Using NAUSP/EMM data to monitor surgical antimicrobial prescribing

Determining quality improvement targets for surgical prophylaxis

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ACT Government | Canberra Health Services

Surgical Antimicrobial Prophylaxis Prescribing

Australian Context

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SAP: Qualitative Prescribing

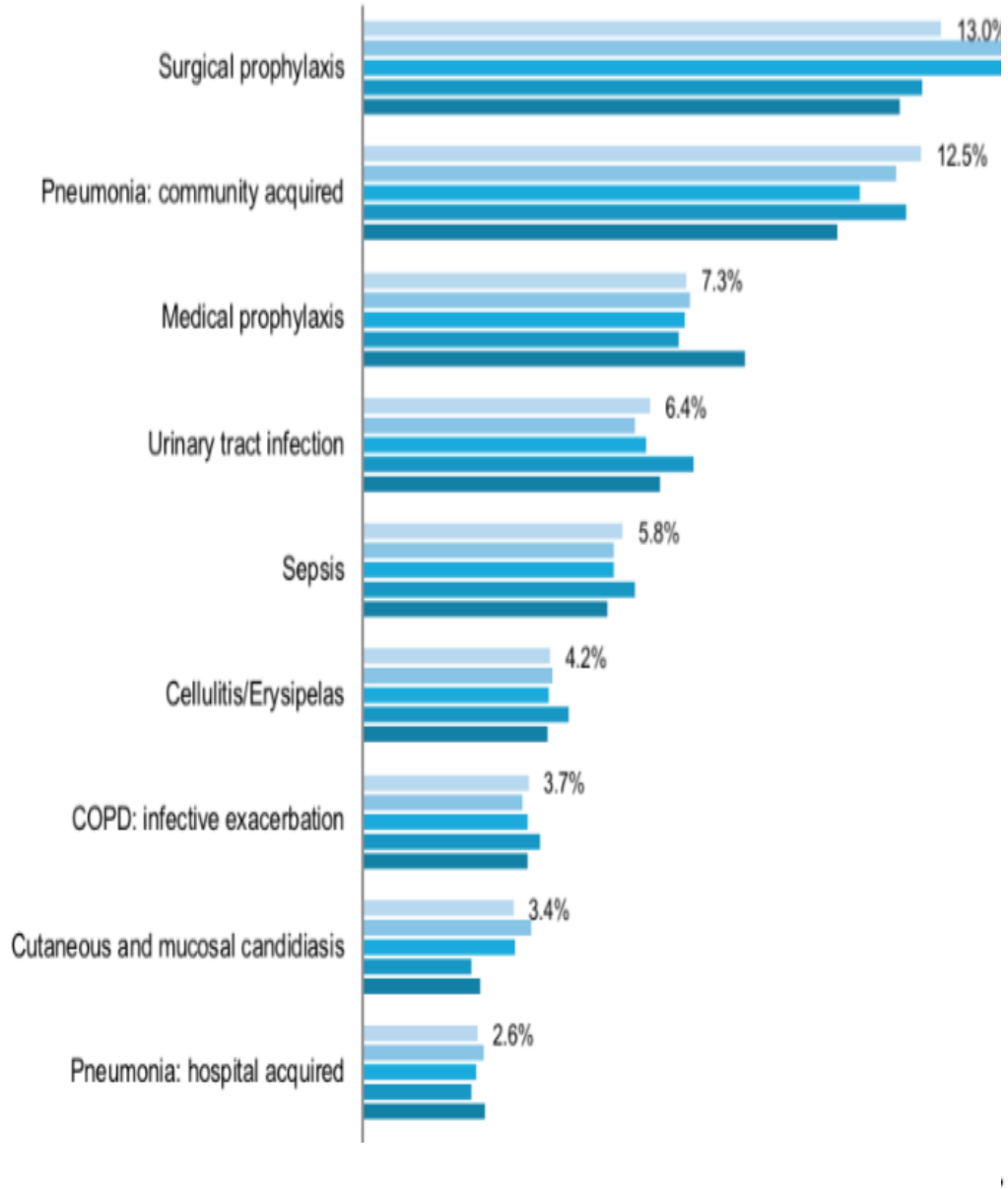
NAPS

- inpatient prescribing, procedure last 24 hours assessed
- extended prophylaxis – peri-operative not assessed

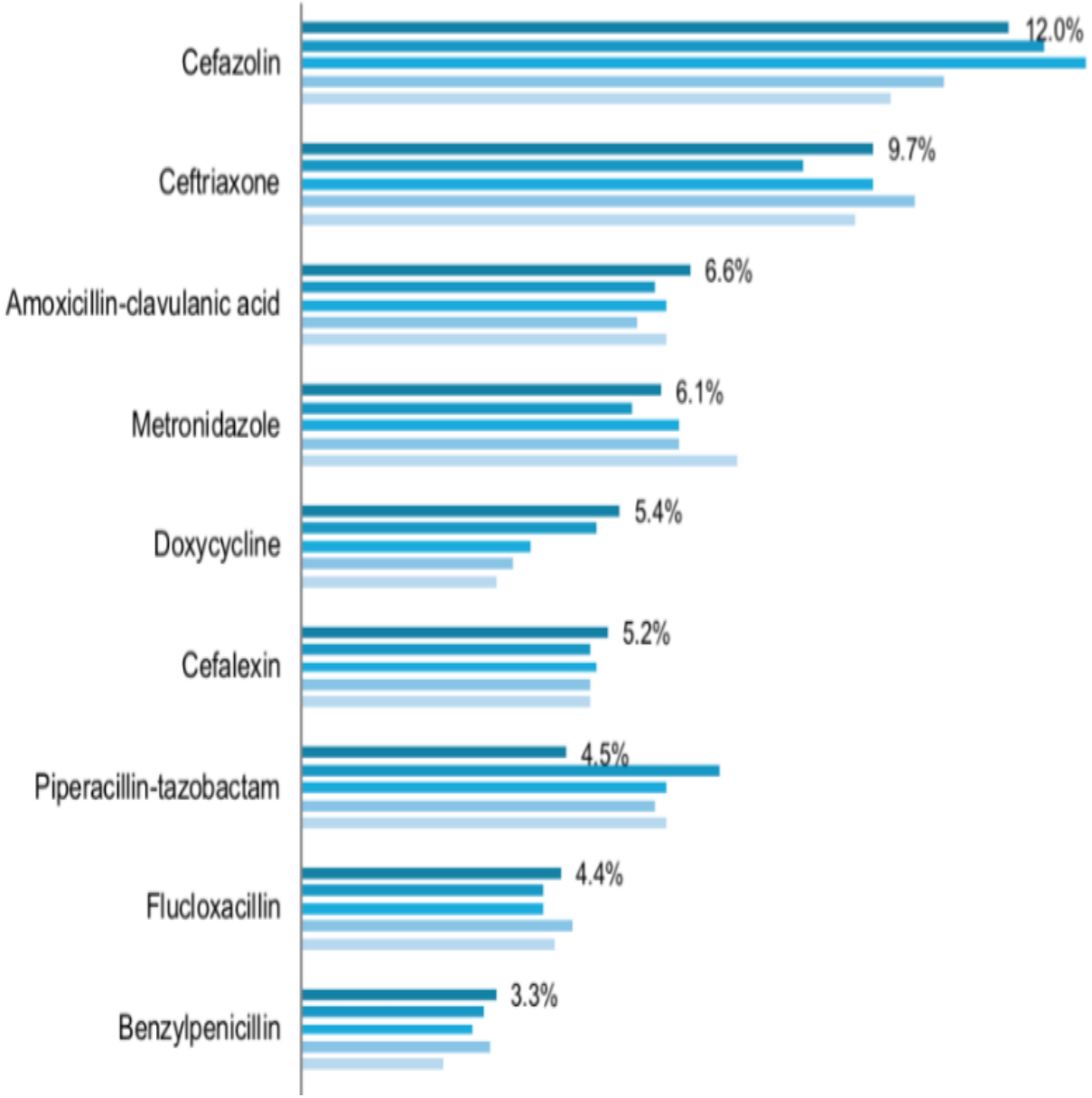
SNAPS

- Min 30 episodes/one week
- Patient “antibiotic prescription” journey

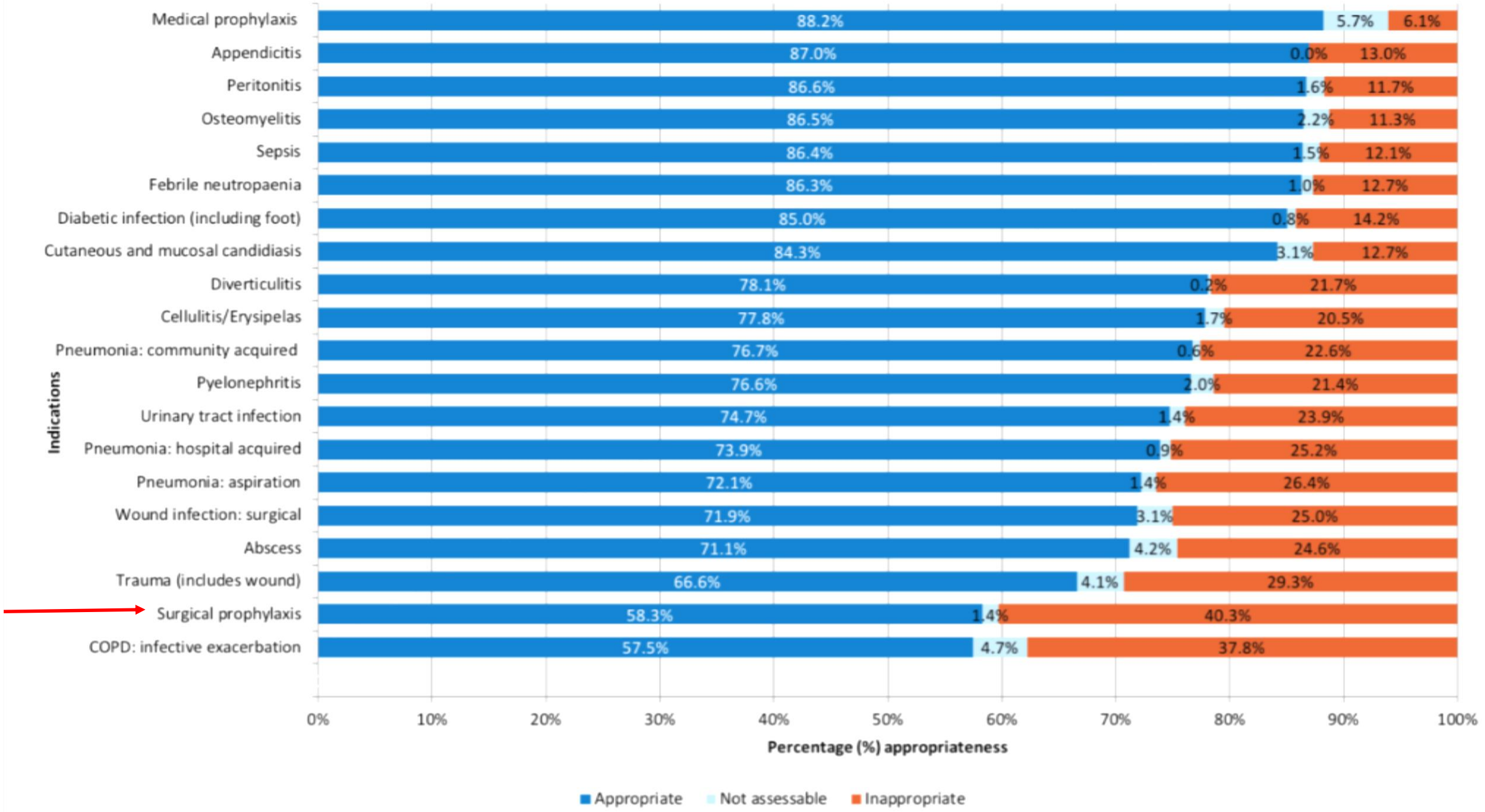
State and territory specific audits – 5x5, surgical specific audits



Common indications in Hospital NAPS, 2013-2017



Commonly prescribed antimicrobials in Hospital NAPS, 2013-2017


Medical prophylaxis 88.2% 5.7% 6.1%
Appendicitis 87.0% 0.0% 13.0%
Peritonitis 86.6% 1.6% 11.7%
Osteomyelitis 86.5% 2.2% 11.3%
Sepsis 86.4% 1.5% 12.1%
Febrile neutropaenia 86.3% 1.0% 12.7%
Diabetic infection (including foot) 85.0% 0.8% 14.2%
Cutaneous and mucosal candidiasis 84.3% 3.1% 12.7%
Diverticulitis 78.1% 0.2% 21.7%
Cellulitis/Erysipelas 77.8% 1.7% 20.5%
Pneumonia: community acquired 76.7% 0.6% 22.6%
Pyelonephritis 76.6% 2.0% 21.4%
Urinary tract infection 74.7% 1.4% 23.9%
Pneumonia: hospital acquired 73.9% 0.9% 25.2%
Pneumonia: aspiration 72.1% 1.4% 26.4%
Wound infection: surgical 71.9% 3.1% 25.0%
Abscess 71.1% 4.2% 24.6%
Trauma (includes wound) 66.6% 4.1% 29.3%
Surgical prophylaxis 58.3% 1.4% 40.3%
COPD: infective exacerbation 57.5% 4.7% 37.8%
Indications
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Percentage (%) appropriateness
Appropriate
Not assessable
Inappropriate

SAP Australia: NAPS

Table 7 Hospital NAPS key indicators, 2013-2017

Key Indicator	Percentage of total prescriptions (%)				
	2013	2014	2015	2016	2017
Indication documented in medical notes (best practice >95%)	70.9	74.0	72.5	75.6	77.7
Review or stop date documented (best practice >95%)	na	na	35.5	38.1	40.5
Surgical prophylaxis given for >24 hours (best practice <5%)*	41.8	35.9	27.4	31.1	30.5
Compliant with *Therapeutic Guidelines* or local guidelines†	72.2	73.7	70.6	65.4	67.3
Appropriate (optimal and adequate)§	75.6	75.9	77.0	76.1	76.5

SAP Australia: SNAPS

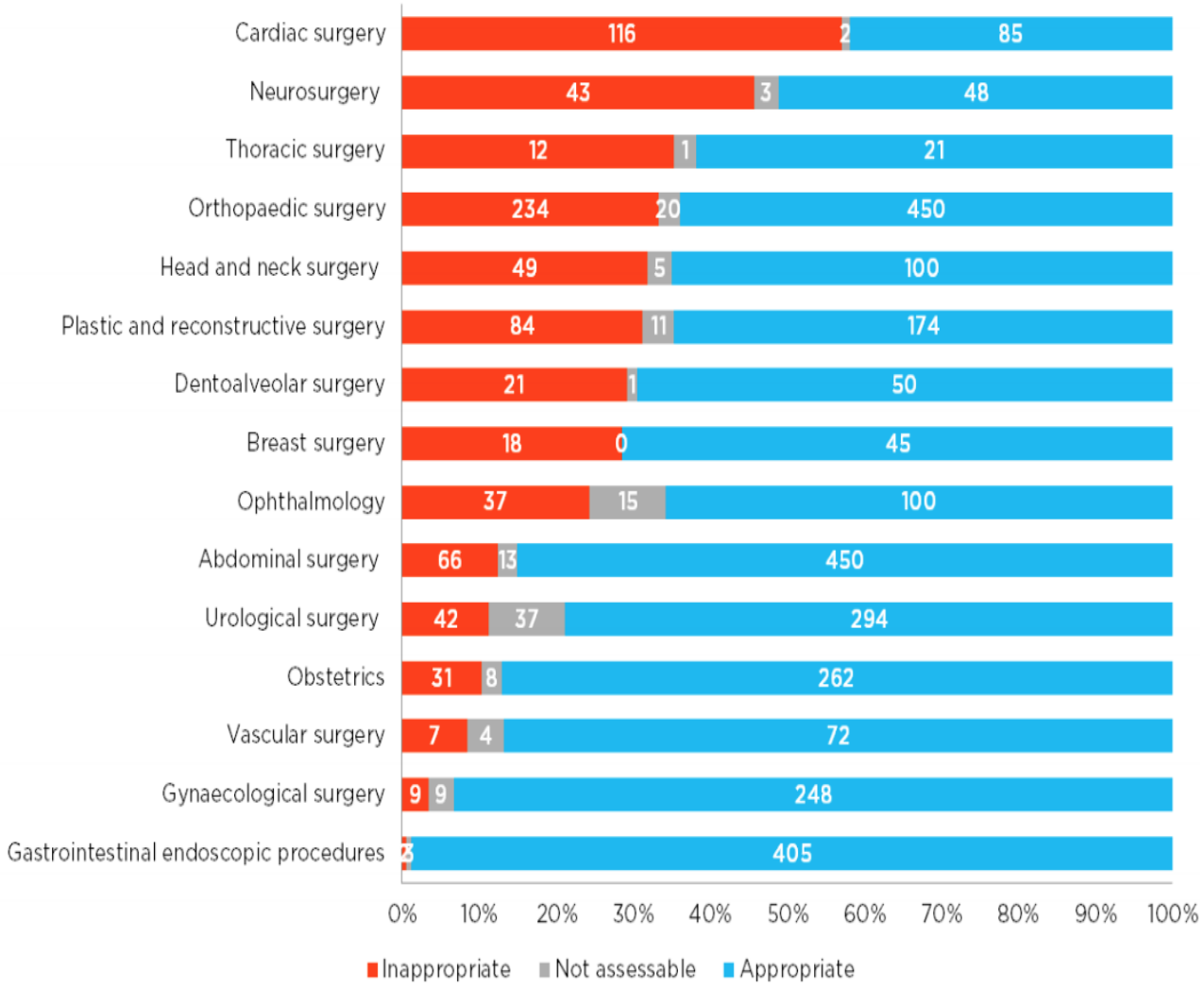
Procedural prescribing

- 1 in 2 intra-operative prescriptions inappropriate
  - Incorrect timing (47%)

Post-procedural prescribing

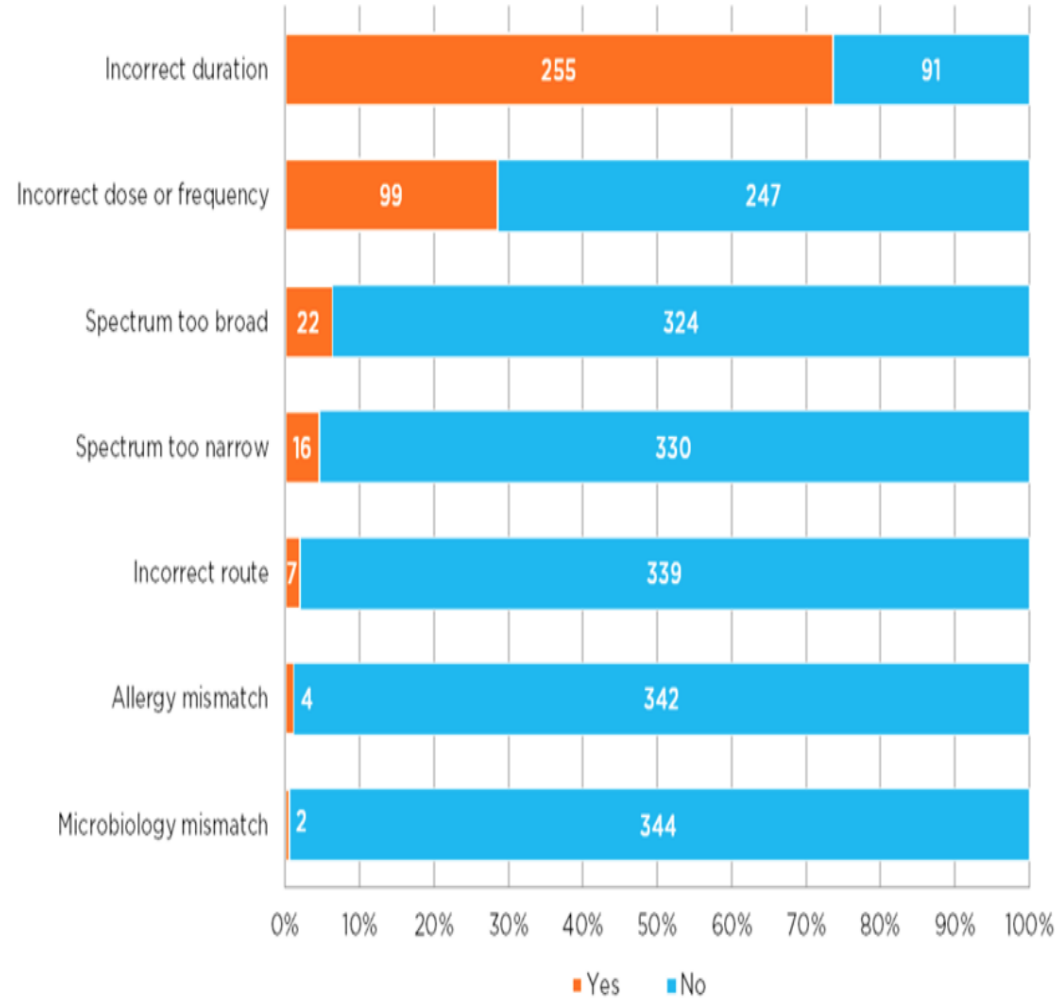
- 57% cefazolin
- 2/5 post-procedural antibiotics are not required

Number of post-procedural antimicrobial prescriptions by percentage appropriateness for each surgical procedure group, SNAPS contributor hospitals, 2016



n = 4,568 including each prescription course, and when no antimicrobial was prescribed

Figure 18 Reasons for inappropriateness, percentage and number of post-procedural antimicrobial prescriptions for prophylaxis#



(n = 346) where post-procedural antimicrobial prophylaxis was required

Surgical Antimicrobial Prophylaxis Prescribing

Canberra Context

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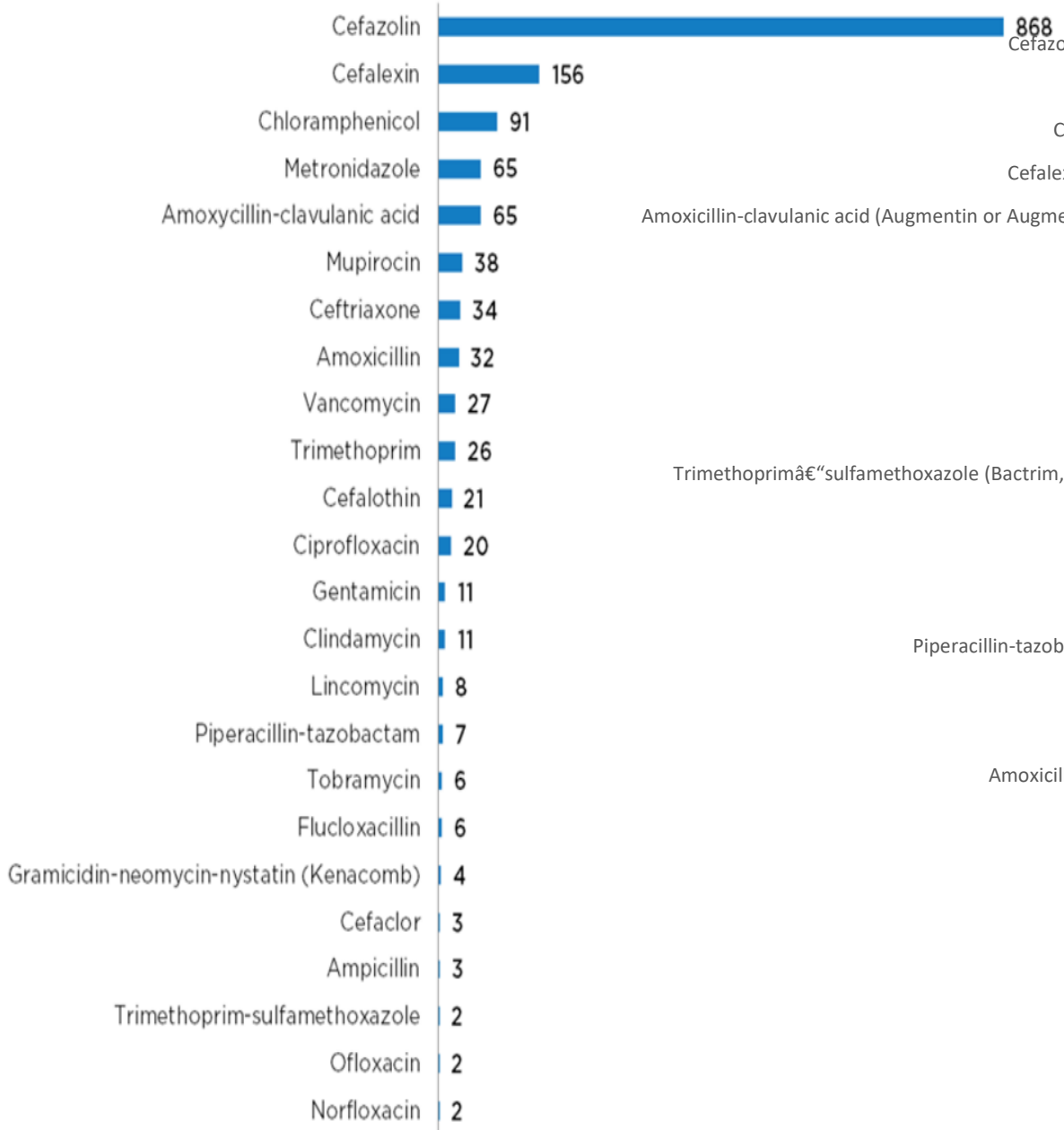
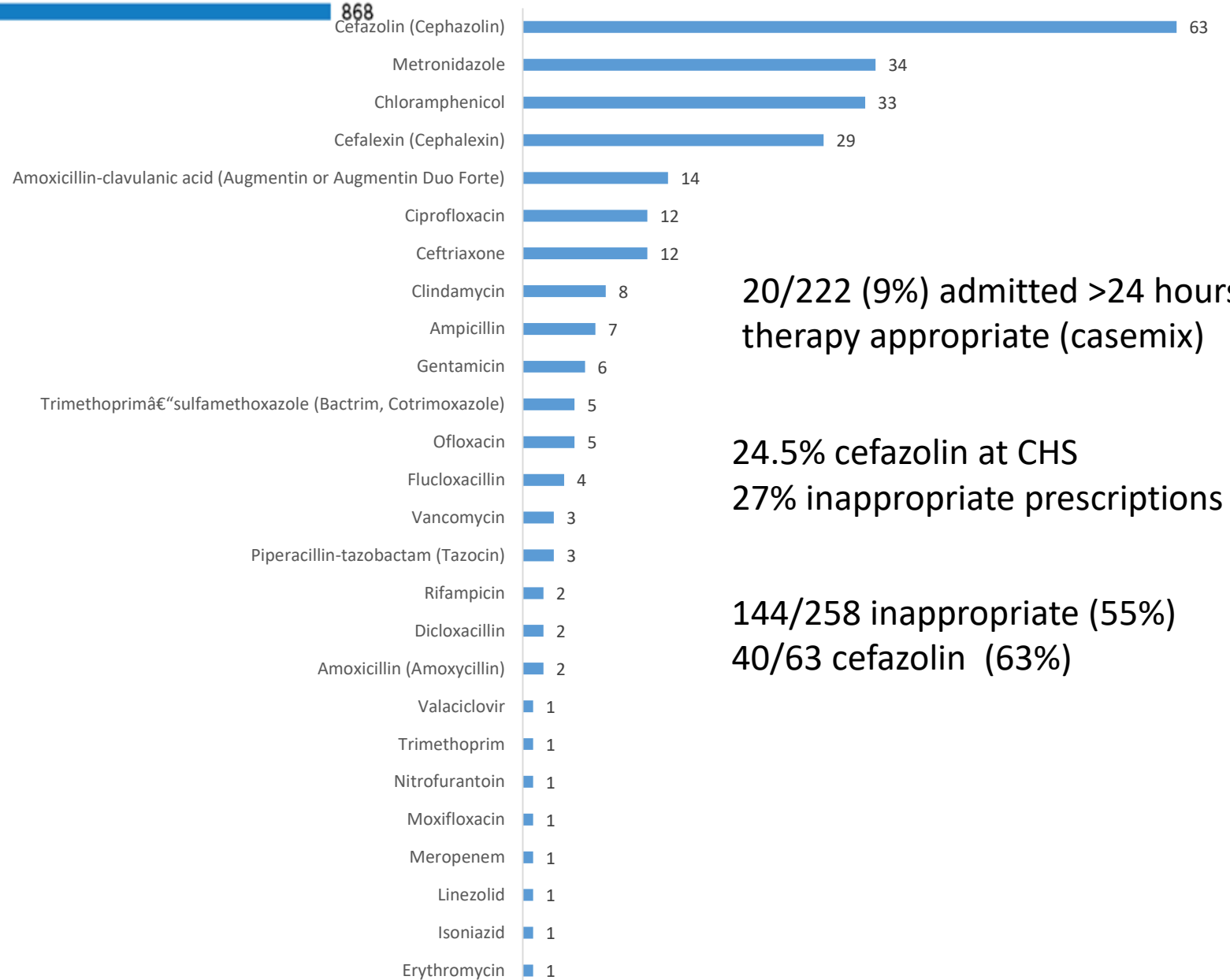
Number of antimicrobials prescribed for post-procedural prophylaxis, SNAPS contributor hospitals, 2016 #



CHS Post-operative prescribing



20/222 (9%) admitted >24 hours of therapy appropriate (casemix)

24.5% cefazolin at CHS
27% inappropriate prescriptions

144/258 inappropriate (55%)
40/63 cefazolin (63%)

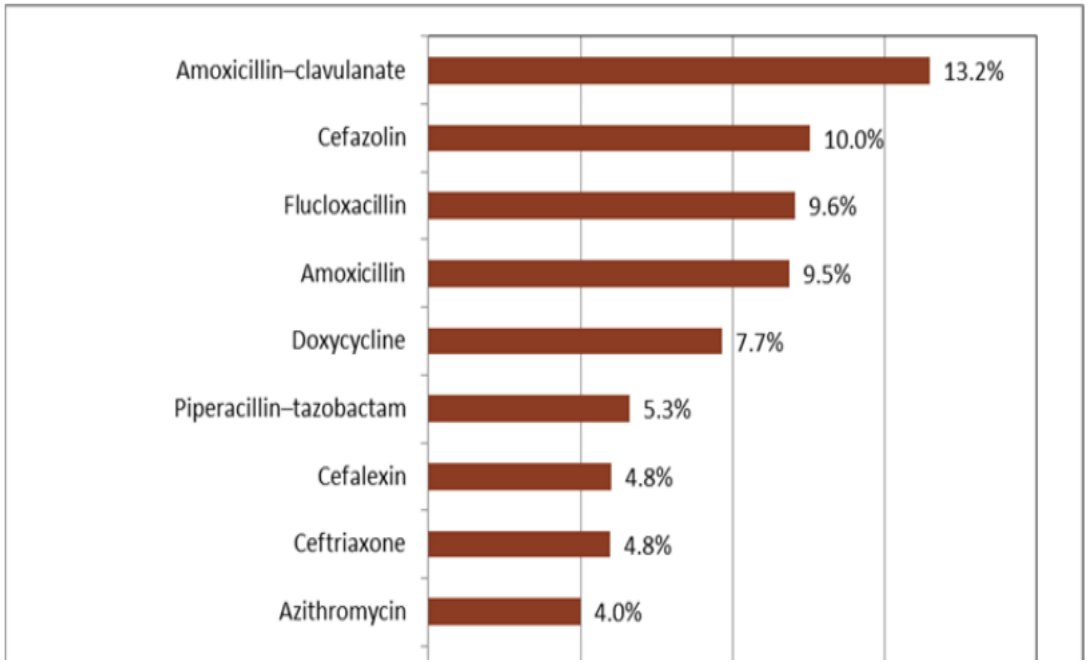
CHS focus

Bias: 30 scripts per specialty

- Inpatient timing
- Cefazolin duration
- Topical chloramphenicol

- How to monitor cefazolin improvements??

NAUSP and Definitions



- Measure of quantity of use
- Defined daily doses per OBDs

Non-ICU usage: cefazolin

- Australia (PR) - 14% total antimicrobial use (111 DDD/OBD)
- CHS – 15.1% (116 DDD/OBD)

Aim

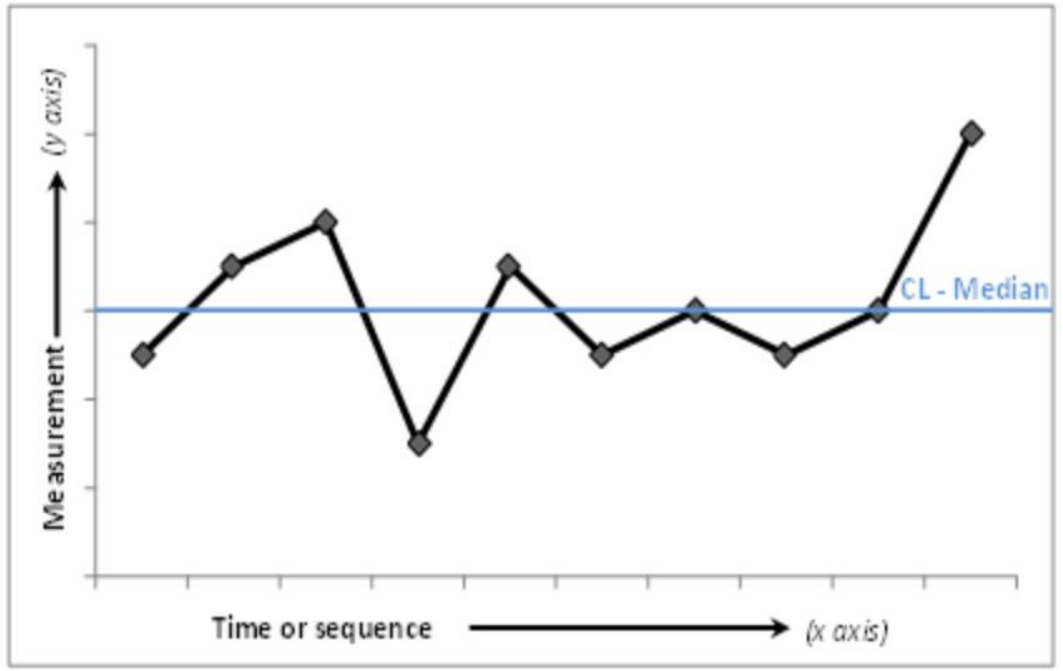
A majority of cefazolin use is for SAP and is captured by the National Antimicrobial Usage Surveillance Program (NAUSP) due to dual prescribing processes (EMM + paper)

We aimed to determine if NAUSP/EMM data could be used to monitor quality improvement reductions in cephazolin prescribing and what targets we would use.

“Real time” feedback (by week/month) – OBD delays

Why not run charts?

- Valuable QI tool
- Likely weekly reporting
- Resourcing variable for run charts
- Delayed reporting if extended prophylaxis (but could use >24 hours)



A typical run chart

- Didn’t have mandatory indications

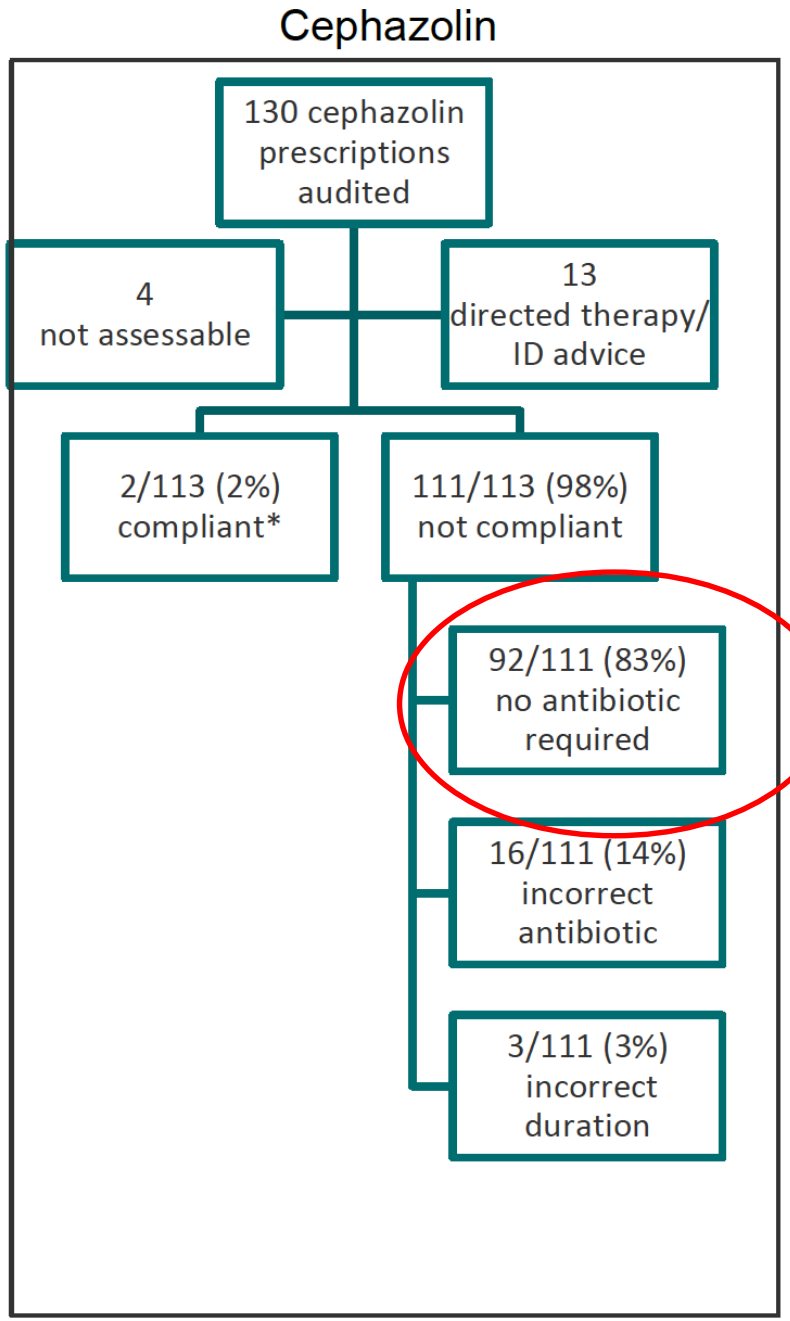
Methods

Audit of ward prescribing electronic medication management (EMM) data (4/52) - (all prescriptions week one then 25 scripts per week)

Proportion of hospital cefazolin used for SAP and appropriate

Total DDDs - administered (EMM):dispensed (non-ICU NAUSP)

NAUSP quality improvement target modelled based on a 50% improvement in the guideline compliance of cephazolin used for postoperative SAP.



*Soft tissue infection in the presence of a penicillin allergy (n=2)

65% of all scripts were for SAP

Fifty-five percent of cephazolin EMM **prescription indications** were for SAP

No post-operative scripts were compliant with guidelines (TG 2014).

Results

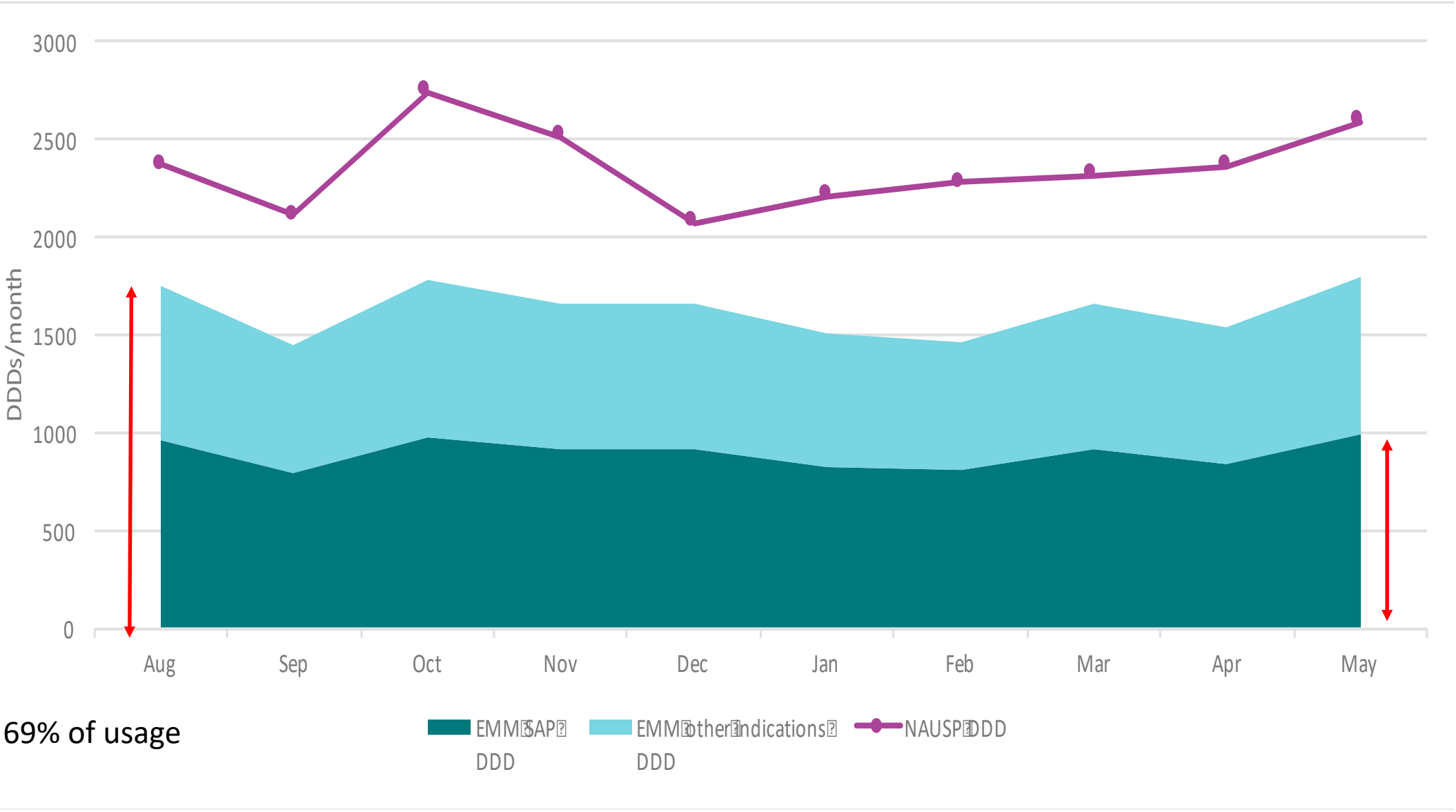
Table 1. Defined daily doses (DDDs) of cephazolin used on the wards, by indication, TCH, Jul-Dec 2018.

Month		EMM estimates of DDDs administered			NAUSP DDDs dispensed
		Total	Surgical prophylaxis*	Other Indications*	
2018	Aug	1753	964	789	2368
	Sep	1441	793	649	2109
	Oct	1785	982	803	2738
	Nov	1654	910	744	2513
	Dec	1661	913	747	2071
2019	Jan	1502	826	676	2212
	Feb	1469	808	661	2281
	Mar	1661	913	747	2318
	Apr	1532	843	689	2359
	May	1802	991	811	2587
Average		**1626**	**894**	**732**	**2356**

*Based on the proportion of EMM prescriptions

Fifty-five percent of cephazolin EMM **prescription indications** were for SAP, and none of this was compliant with guidelines.

Strong correlation between monthly DDDs of cephazolin measured by NAUSP and EMM (r=0.68, p=0.03)



69% of usage

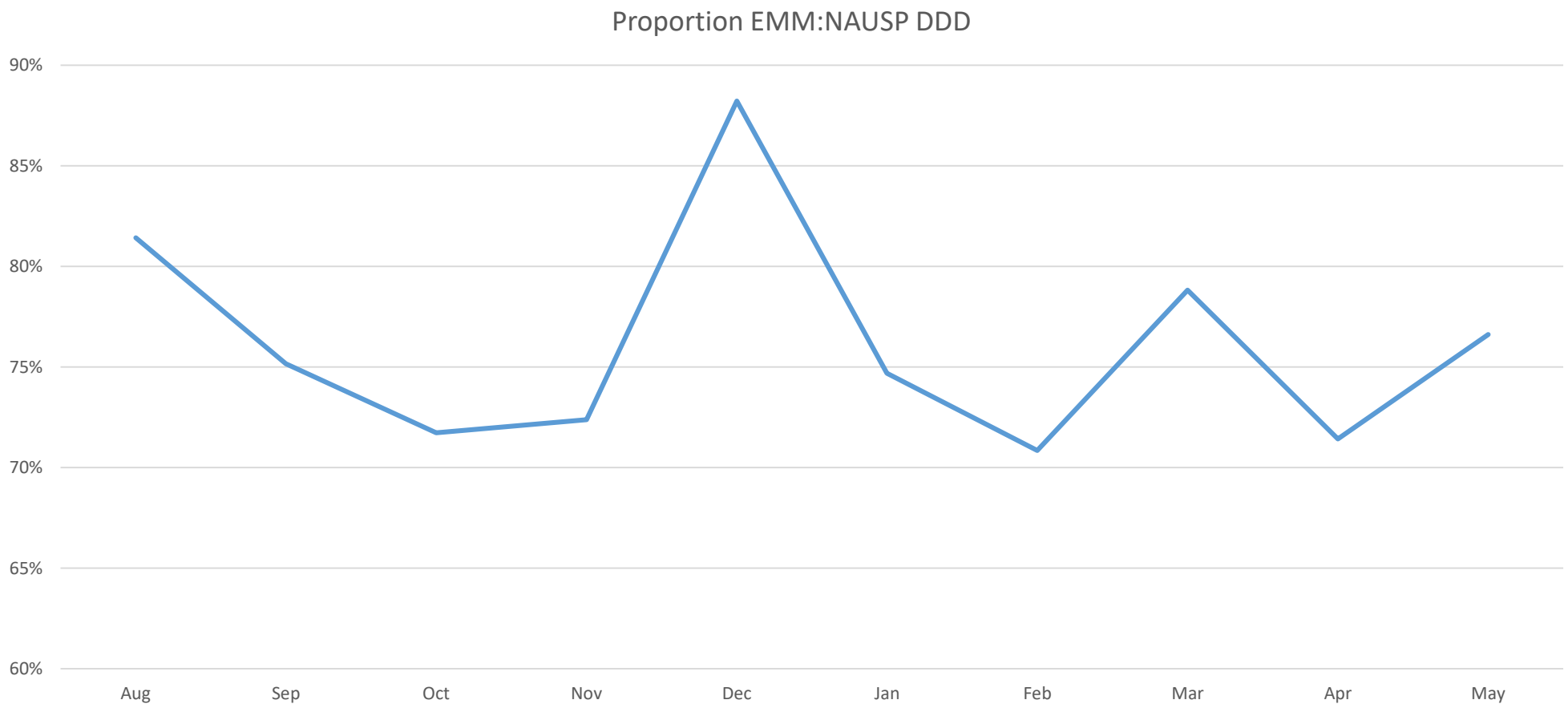
Minimum of 38% of NAUSP

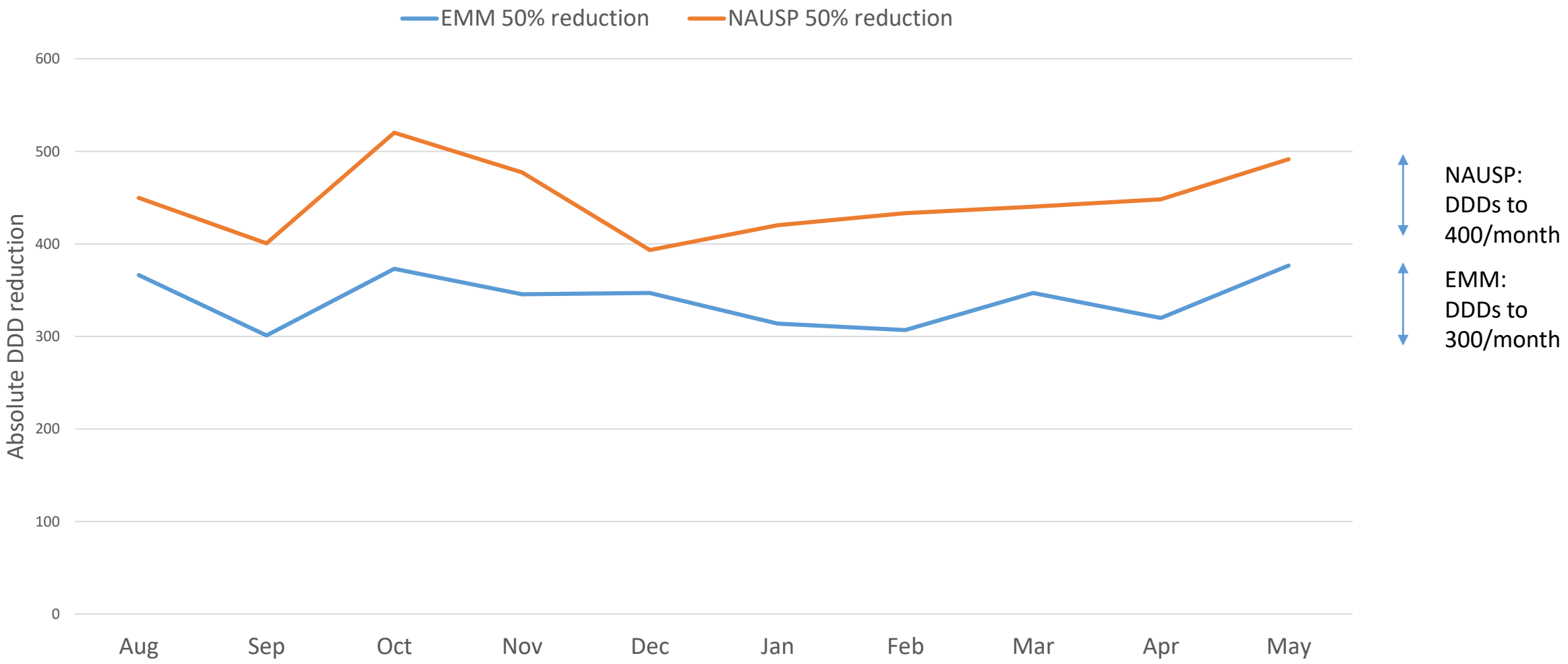
55% of EMM usage

Administration:dispensing

Varies 71-88%

Paper charts!





An effective quality improvement intervention to improve guideline compliance by 50% would lead to a 19% reduction in NAUSP DDDs.

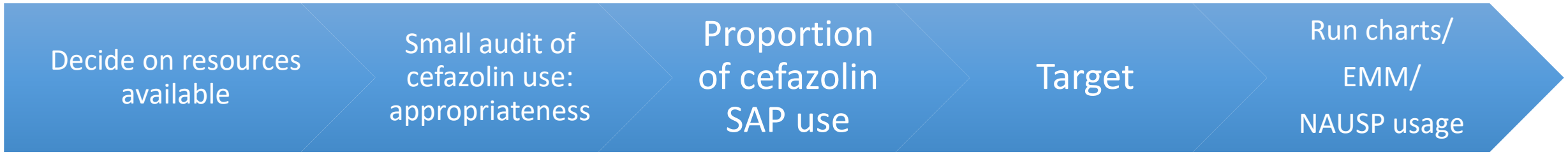
A safe target would be anything >400 DDD (no adjusted for OBD)

Options for future SAP monitoring

- NAUSP data may be useful for monitoring SAP quality improvement interventions, in conjunction with less frequent SNAPS/5x5 or EMM audits.

- We set a quality improvement target of a 10% (average 235 DDD/month) reduction in total hospital use within 6 months.

Local facility application



Thanks

- Alexandra Marmor
- Dr Hayley Heaton
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- Infection Prevention and Control Program
- Antimicrobial Stewardship Program

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