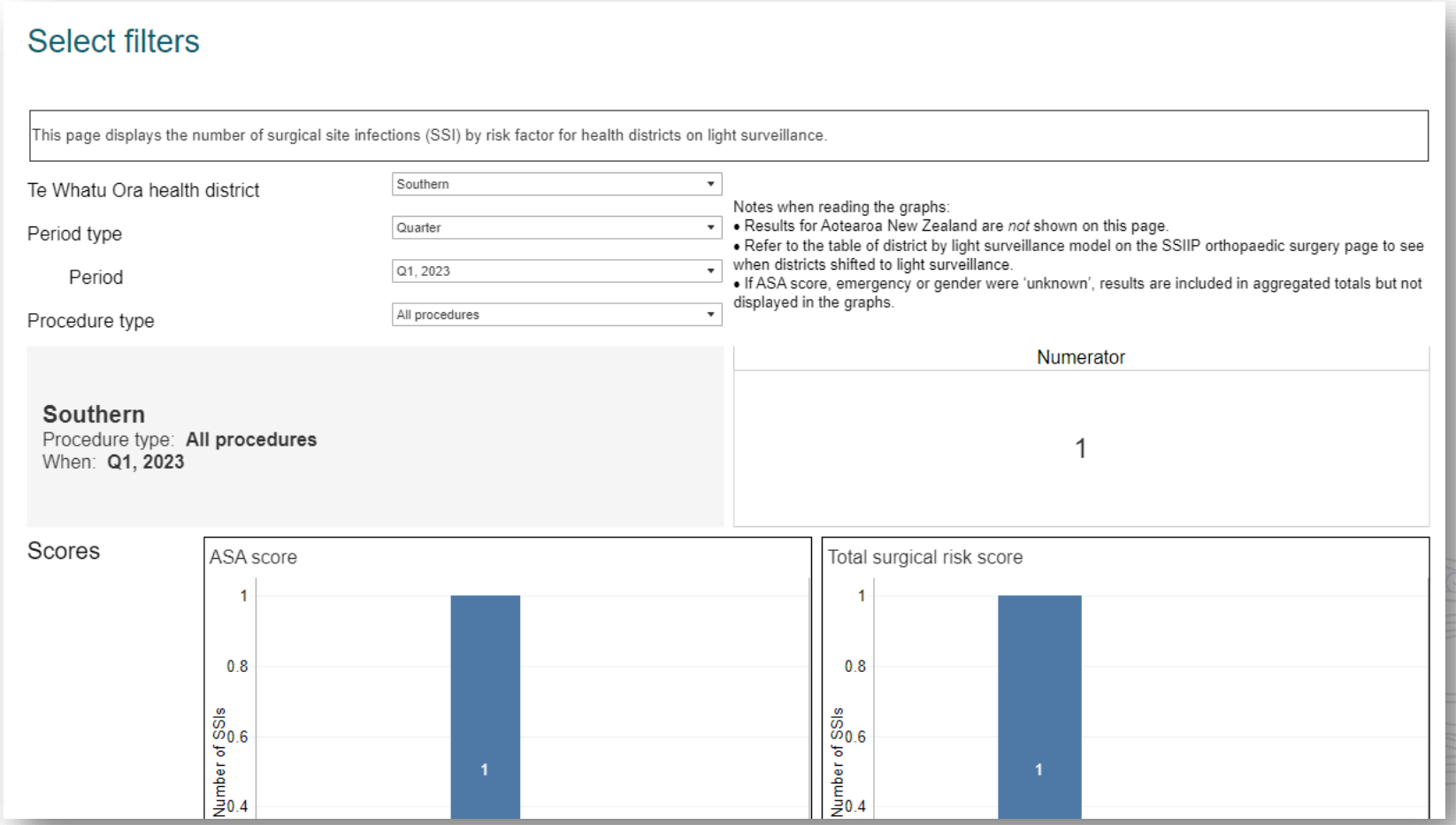
- Results for ASA score, BMI and emergency for all period types do not include procedures from Capital & Coast.

Added tabs

- SSI – light surveillance only
  - Only shows counts of SSI cases for districts on light surveillance
  - This information comes entirely from the risk factor summary pages

- SSI process measure analysis
  - *NEW!*
  - Statistically significant differences in compliance between full and light procedures
  - Districts on light surveillance only
  - Can choose process measure

SSI – light surveillance only



SSI process measure analysis

Select process measure

Timing

Hover over the table to see counts of infections (denominator).
Hover over this box to see the process measure definitions.

Example:
In data available up to September 2022 for *All procedures*:
97% of the infections were compliant with the Timing process measure on *full surveillance* (430/442).
81% of the infections were compliant with the Timing process measure on *light surveillance* (87/107).
This is a statistically significant difference.

Hover here for notes about results below

	Full	Light	Difference
All procedures*	97%	83%	Significantly different
Bay of Plenty	100%	100%	Not significantly different
Canterbury	98%	86%	Not significantly different
Capital & Coast	94%	100%	Not significantly different

National Monitor data collection

Michelle Taylor

Data checking

- Frequent quarterly data issues
  - Bilateral versus unilateral
  - Duplicate forms
  - Full data required for patients with infections
- QCK reports
  - To find data input issues
  - Fix issue in the SSI database
  - Send form to the national monitor again
- DOR/DCR reports
  - Summary of data
  - Current quarter or cumulative

Deleting forms

- Active forms
  - District can delete
  - Can only delete a form if **you** created it
  - Form will go into '*Deleted forms'* folder
- Sent forms
  - District can delete form (but **not data**)
  - Form will go into '*Deleted (sent) forms'* folder
  - Must let programme team know – ICNetSupport@cdhb.health.nz
  - Programme team will delete from National Monitor

Data updates

- Private hospitals will import their own data
  - Southern Cross first
  - Data will be reported with the public district data
- NHI update

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SSI case study

Angie Foster, IPC nurse

Te Whatu Ora, South Canterbury

For information about this case study, contact ssiip@hqsc.govt.nz

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Preventing SSIs in orthopaedic surgery

Arthur Morris

Clinical lead NZ SSIIP

Clinical microbiologist, Auckland City Hospital

Te Tāhū Hauora SSIIP 2013–2021
Analysis of risk factors for orthopaedic SSI

- 85,019 procedures
  - hip/knee arthroplasties, primary and revision
- Matched to national minimum dataset (ethnicity, smoking diabetes, etc)
- Gender
- BMI
- ASA
- Prophylaxis: timing, dose
- Skin preparation: alcohol vs. non-alcohol containing
- Primary, revision
- Multivariable analysis

ASA = American Society of Anaesthesiologists score; BMI = body mass index.

Risk factors for orthopaedic SSI: NZ 2013–2021

Independent risk factors for SSI after arthroplasty

Feature	Subgroup	SSI %	OR	95% CI
Sex	Female	1.0	Ref	
	Male	1.3	1.4	1.2–1.6
Procedure	Primary	1.0	Ref	
	Revision	2.6	2.1	1.6–2.6
Deprivation quintiles	≤2	0.9	Ref	
	3–4	1.1	1.2	NS
	5–6	1.1	1.3	NS
	7–8	1.1	1.3	NS
	9+	1.5	1.6	1.2–2.1

CI = confidence interval; NS = not significant; OR = odds ratio; Ref = reference.

Risk factors for orthopaedic SSI: NZ 2013–2021

Independent risk factors for SSI after arthroplasty

Feature	Subgroup	SSI %	OR	95% CI
BMI	<30	0.9	Ref	
	30 to <35	1.1	1.4	1.2–1.7
	35 to <40	1.4	1.7	1.4–2.0
	≥40	2.4	3.0	2.5–3.7
Skin preparation	Alcohol	1.1	Ref	
	Non-alcohol	2.9	2.6	1.6–4.2
Prophylaxis timing	On time	1.1	Ref	
	Early	2.6	2.3	1.4–3.7
	Late	2.0	1.3	0.8–2.0
Cefazolin dose adequate	No	2.4	Ref	
	Yes	1.1	0.4	0.3–0.5

BMI = body mass index; CI = confidence interval; NS = not significant; OR = odds ratio; Ref = reference.

SSI rates: BMI vs procedure type

	SSI %	
BMI	Primary	Revisions
<30	0.7	2.1
30 to <35	1	3.2
35 to <40	1.3	3.3
40	2.3	5.2

BMI = body mass index.

Anti-staphylococcal bundle
Staphylococcus aureus nasal carriers

- 375 surgical patients
- 111 (30 percent) *S. aureus* nasal carriers
- 10 (2.7 percent) *S. aureus* SSIs
- Seven were nasal carriers
  - Six of these had identical *S. aureus* in nose and SSI
- Approximately six times more likely to develop infection if nasal carrier

Skråmm I, et al. 2014. Surgical site infections in orthopaedic surgery demonstrate clones similar to those in orthopaedic *Staphylococcus aureus* nasal carriers. *The Journal of Bone and Joint Surgery* 96(11): 882-88.

S. aureus nasal carriers

- Multicentre studies
- *S. aureus* nasal colonisation = 1,278
  - 14 developed bacteraemia
  - 12 of those genetically identical (86 percent)

- *S. aureus* bacteraemia
- 180 of 219 had genetically identical nasal isolates (82 percent)

von Eiff C, et al. 2011. Nasal carriage as a source of *Staphylococcus aureus* bacteremia. Study Group. *New England Journal of Medicine* 344(1):11-6.

Other interventions to reduce SSI rate

- High QSM compliance
- SSI rate not reducing further
- Burden of staphylococcal causes of orthopaedic SSIs:
  - *S. aureus* = 31 percent (30 percent deep/organ space SSIs)
  - Coagulase-negative = 14 percent (19 percent deep/organ space SSIs)
- Meta-analysis for ‘anti-staph bundle’

QSM = quality & safety marker.

Anti-staphylococcal bundle

REVIEW ARTICLE

ANZJSurg.com

Systematic review of a patient care bundle in reducing staphylococcal infections in cardiac and orthopaedic surgery

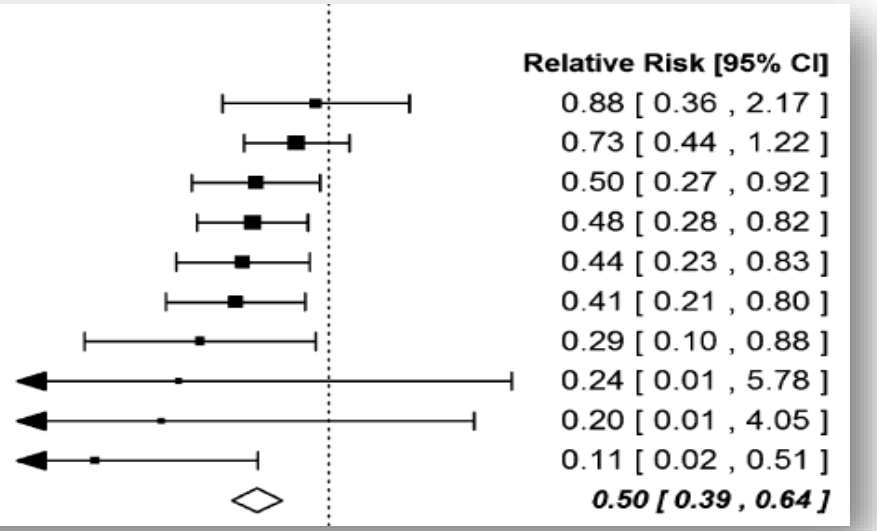
Ning Ma,* Alun Cameron,* David Tivey,* Nikki Grae,† Sally Roberts‡ and Arthur Morris‡

*Royal Australasian College of Surgeons, Adelaide, South Australia, Australia
†New Zealand Health Quality & Safety Commission, Wellington, New Zealand and
‡Auckland District Health Board, Auckland, New Zealand

Ning M, et al. 2017. Systematic review of a patient care bundle in reducing staphylococcal infections in cardiac and orthopaedic surgery. *Australian and New Zealand Journal of Surgery* 87:239-46.

S. aureus SSIs: observational studies

Author(s) and Year (N = 20)	Bundle		Comparator		
Orthopaedic Surgery (n = 10)	**SSI**	**Total**	**SSI**	**Total**	**Relative Risk [95% CI]**
Hadley et al. 2010	21	1644	6	414	0.88 [0.36 , 2.17]
Baratz et al. 2015	27	3434	33	3080	0.73 [0.44 , 1.22]
Gernaat-van der Sluis et al. 1998	14	1044	34	1260	0.50 [0.27 , 0.92]
Schweizer et al. 2015	17	11059	66	20642	0.48 [0.28 , 0.82]
Rao et al. 2011	17	1440	20	741	0.44 [0.23 , 0.83]
Kim et al. 2010	13	7019	24	5293	0.41 [0.21 , 0.80]
Bebko et al. 2015	4	365	13	344	0.29 [0.10 , 0.88]
Sankar et al. 2005	0	231	1	164	0.24 [0.01 , 5.78]
Price et al. 2008	0	43	2	43	0.20 [0.01 , 4.05]
Wilcox et al. 2003	2	1135	7	420	0.11 [0.02 , 0.51]
RE Model for Subgroup					***0.50 [0.39 , 0.64]***



Ning M, et al. 2017. Systematic review of a patient care bundle in reducing staphylococcal infections in cardiac and orthopaedic surgery. *Australian and New Zealand Journal of Surgery* 87:239-46.

Meta-analysis of the efficacy of preoperative screening and decolonization for *S. aureus* in total joint arthroplasty

- 2008–September 2020
- 12 studies: eight retrospective and four prospective cohorts
- Range of 106–11,133 participants per study
- Seven had >1,000 in the treatment group
- Nine studies were from the USA
- Overall study quality: high
- All used nasal mupirocin, 11 used chlorhexidine
- Six added vancomycin for MRSA

Lin L, et al. 2021. Review article: efficacy of preoperative screening and decolonization for staphylococcus aureus in total joint arthroplasty: a meta-analysis. *Asian Journal of Surgery* 22:807-18.
MRSA = methicillin-resistant *S. aureus.*

Meta-analysis of the efficacy of preoperative screening and decolonization for *S. aureus* in total joint arthroplasty

Questions

- Did nasal colonisation mean higher SSI?
- Did decolonisation reduce carriage?
- Does screening and decolonisation reduce SSI?
- Is universal decolonisation analogous to screening-based?

Lin L, et al. 2021. Review article: efficacy of preoperative screening and decolonization for staphylococcus aureus in total joint arthroplasty: a meta-analysis. *Asian Journal of Surgery* 22:807-18.

Meta-analysis of the efficacy of preoperative screening and decolonization for *S. aureus* in total joint arthroplasty

Did nasal colonisation mean higher SSI?

- Total SSI higher with colonisation: RR 2.2 (95% CI 1.3–3.7)
- *S. aureus* SSI higher with colonisation: RR 4.0 (95% CI 1.1–15.4)

Did treatment reduce colonisation?

- RR 0.23 (95% CI 0.07–0.76)

Lin L, et al. 2021. Review article: efficacy of preoperative screening and decolonization for staphylococcus aureus in total joint arthroplasty: a meta-analysis. *Asian Journal of Surgery* 22:807-18.
CI = confidence interval; RR = risk ratio.

Meta-analysis of the efficacy of preoperative screening and decolonization for *S. aureus* in total joint arthroplasty

Does screening and decolonisation reduce SSI?

- Total SSI lower with treatment: RR 0.52 (95% CI 0.4–0.7)
- *S. aureus* SSI rate lower: RR 0.48 (95% CI 0.32–0.72)
- MRSA rate lower: RR 0.45 (95% CI 0.2–0.96)

Lin L, et al. 2021. Review article: efficacy of preoperative screening and decolonization for staphylococcus aureus in total joint arthroplasty: a meta-analysis. *Asian Journal of Surgery* 22:807-18.
CI = confidence interval; MRSA = methicillin-resistant *S. aureus*; RR = risk ratio.

Meta-analysis of the efficacy of preoperative screening and decolonization for *S. aureus* in total joint arthroplasty

Is universal decolonisation analogous to screening-based?

- Only two studies analysed
- No differences for:
  - total SSI
  - *S. aureus* SSI
  - MRSA SSI
- Screening issues:
  - no single screen is 100 percent sensitive
  - who orders, when, results sent to, who actions?
  - patient education, supply of agents

Lin L, et al. 2021. Review article: efficacy of preoperative screening and decolonization for staphylococcus aureus in total joint arthroplasty: a meta-analysis. *Asian Journal of Surgery* 22:807-18.
MRSA = methicillin-resistant *S. aureus.*

Upcoming dates

December 2023	
15 December	Quarterly QSM, SSIIP dashboards and VLAD reports published
31 December	End of quarter and close of day 90 for Q3, 2023
January 2024	
9 January	Quarterly SSIIP investigation summary form due for investigations completed October–December 2023
31 January	Close of day 30 follow-up for Q3, 2023
February 2024	
TBA	Quarterly SSIIP investigation meeting

VLAD = variable life adjustment display.

Thank you for your contribution to the SSI Improvement Programme this year