Improvement science for surgical antibiotic prophylaxis

CEC NSW AMS FORUM
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Overview

- Background

- Shared problem

- Our objective at the CEC

- Partnering on Quality Improvement (QI) Projects

Background

- Surgical antibiotic prophylaxis (SAP) is the most common indication for antibiotics prescribed to inpatients in Australian hospitals (Hospital NAPS 2017)

- Duration: about 30% of inpatient SAP prescriptions exceed 24 hours in duration (Hospital NAPS, 2017)
    - Not much change in recent years
    - 31% in NSW/ACT in 2016 and 2017

NCAS and ACSQHC, 2018. Antimicrobial prescribing practice in Australian hospitals: results of the 2017 Hospital National Antimicrobial Prescribing Survey. https://www.ncas-australia.org/ncas-publications

Background

Procedural prophylaxis

- 34% of prescriptions were deemed inappropriate (Surgical NAPS 2017)
  - Incorrect timing 44.6%
  - Incorrect dosage 26.9%
  - Spectrum too broad 13.7%

Post procedural prophylaxis

- 19.3% of prescriptions were deemed inappropriate (Surgical NAPS 2017)
  - Incorrect duration 59.6%
  - Incorrect dosage or frequency 34%
  - Spectrum too broad 10.1%

Drivers for change

- Inclusion of SAP monitoring in national standards

    - ACSQHC Advisory no: A17/01 (November 2017)
        - Health service organisations should ensure surgical prophylaxis is included and addressed as part of their AMS program
        - Monitoring according to AMS Clinical Care Standard
        - Evidence of action taken in response to issues identified as a result of monitoring

    - ACSQHC NSQHS Standards Version 2 (January 2019)
        - Action 3.15: The health service organisation has an AMS program that… incorporates core elements, recommendations and principles from the current AMS Clinical Care Standard

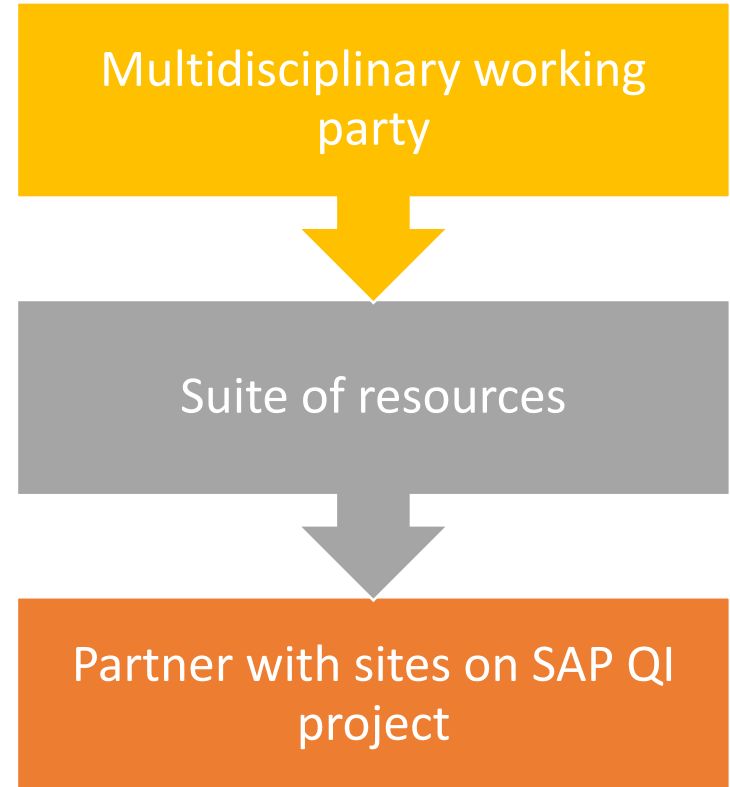## Quality statement 9 – Surgical prophylaxis

If a patient having surgery requires prophylactic antibiotics, the prescription is made in accordance with the current *Therapeutic Guidelines*[1] (or local antibiotic formulary), and takes into consideration the patient's clinical condition.

Shared problem

- Action needed across NSW in the short term
- Some success with SAP initiatives in selected metropolitan hospitals but time and resources +++
- Limited information on specific areas of need
- Limited information on how we could measure success

Our objective

- To support and facilitate improvement in SAP use in NSW public hospitals
  - To use quality improvement methodology to guide improvement
  - To drive better outcomes for patients and a more positive work experience for staff
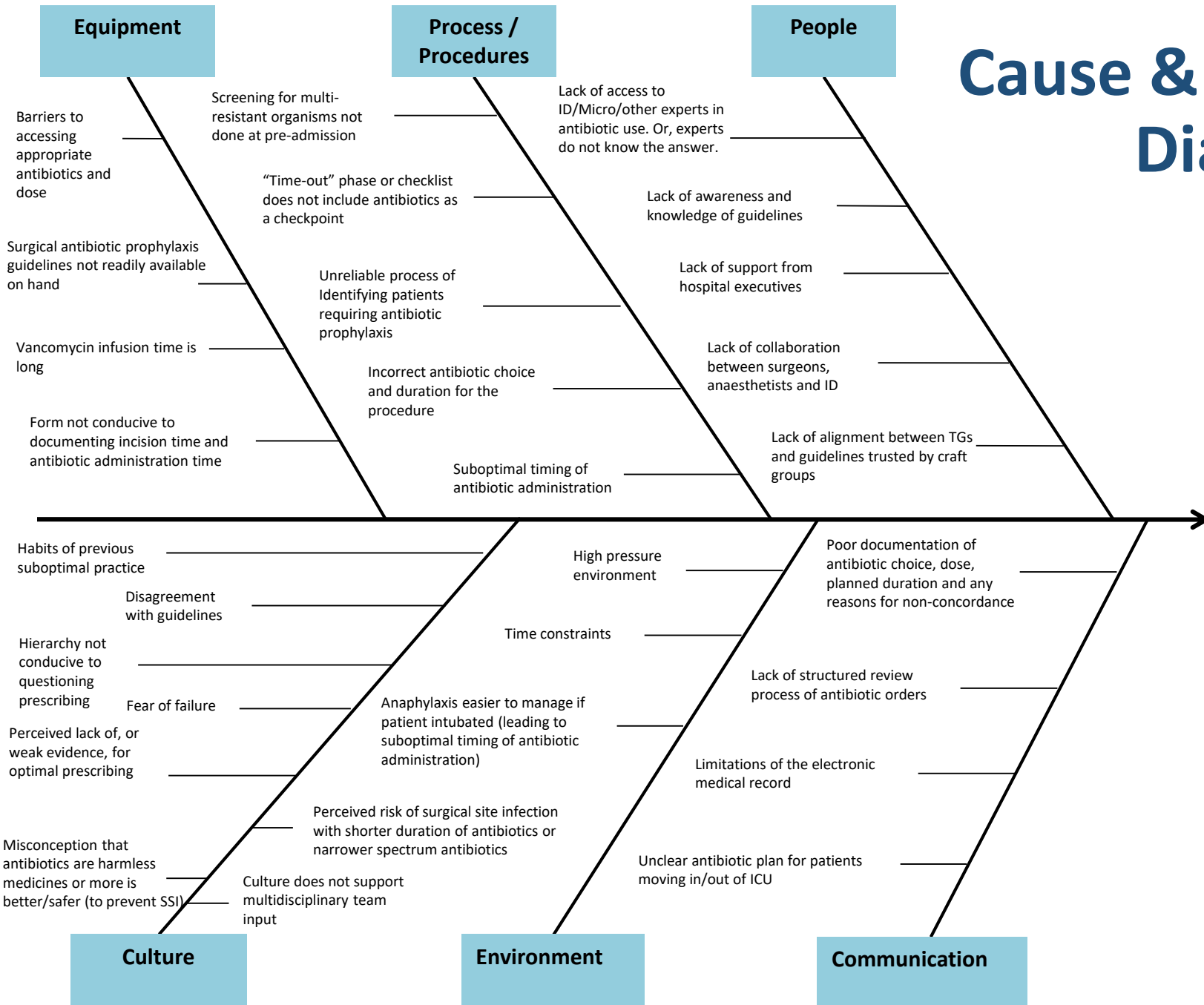
Multidisciplinary working party

↓

Suite of resources

↓

Partner with sites on SAP QI project

Cause & Effect Diagram

Equipment

- Barriers to accessing appropriate antibiotics and dose
- Surgical antibiotic prophylaxis guidelines not readily available on hand
- Vancomycin infusion time is long
- Form not conducive to documenting incision time and antibiotic administration time

Process / Procedures

- Screening for multi-resistant organisms not done at pre-admission
- "Time-out" phase or checklist does not include antibiotics as a checkpoint
- Unreliable process of Identifying patients requiring antibiotic prophylaxis
- Incorrect antibiotic choice and duration for the procedure
- Suboptimal timing of antibiotic administration

People

- Lack of access to ID/Micro/other experts in antibiotic use. Or, experts do not know the answer.
- Lack of awareness and knowledge of guidelines
- Lack of support from hospital executives
- Lack of collaboration between surgeons, anaesthetists and ID
- Lack of alignment between TGs and guidelines trusted by craft groups

Culture

- Habits of previous suboptimal practice
- Disagreement with guidelines
- Hierarchy not conducive to questioning prescribing
- Fear of failure
- Perceived lack of, or weak evidence, for optimal prescribing
- Misconception that antibiotics are harmless medicines or more is better/safer (to prevent SSI)
- Culture does not support multidisciplinary team input

Environment

- High pressure environment
- Time constraints
- Anaphylaxis easier to manage if patient intubated (leading to suboptimal timing of antibiotic administration)
- Perceived risk of surgical site infection with shorter duration of antibiotics or narrower spectrum antibiotics

Communication

- Poor documentation of antibiotic choice, dose, planned duration and any reasons for non-concordance
- Lack of structured review process of antibiotic orders
- Limitations of the electronic medical record
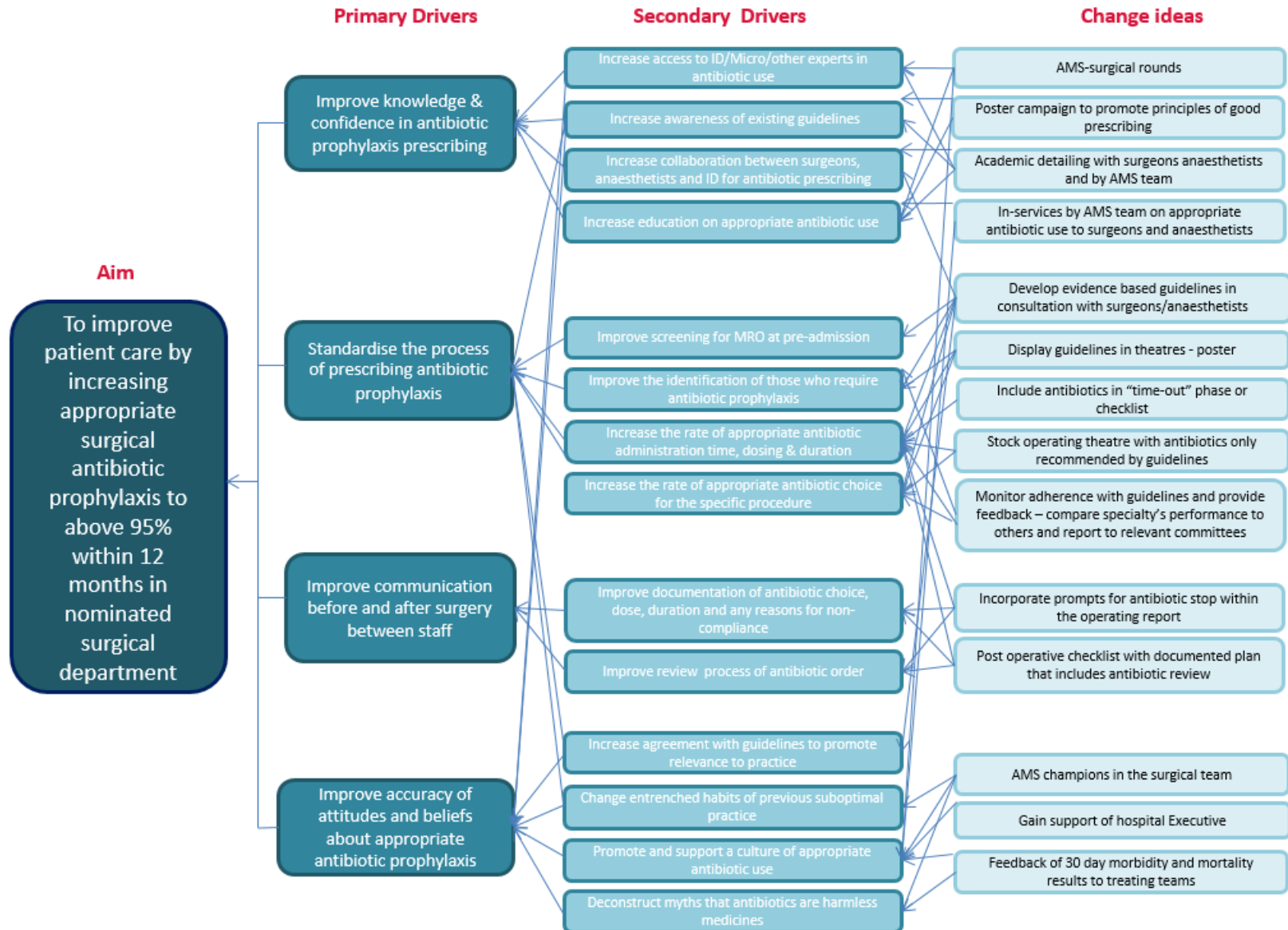- Unclear antibiotic plan for patients moving in/out of ICU

PROBLEM:

Inappropriate prescribing of antibiotics for surgical prophylaxis

*Inappropriate in relation to choice of antibiotic, dose, route, timing of administration or duration
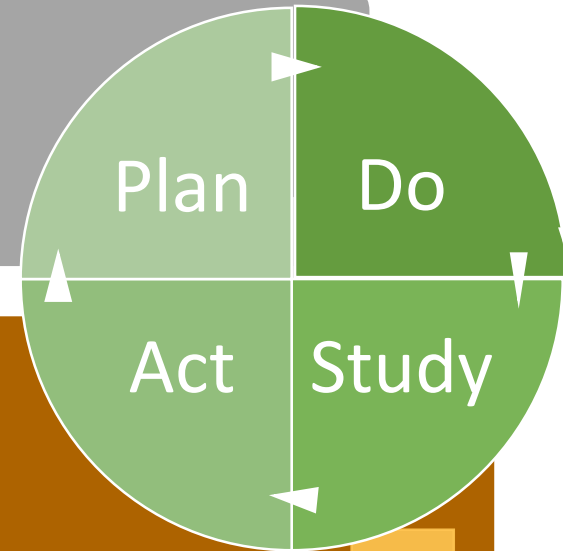
Driver Diagram

Primary Drivers

Secondary Drivers

Change ideas

Aim

To improve patient care by increasing appropriate surgical antibiotic prophylaxis to above 95% within 12 months in nominated surgical department

Primary Drivers

- Improve knowledge & confidence in antibiotic prophylaxis prescribing
- Standardise the process of prescribing antibiotic prophylaxis
- Improve communication before and after surgery between staff
- Improve accuracy of attitudes and beliefs about appropriate antibiotic prophylaxis

Secondary Drivers

- Increase access to ID/Micro/other experts in antibiotic use
- Increase awareness of existing guidelines
- Increase collaboration between surgeons, anaesthetists and ID for antibiotic prescribing
- Increase education on appropriate antibiotic use
- Improve screening for MRO at pre-admission
- Improve the identification of those who require antibiotic prophylaxis
- Increase the rate of appropriate antibiotic administration time, dosing & duration
- Increase the rate of appropriate antibiotic choice for the specific procedure
- Improve documentation of antibiotic choice, dose, duration and any reasons for non-compliance
- Improve review process of antibiotic order
- Increase agreement with guidelines to promote relevance to practice
- Change entrenched habits of previous suboptimal practice
- Promote and support a culture of appropriate antibiotic use
- Deconstruct myths that antibiotics are harmless medicines

Change ideas

- AMS-surgical rounds
- Poster campaign to promote principles of good prescribing
- Academic detailing with surgeons anaesthetists and by AMS team
- In-services by AMS team on appropriate antibiotic use to surgeons and anaesthetists
- Develop evidence based guidelines in consultation with surgeons/anaesthetists
- Display guidelines in theatres - poster
- Include antibiotics in "time-out" phase or checklist
- Stock operating theatre with antibiotics only recommended by guidelines
- Monitor adherence with guidelines and provide feedback – compare specialty's performance to others and report to relevant committees
- Incorporate prompts for antibiotic stop within the operating report
- Post operative checklist with documented plan that includes antibiotic review
- AMS champions in the surgical team
- Gain support of hospital Executive
- Feedback of 30 day morbidity and mortality results to treating teams

Model for Improvement

What are we trying to accomplish?

How will we know that a change is improvement?

What change can we make that will result in improvement?

Plan | Do
Act | Study

Institute for Healthcare Improvement, "How to Improve", http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx

Our approach

- Teach Improvement Science
- Analysed local baseline data – chose a target
- Devise own measurement strategy
- Collected small samples of data frequently
- Use run charts – a lot of them!
- Regular meetings to discuss progress and plan PDSAs

What they achieved

- Hospital A:
  - Regional base hospital, 120 beds
  - General surgery, ophthalmology, obstetrics and gynaecology, urology
  - Area of focus for improvement:
    - Caesarean sections and cholecystectomies
    - Correct dose and timing of administration of peri-operative antibiotic

- Hospital B:
  - Rural referral hospital, 280 beds
  - General surgery, orthopaedics, ophthalmology, ENT, obstetrics and gynaecology and urology
  - Area of focus for improvement:
    - Caesarean sections
    - Documenting antibiotic administration time and correct timing of peri-operative dose

Hospital A: % of patients receiving timely peri-op antibiotics

Percentage of patients receiving timely peri-operative antibiotics - March 2018 - March 2019

Sample size

| 12 | 5 | 5 | 6 | 14 | 7 | 4 | 3 | 13 | 4 | 10 | 10 | 7 | 6 | 5 | 11 | 13 | 6 | 10 | 15 | 8 | 4 | 5 | 6 | 14 | 10 | 4 | 6 |

Head anaesthetists provided inservice to all anaesthetist

Median

One on one feedback with anaesthetists

Commenced using documentation stamp

Week
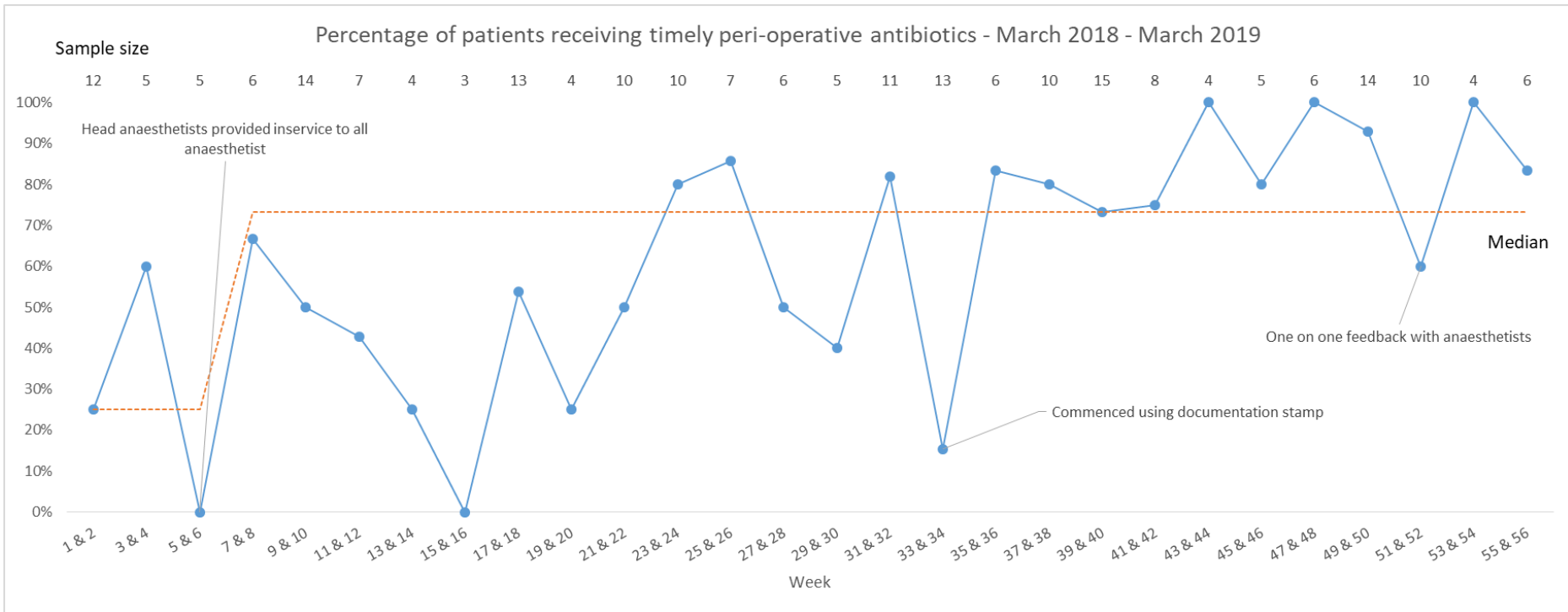
Total = 223 episodes

Hospital A: % of patients receiving correct dose

Percentage of patients who received the correct antibiotic dose - March 2018 - March 2019
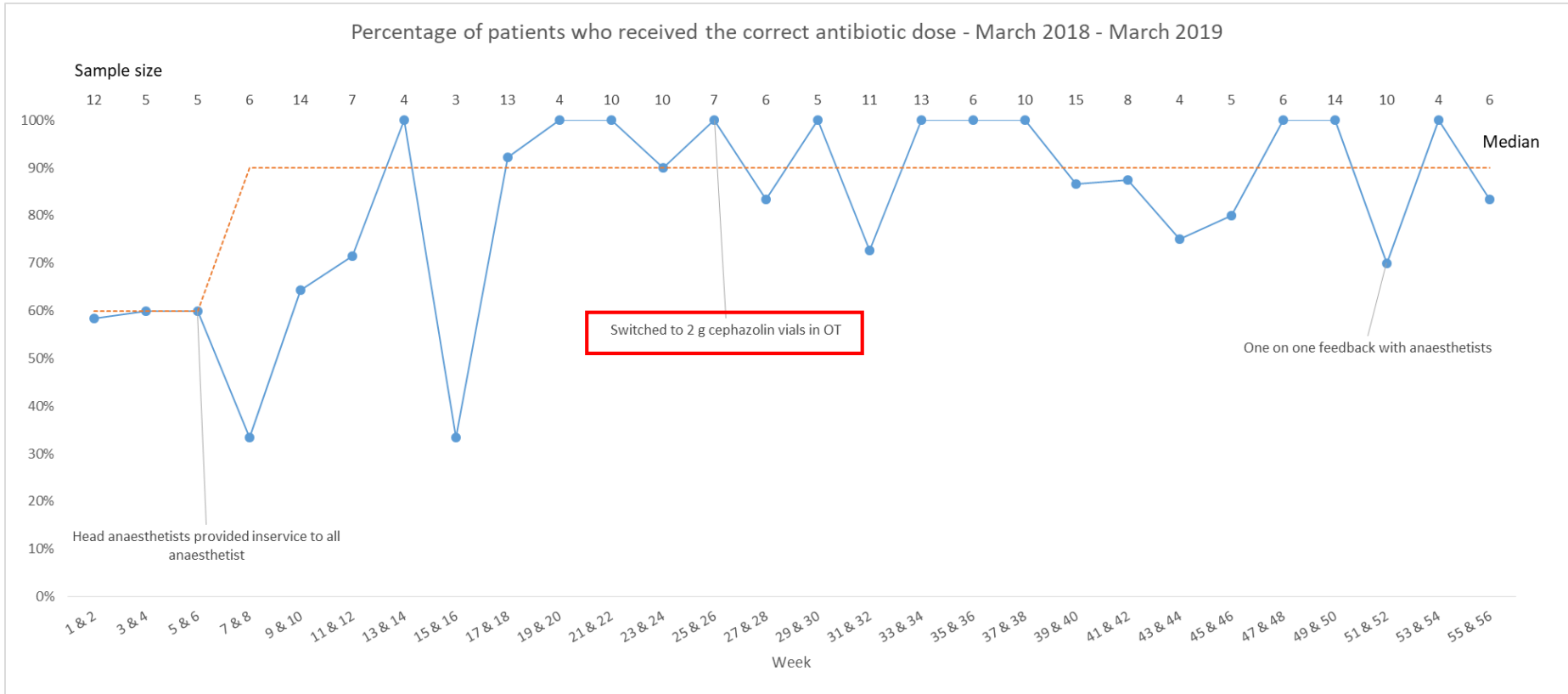
Total = 223 episodes

Hospital B: % of patients missing antibiotic admin time

Percentage of patients with antibiotic administration time not documented - January 2018 - December 2018

Sample size: 13 11 15 12 7 15 13 13 10 18 10 11 16 12 10 10 13 13 14 12 10 5 9 7 4 1

PDSA: Documentation of knife to skin and antibiotic administration time on whiteboard & then into iPM

Education about new process

Median

Good ↓
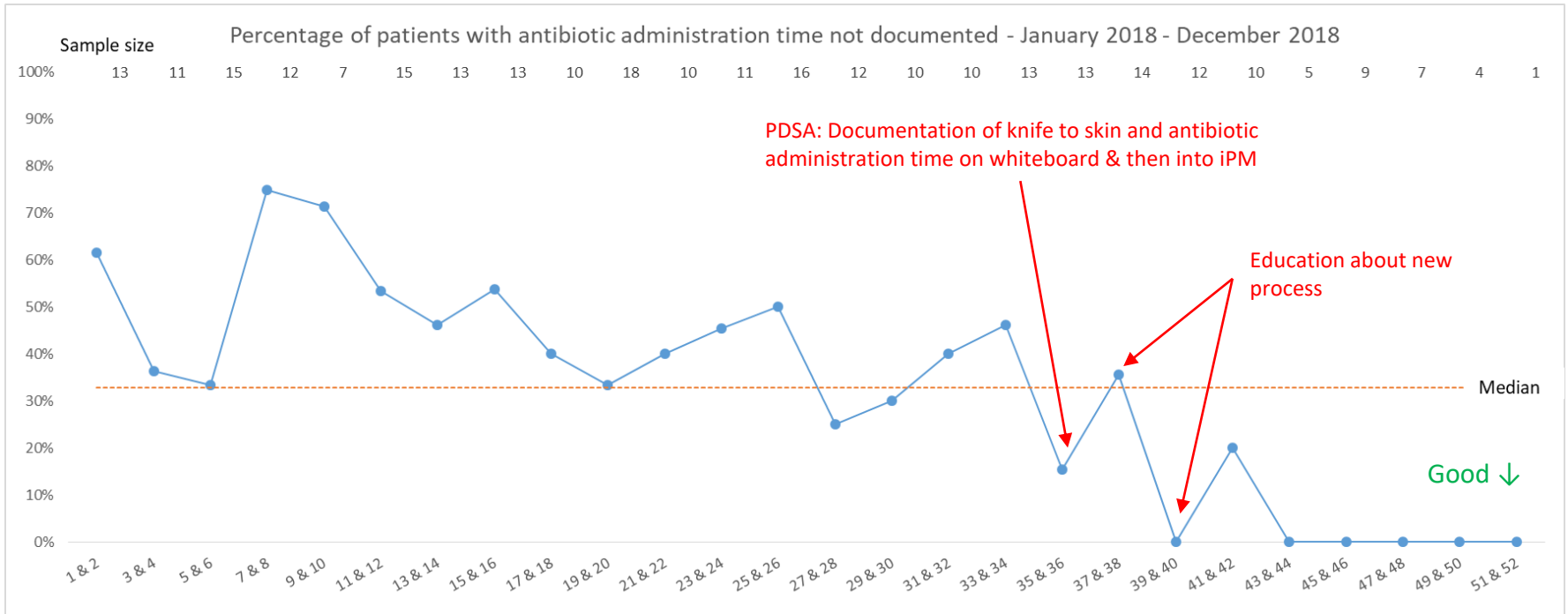
Total = 284 episodes

Hospital B: % of patients receiving timely antibiotics

Percentage of patients who received antibiotics within the correct time frame - Jan - Dec 2018
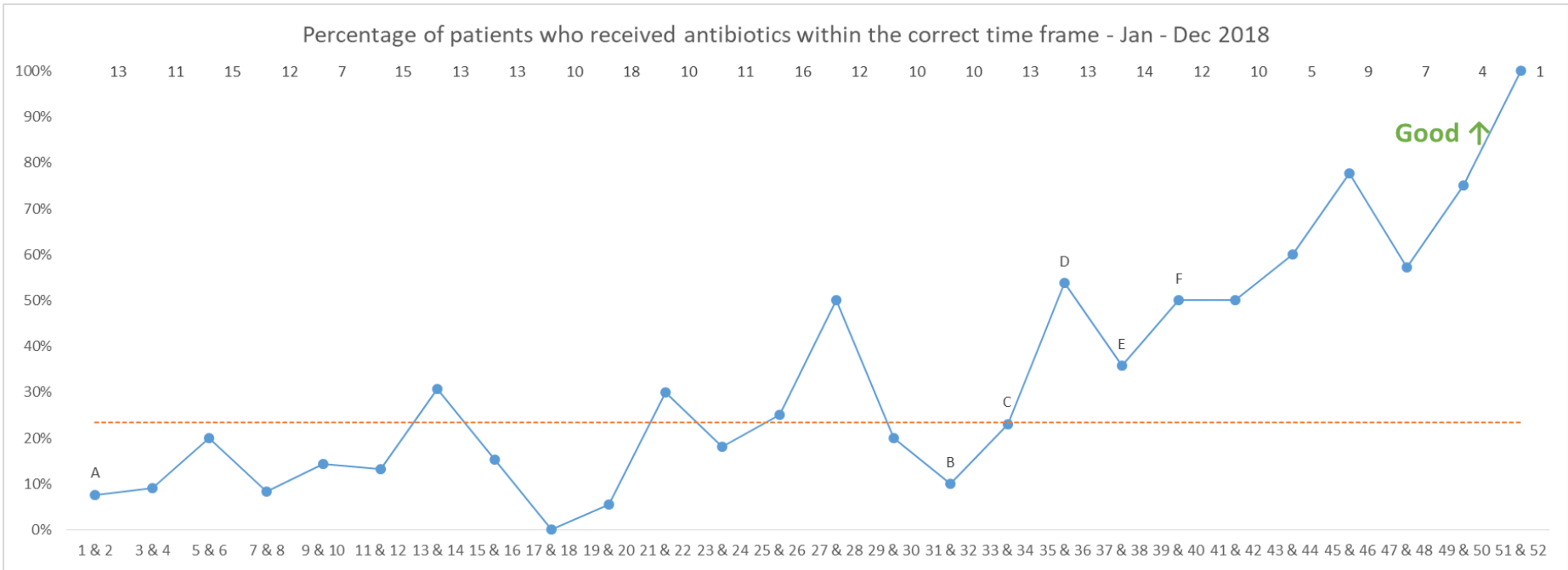
Total = 284 episodes

A Patient information leaflet developed and given to patients
B Education to midwives and new grads
C Presentation to obstetricians by Head OBGYN
D Documentation of knife to skin and antibiotic admin time on whiteboard & then into iPM
E Education to registrars
F Education to new locums

Teams lessons learned
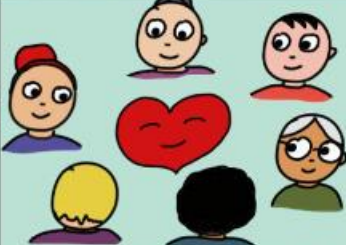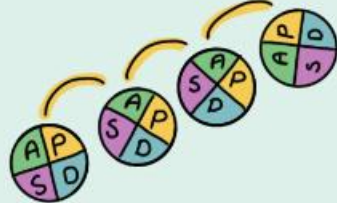
- Don't start too big

- Improvement takes persistence and patience

- Frequent data collection requires discipline and protected time

- The value of PDSAs – make mistakes and learn quickly

- Constantly educate – continuous enforcement of changes

- Trust and understand data to use it for QI

Why use a QI approach?

- Healthcare is dynamic and always changing

- No two systems are the same

- QI involves considering the context of the changes required

- Identifying inefficiencies, variation and preventable errors can be helpful in developing change strategies

- Rapid tests of change allow you to learn and refine your changes as you progress

What is Quality Improvement?

Quality Improvement

A systematic method to solving complex problems through testing + learning

QI empowers those closest to the improvement opportunity to identify and test ideas

Data is used to evidence change has led to an actual improvement (statistically)

In QI, a clear aim is set that specifies "how good" and "by when"

"The model for improvement" is a key QI method that includes Plan-Do-Study-Act cycles for testing

Quality Improvement Tips

Identify "what matters the most" by engaging with staff and involving service users

QI is a team sport. Include service users + families to make sure the focus is right

Start small and test ideas a few times using Plan Do Study Act Cycles

As part of testing, failure is expected + natural. Learn from it.

Quality Management System

4 types of activity are used to manage quality + continuous improvement

① QUALITY PLANNING: putting in place structures + processes to meet the needs of the population

② QUALITY CONTROL: monitor quality and performance in real-time, taking action when needed

③ QUALITY ASSURANCE: periodic checks to make sure the service is meeting service user needs.

④ QUALITY IMPROVEMENT: Solve complex problems by testing ideas + theories to improve the system

www.qi.elft.nhs.uk

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Thank you

Questions?