

# Clinical Leadership Training Course

**DATE |** Feb 18, 19, 20, 2025

**VENUE |** 2F Chrysanthemum, Grand InterContinental Seoul Parnas Hotel

# Looking beyond data collection: Maturing your AMS Program

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# Learning objectives

- Identify barriers and facilitators for AMS implementation
- Understand the importance of behaviour change
- Appreciate the importance of leveraging data science for scaling stewardship

# Data collection is a good start but....

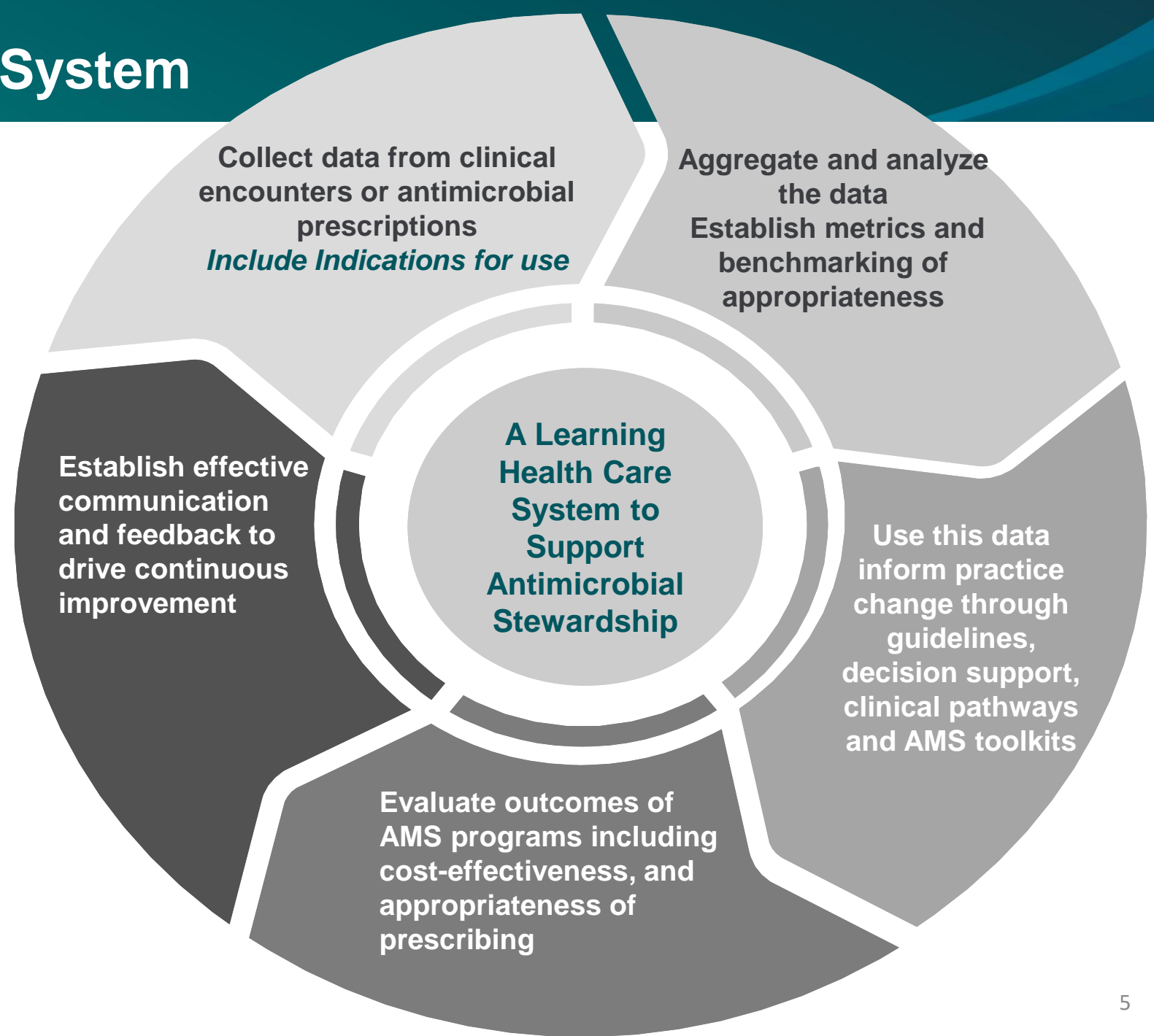
## What are you doing with this data?

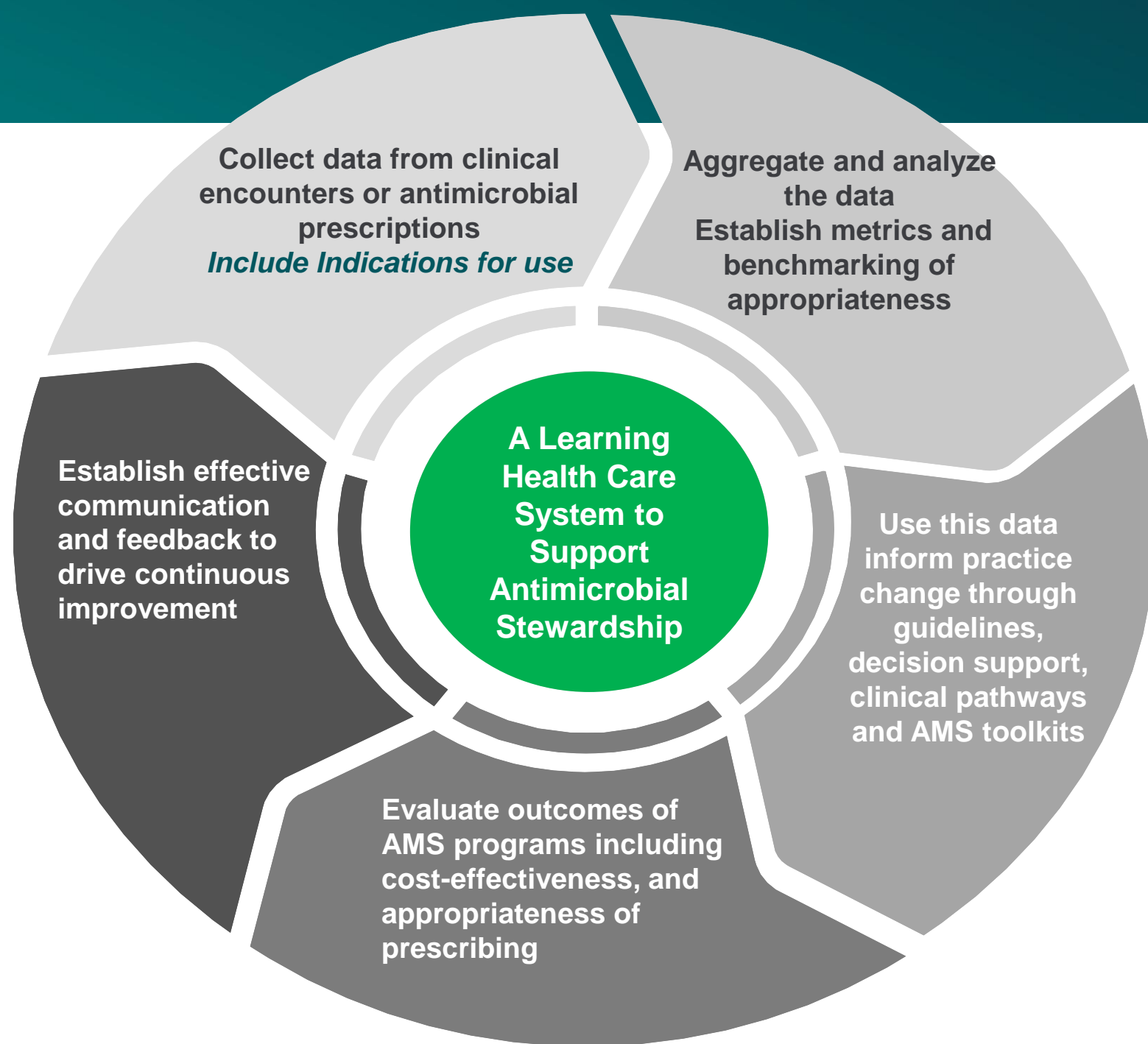
- How do we create system change?
- How do we change prescribing behaviours?
- What is the role of implementation science
- Understanding theories and frameworks



# The Learning Health System

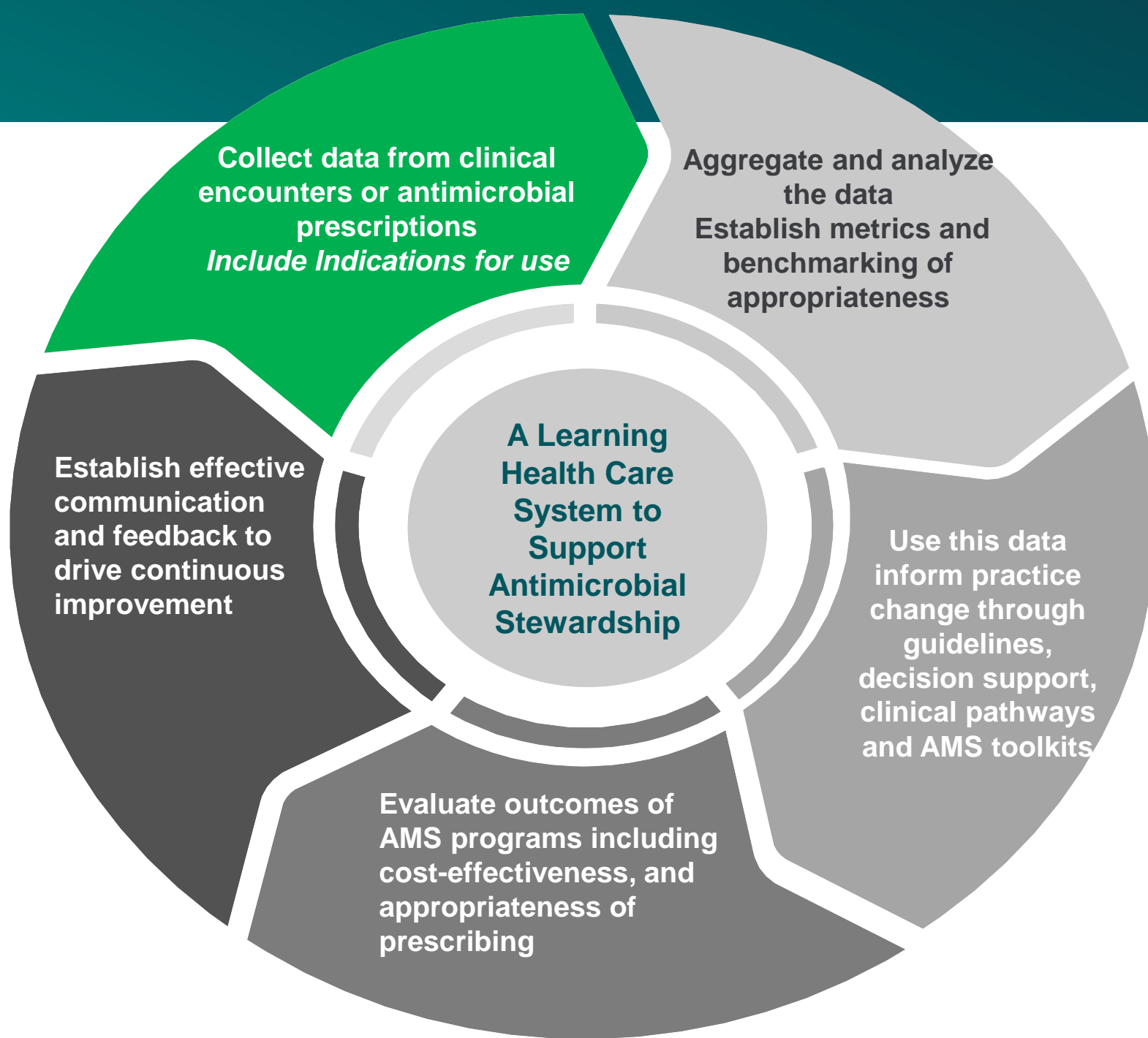
*Using a data to knowledge to practice framework to drive quality improvement for antimicrobial prescribing*





# Who is your learning health community?

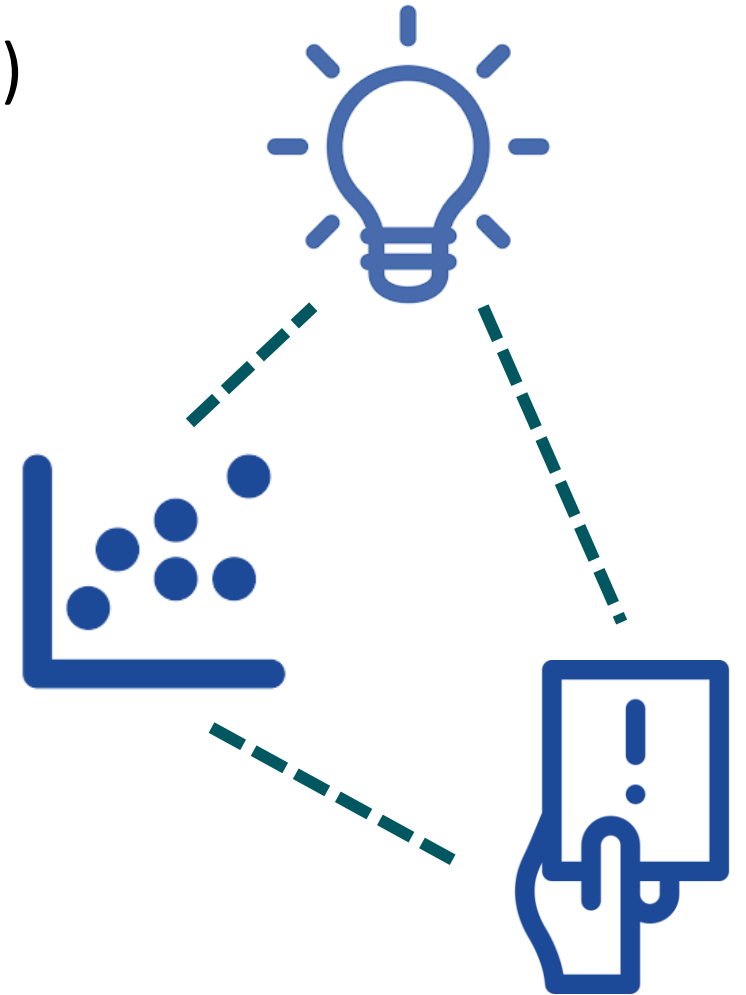
- Most important activity, and your starting point
- Supports co-design, consumer and clinician engagement
- **An engaged executive is essential**
- **Who is your AMS team?**

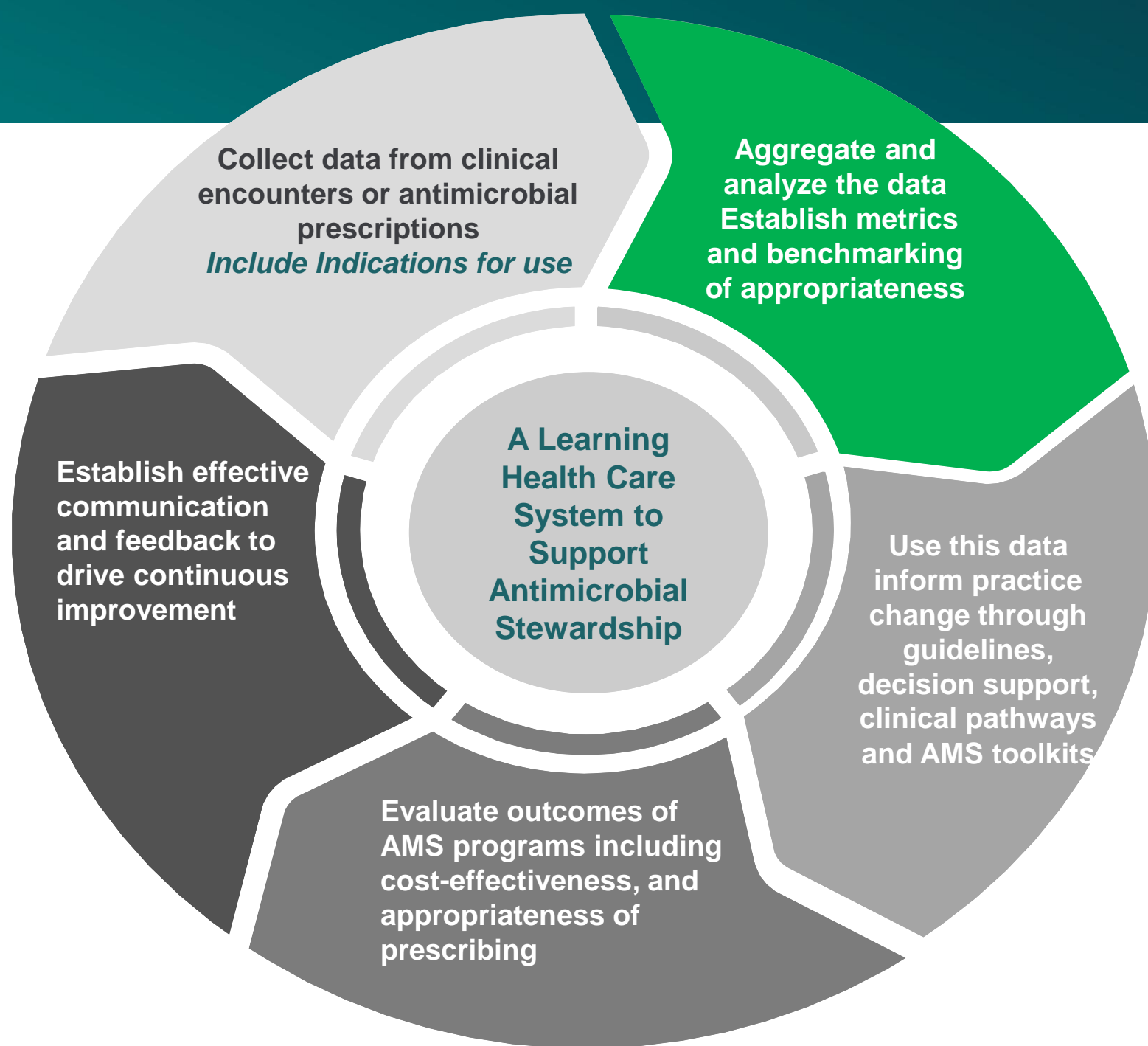




# Data for action

- Indications
- Appropriateness (more meaningful than quantity)
- AMR rates etc
- Quality improvement data/risk events
- Sepsis/SSI/HAI
- Patient outcomes
- Qualitative data “What Matters to You?”
- Ethnographic (observational) data
- Data science – NLP/machine learning

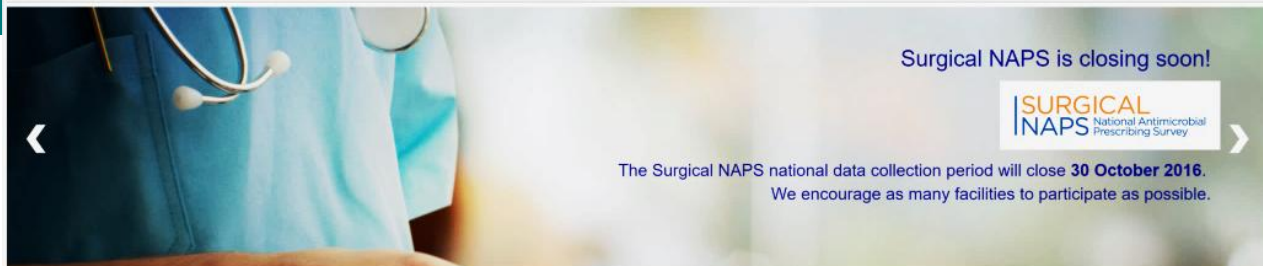




# Data Visualisation

- Establish key metrics and goals
- Select appropriate visualisation types
- Highlight performance and action points
- Make data interactive and user-specific (execs vs clinicians)
- Provide context and insights (including benchmarking)
- Evaluate and adjust





Please select your module below

**Hospital**

**HOSPITAL NAPS** National Antimicrobial Prescribing Survey

**SURGICAL NAPS** National Antimicrobial Prescribing Survey

**Q** Quality Improvement

**Residential Aged Care**

**AGED CARE NAPS** National Antimicrobial Prescribing Survey

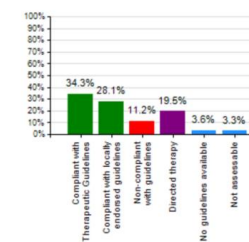
**Veterinary**

**VETERINARY NAPS** National Antimicrobial Prescribing Survey

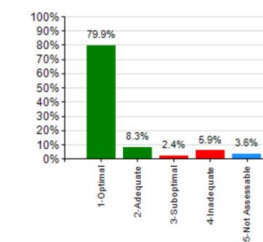
Surveys included	Methodology	Percentage of patients on antimicrobials
<b>Royal Melbourne Hospital [Parkville]</b>		
hospital NAPS 2016	Hospital wide point prevalence survey	47.7 % (184 of 386 patients)

\* For repeat point prevalence surveys, this percentage is calculated based on the first audit day only

#### Compliance with Guidelines



#### Appropriateness of Antimicrobial



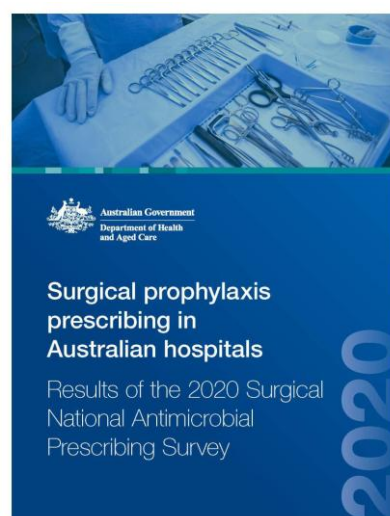
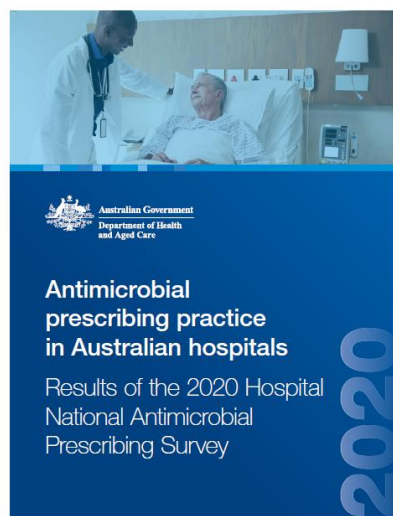
Compliant with Guidelines	62.4%	Appropriate	88.2%
Noncompliant with Guidelines	11.2%	Inappropriate	8.3%
Directed Therapy	19.5%	Not Assessable	3.6%
Other	6.8%		

'Optimal' and 'Adequate' are deemed as being **appropriate** (displayed in green).  
'Suboptimal' and 'Inadequate' are deemed as being **inappropriate** (displayed in red).

#### Documentation of Indication



#### Review or stop date documented



## International Adoption

Developed and managed by the Guidance group (ISO9001 certified) at RMH. Funding support from Australian Commission of Quality and Safety in Healthcare, Commonwealth Department of Health, and National Centre for Antimicrobial Stewardship

# NAPS National Antimicrobial Prescribing Survey



All states and territories and both private and public sectors use the NAPS for quality improvement



**Hospital NAPS**  
since 2013

**>650 facilities**  
~250,000 prescriptions  
~3000 auditors



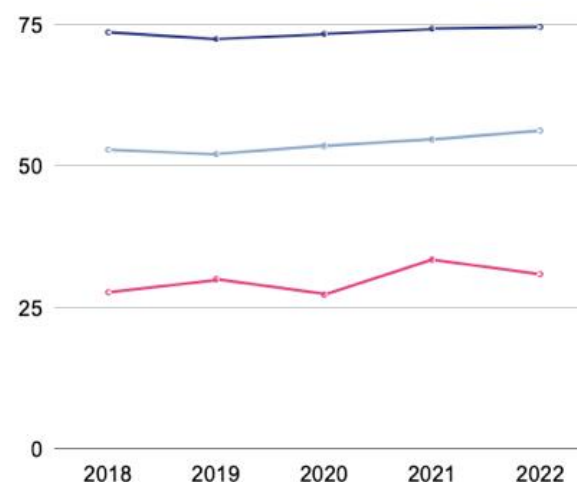
**Aged Care NAPS**  
since 2016

**>1,200 facilities**  
~210,000 RESIDENTS  
~2000 auditors



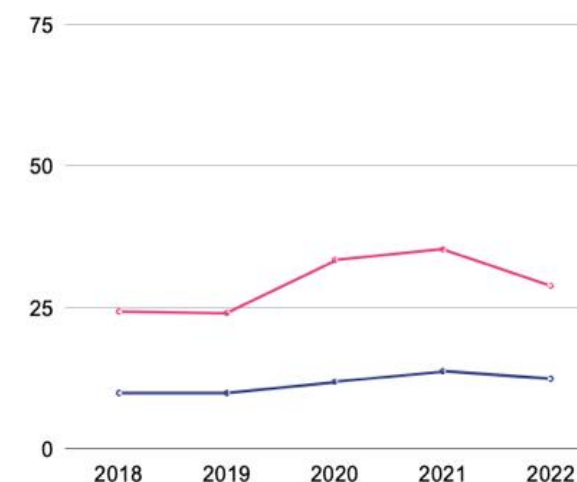
**Key indications** surgical prophylaxis, respiratory and urinary tract infections

## HOSPITAL NAPS National Antimicrobial Prescribing Survey



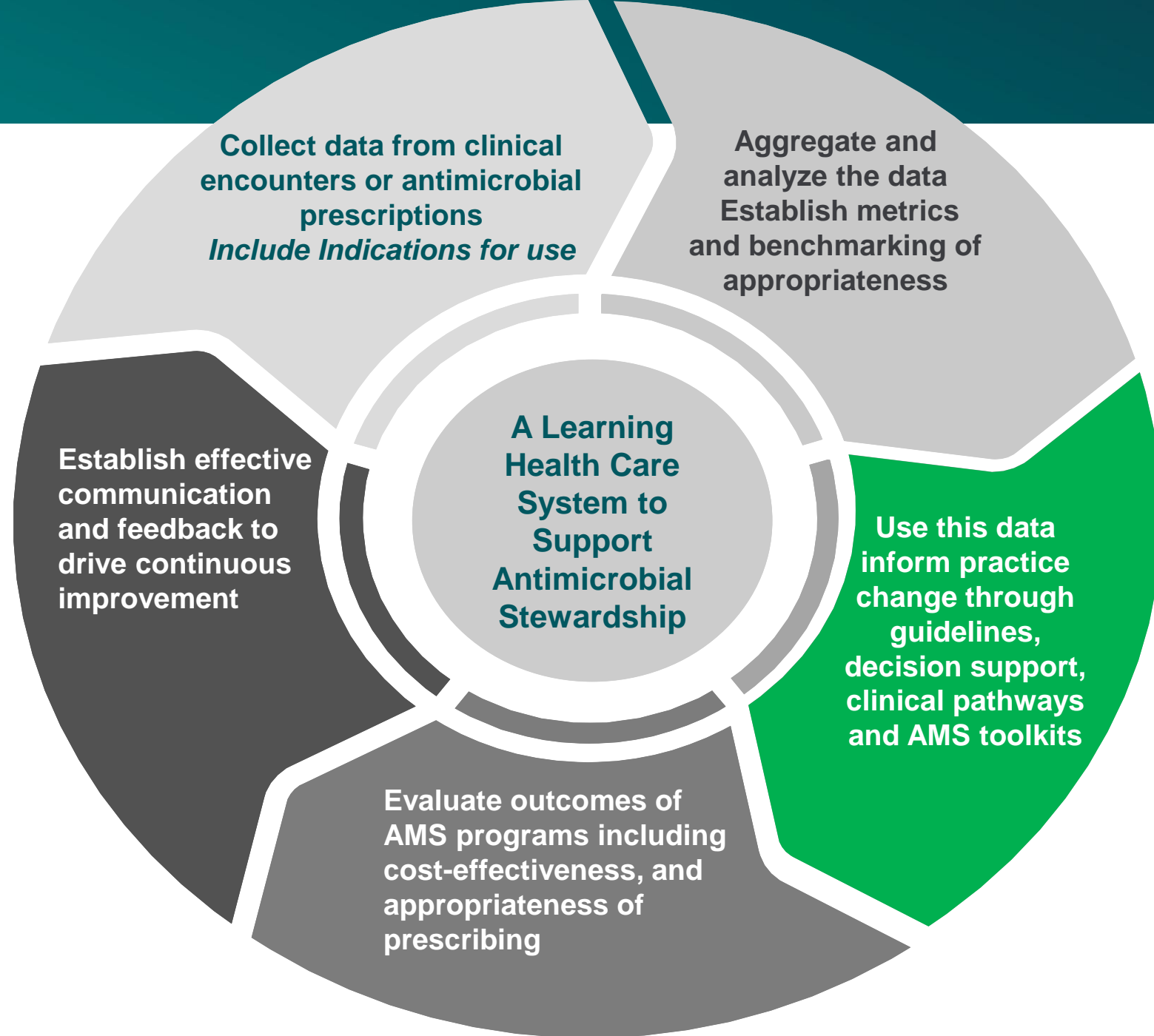
● Appropriateness  
● Guideline compliance  
● Surgical prophylaxis >24 hours

## AGED CARE NAPS National Antimicrobial Prescribing Survey



● Residents prescribed at least one antimicrobial  
● Duration >6 months





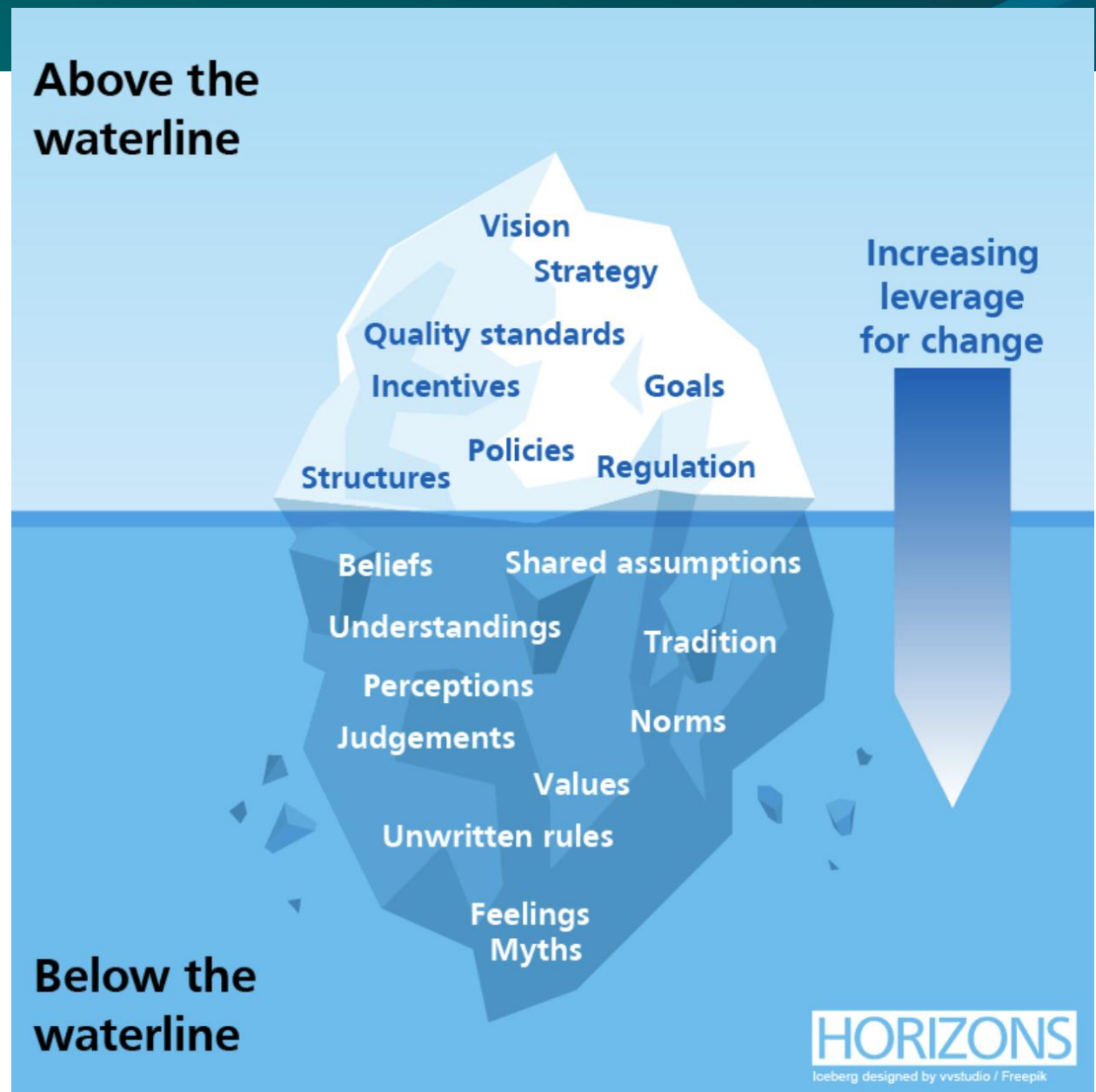


**WHY?**

Do we see:

- guideline non concordance and
- 30-50% inappropriate antimicrobial prescribing?

*“Implementation is impacted by social, cultural, behavioural and technological factors.”*

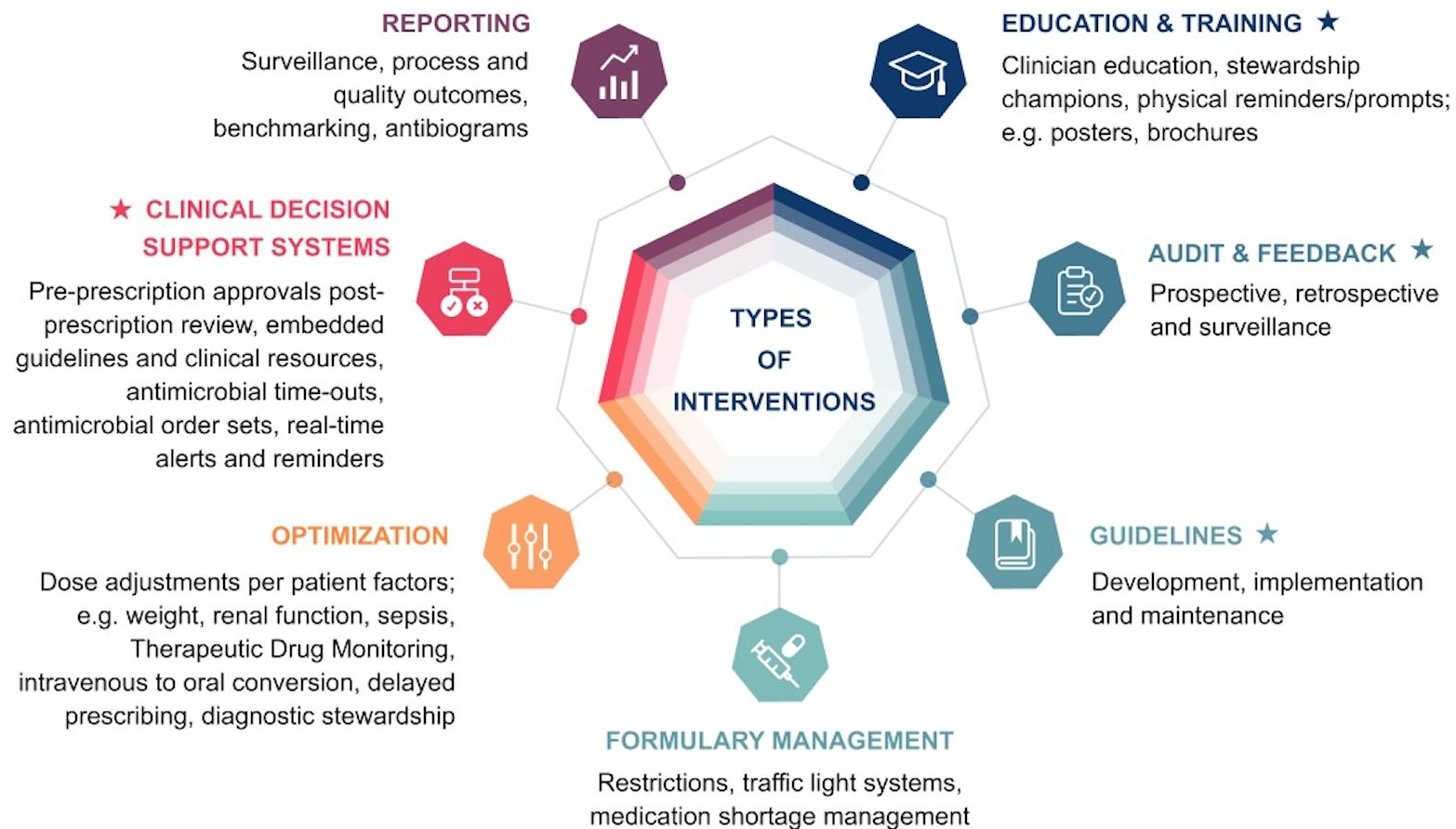




# What you could do....

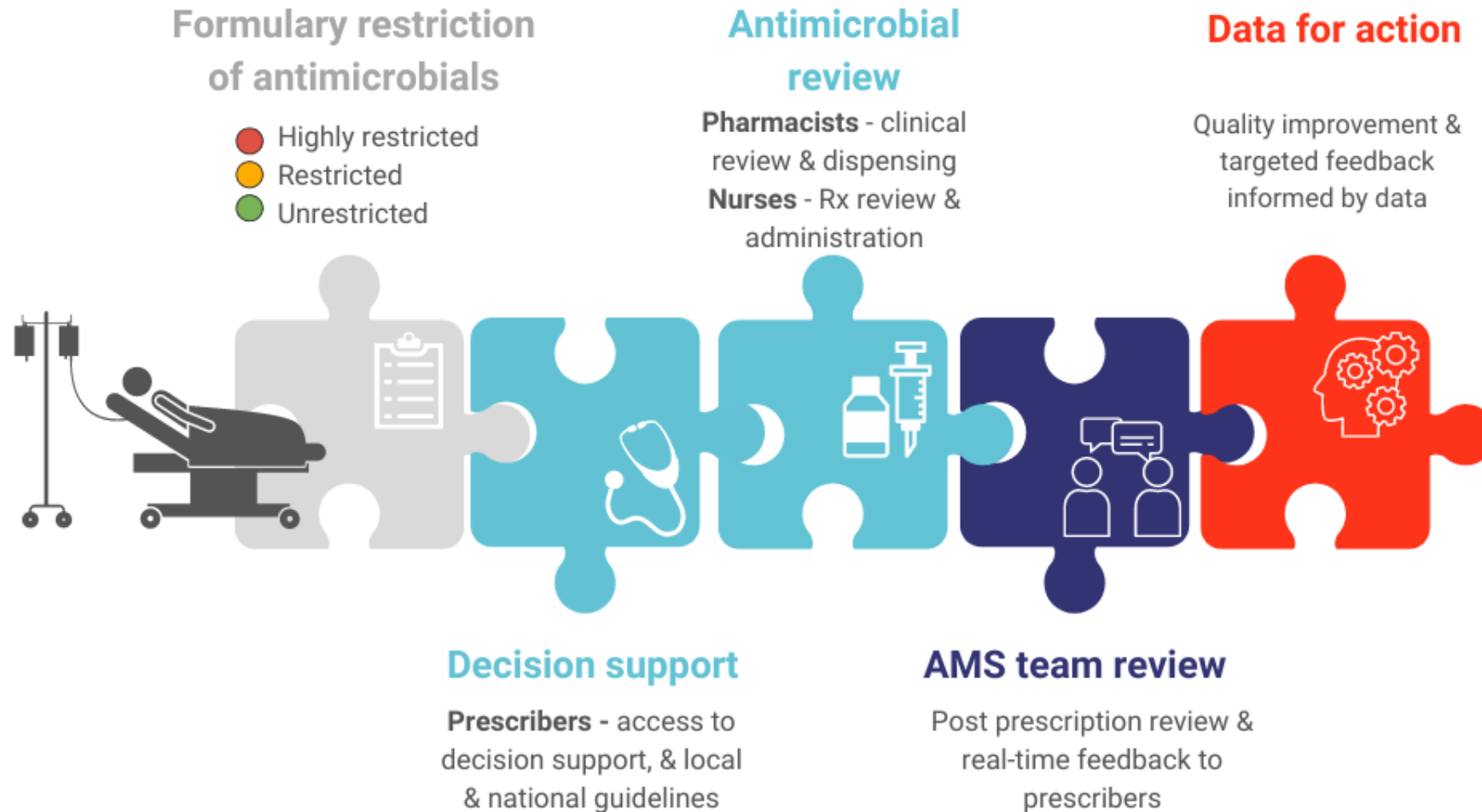
- Undertake a situational analysis
- Organisational readiness assessment
- Understand barriers and facilitators
- Identify knowledge gaps
- Ensuring that actors, actions, timing, are defined in all guidelines
- Always consider implementability (feasibility)

Presseau, J., McCleary, N., Lorencatto, F. et al. Action, actor, context, target, time (AACTT): a framework for specifying behaviour. *Implementation Sci* 14, 102 (2019). <https://doi.org/10.1186/s13012-019-0951-x>

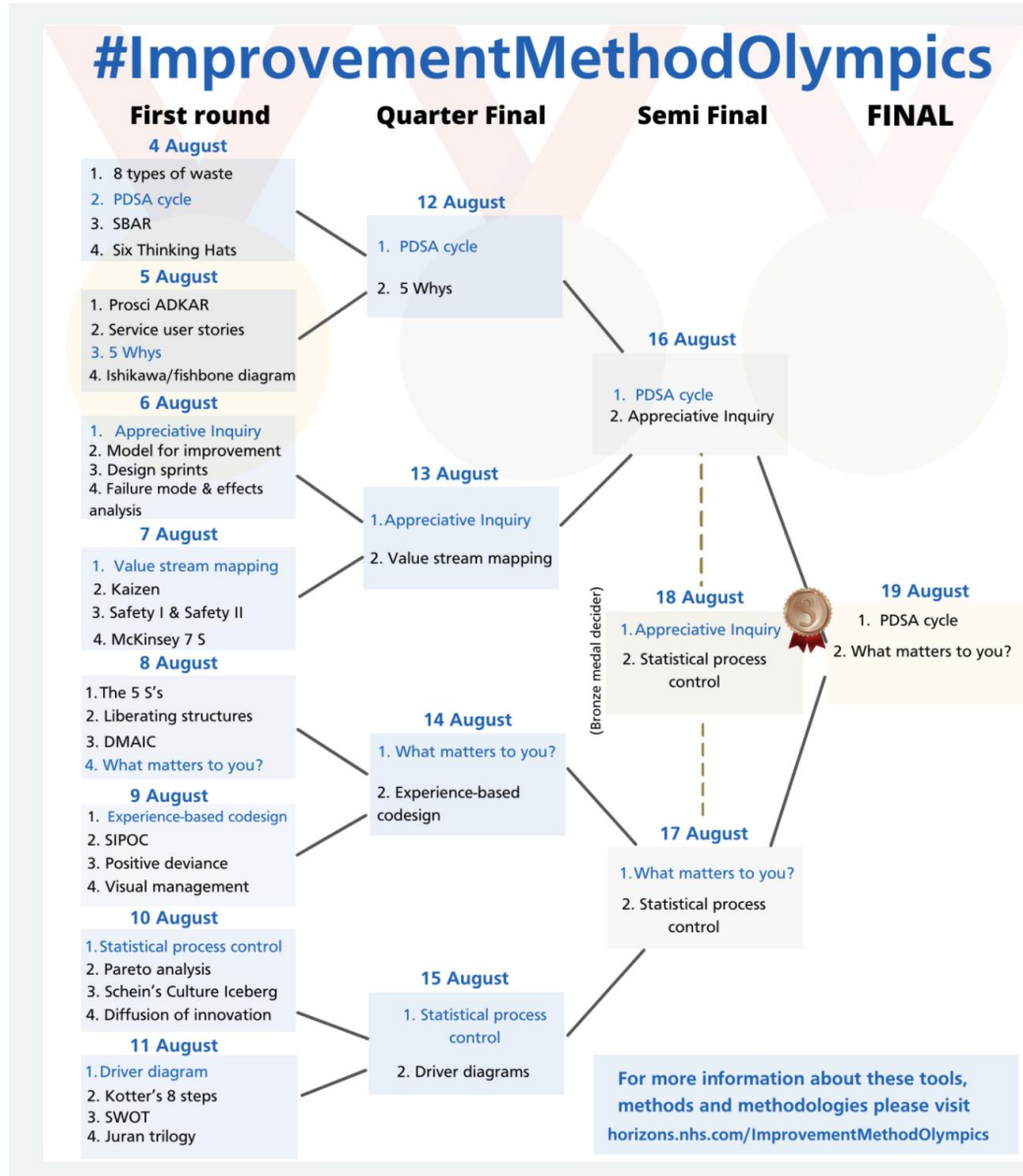


★ Effective AMS behaviour change interventions: Education & Training, Audit & Feedback, Guideline implementation and decision support, Social influence & peer modelling, Reminders & Nudges

# The RMH Guidance model for AMS



# Improvement methodologies



@HelenBevanTweet

# The #ImprovementMethodOlympics

In the spirit of the Olympics and Paralympics

## Congratulations to our winners!

### What Matters to You?

“If you don't ask, listen & then act together you'll potentially waste time and resources on improving things that aren't important to people.

@ClaireM7523

### PDSA cycles

“PDSA is amazing, it empowers you to try small tests of change and to learn from what happens and generate even better ideas. If you only ever use one QI tool...

@JenniferVeitch

### Appreciative Inquiry

“It's about recognising the strengths of those involved in the change, whipping up lots of enthusiasm and boosting with a charge of feeling empowered.

@MsKTaylorMoore



For more info: [horizonsnhs.com/ImprovementMethodOlympics](https://horizonsnhs.com/ImprovementMethodOlympics)



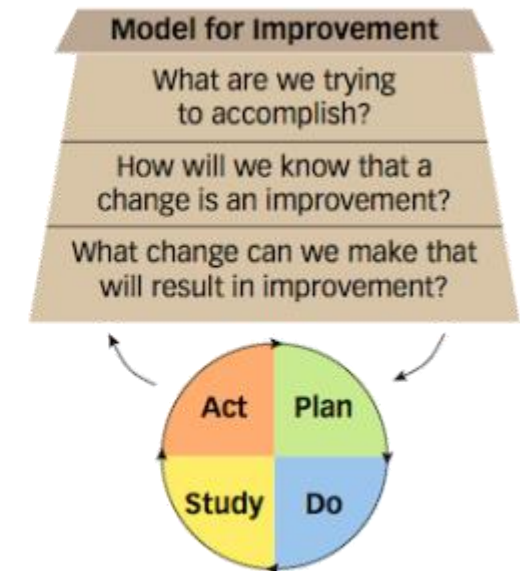
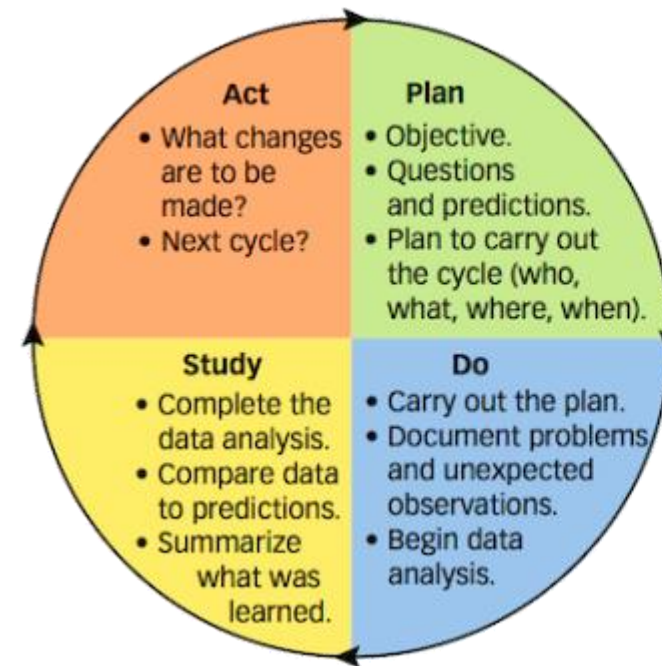
# PDSA

PDSA cycles to test an idea for change by temporarily trialling a change and assessing its impact

- **Plan** – the change that needs to be tested or implemented
- **Do** – carry out or test the change
- **Study** – data before and after the change and reflect on what is learned
- **Act** – plan the next change cycle or full implementation

Test improvements on a small scale before scaling

Create ownership is key to implementing the improvement successfully. Reduce the barrier to change





# Resources

Home > Resources > **What Matters to You?**

Font Size: **Smaller** • **Larger**

## What Matters to You?

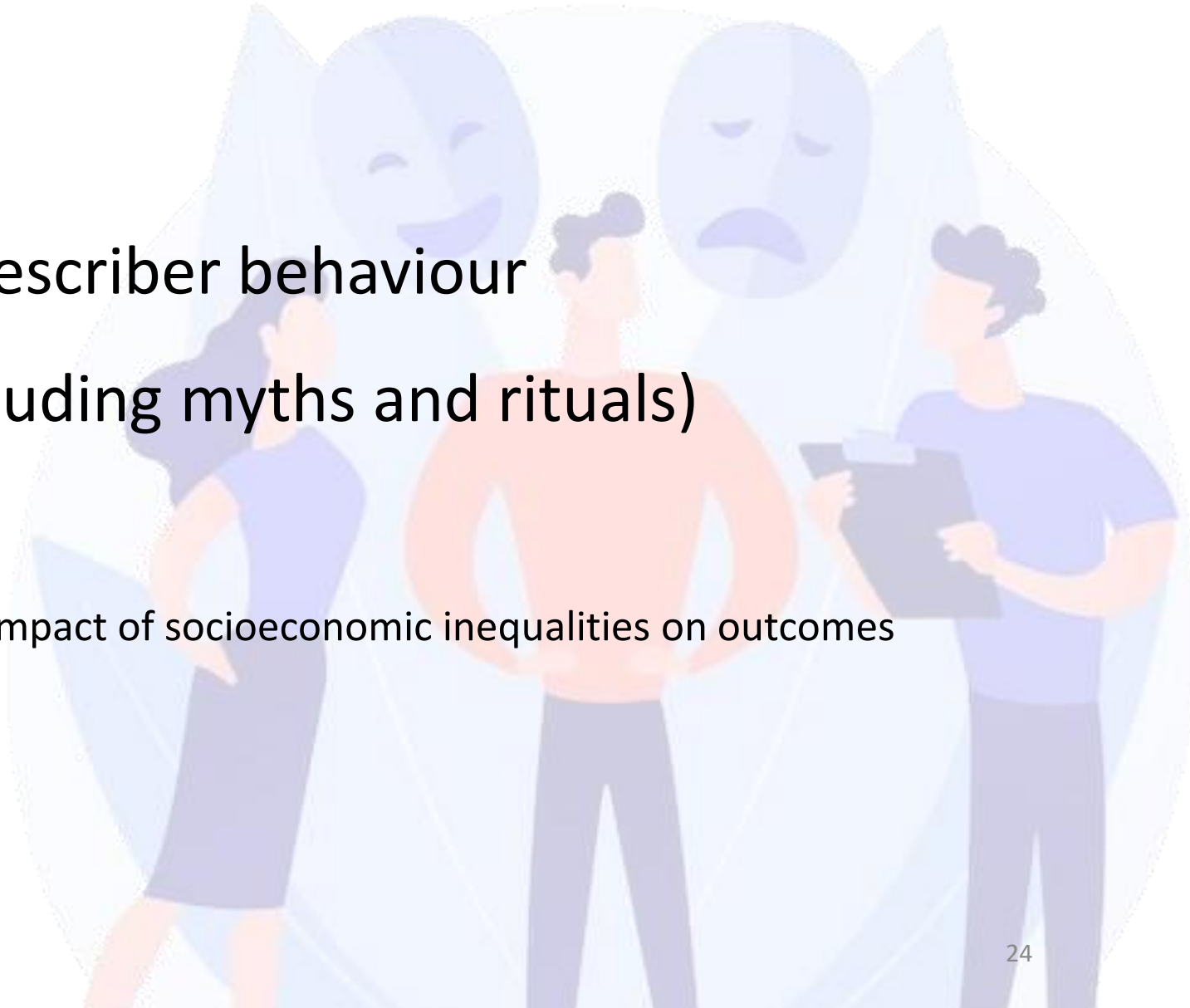
“What Matters to You?” is a simple question that can have a big impact on the quality of care. When providers have a conversation about what really matters to the people they care for, it helps them to perform their work more effectively and to provide care that is patient- and family-centred. To support health care providers in this work, we launched a provincial initiative with a simple question aimed at ensuring that care is aligned with what matters to patients and their families. Learn more about “**What Matters to You?**”

[Download “What Matters to You?” Resources](#)

A selection of downloadable resources is available on [the “What Matters to You?” order page](#). Additional resources for patients and providers are available to order, and will be distributed for free within BC.

# Social and behavioural challenges

- Prescribing etiquette
- Hierarchies influencing prescriber behaviour
- Strong belief systems (including myths and rituals)
- Social/cultural disparities
  - Research gaps in understanding the impact of socioeconomic inequalities on outcomes





# Case Study: Surgical Antimicrobial Prescribing

## Data from the Surgical NAPS

- Crude appropriateness of all SAP is **48.7%**

Low Adjusted Appropriateness (AA) for ALL surgical procedure groups

**Procedural**  
range: 33.7%- 68.9%  
(dentoalveolar to neurosurgery)

**Post-procedural**  
range: 21.5% - 58.7%  
(breast to ophthalmological)

Most common reasons for inappropriate SAP

**Procedural**  
incorrect timing (44.9%)

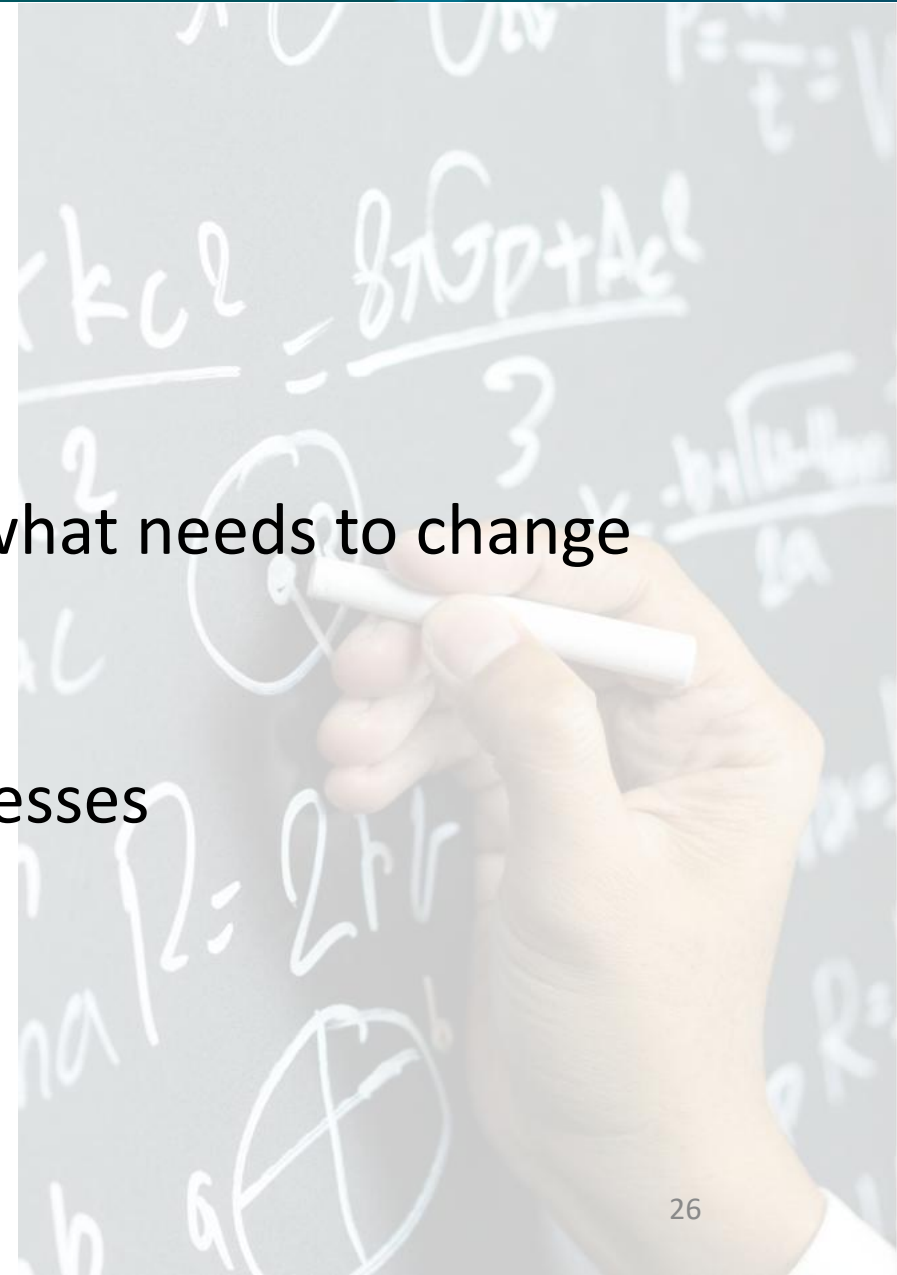


**Post-procedural**  
duration  $\geq$  24 hours (54.3%).



# Applying theory to intervention design and evaluation

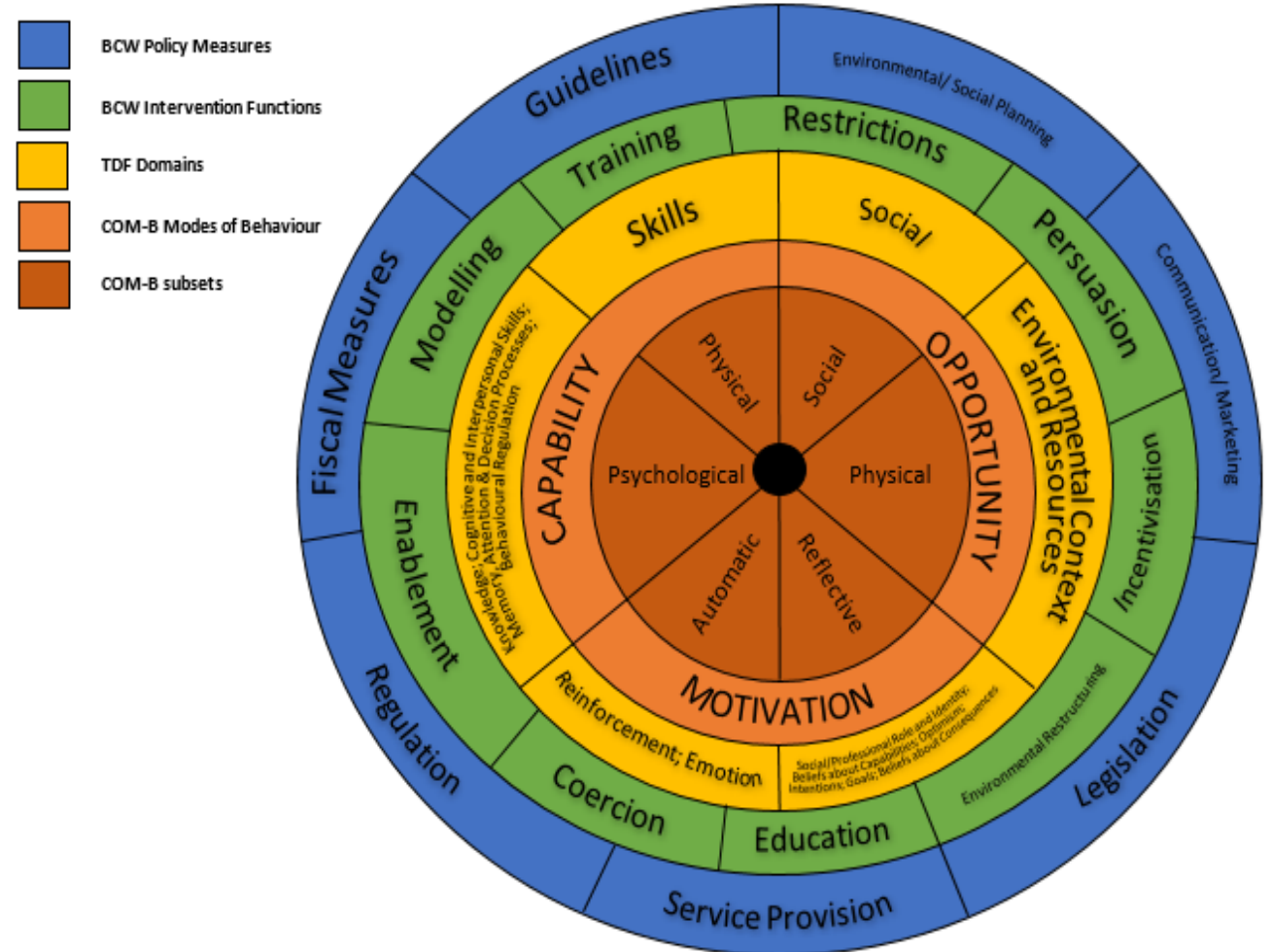
- Provides a framework to facilitate
  - accumulation of evidence
  - communication across research groups
- Identifies barriers and facilitators to change and what needs to change
- Identifies mechanisms of action
  - evidence that can be used to understand processes
  - design and improve interventions



# The role of implementation science frameworks

## Behaviour Change Wheel

“A systematic way of identifying relevant intervention functions and policy categories based on what is understood about the target behaviour.”



Overall Themes	Sub Themes	Barrier or Enabler	COM-B Model Components	Relevant Domains (Theoretical Domains Framework)
Low priority for surgical antimicrobial prophylaxis prescribing skills.	Surgical technique of greater importance	Barrier	Physical Capability	Skills
	Deskilling surgeons	Barrier		
Prescriber autonomy overrules guideline compliance	Guideline knowledge and awareness of limitations	Barrier & Enabler	Psychological Capability	Knowledge
	Competition as a means to regulate behaviour	Enabler		Memory, attention and decision processes
				Behavioural regulation
Social codes of prescribing reinforce established practices	Intra-specialty hierarchy Rules	Barrier	Social Opportunity	Social Influences
	Cross-specialty prescriber etiquette	Barrier		
Need for improved communication, documentation and data for action	Poor documentation and communication	Barrier	Physical Opportunity	Environmental context and resources
	‘Time-Out’ supports pre-operative communication; post-operative management is less standardised	Barrier & Enabler		
	Data for action	Enabler		
Fears and perceptions of risk hinder appropriate SAP prescribing.	Fear of infections	Barrier	Automatic Motivation	Emotion
	Varied risk perceptions across specialties	Barrier & Enabler		
	Fear of litigation	Barrier		
	Risking career progression and job security	Barrier		
Lack of clarity regarding the roles and accountability	The buck stops with the surgeon	Barrier & Enabler	Reflective Motivation	Social/ professional role and identity
	Passive prescribing hinders accountability and SAP cessation	Barrier & Enabler		Beliefs about Capabilities
		Capacity for role expansion of pharmacists and nurses.	Barrier & Enabler	Beliefs about Consequences

"If I had a post-operative wound infection which was superficial on the abdomen...I think, **we don't usually use antibiotics**. Whereas, plastics on the other hand... you know, if you went and **rubbed a bit of faeces on to one of their skin grafts** (laughing), it'll be horrifying. We do **flaps in the anus, and we don't use long extended antibiotics for that.**" (F4. Public colorectal surgeon)

"I think the problem is that **an infection is a nightmare**. An infected joint is **a catastrophe**".  
(F3. Private anaesthetist)

Fear of infections

Fear of litigation

Varied risk perceptions across specialties

Fears and perceptions of risk hinder appropriate SAP prescribing

Risking career progression and job security

"If you're **annoying and ask stupid questions to them**, that slowly will affect their view. **They're not going to respect you** necessarily, for asking the tough questions. They just will **consider you a hassle.**"  
(F15. Public orthopaedic surgeon)

"I think (that's) what's a **major contaminant in the space**, is the **behaviour of Medibank Private**. Who are looking to **not fund readmissions and problems for post-operative infections** etc. I think that is a **significant pressure** that, I think, some surgeons will feel, and will mitigate against. So, someone will say, '**yeah, I want to give more antibiotics, I'm worried about (infections).**'"  
(F4. Public colorectal surgeon)

# A framework for SAP Stewardship in Australia

## Collaboration/Engagement

**RACS + specialty colleges:** AMR framework and AMS for SAP

**ACQSHC:** Mandate surgeon involvement in AMS for SAP

**TG/NSW CEC** - implementation toolkit and resources

Partnered/ collaborative SAP prescribing models  
- **anaesthetists, pharmacists, nurses**

**Infection prevention** and surveillance services

Collab with **surgical colleagues** to undertake Surgical NAPS audits

## Data For Action

### Surgical NAPS

- Targets for stewardship
  - procedural timing
  - post-procedural duration
  - topical use
  - high volume surgeries
  - high ceftriaxone use
  - Prolonged durations

### Surgical Site Infection Surveillance

- No national standard

## Interventions

Co-design pathways involving pharmacists/nurses

Develop tailored AMS medical orientation packages

Electronic re-dosing reminders


CPOE/CDSS SAP order sets

Modify 'time-out' and ERAS pathways to include post-operative SAP/cessation

Standardised post-operative documentation/ checklist

**Intervention Mapping with BCW**

# Action, actor, context, target, time (AACTT): a framework for specifying behaviour

[Justin Presseau](#) , [Nicola McCleary](#), [Fabiana Lorencatto](#), [Andrea M. Patey](#), [Jeremy M. Grimshaw](#) & [Jill J. Francis](#)

[Implementation Science](#) **14**, Article number: 102 (2019) | [Cite this article](#)

## Detailed behaviour specification helps to

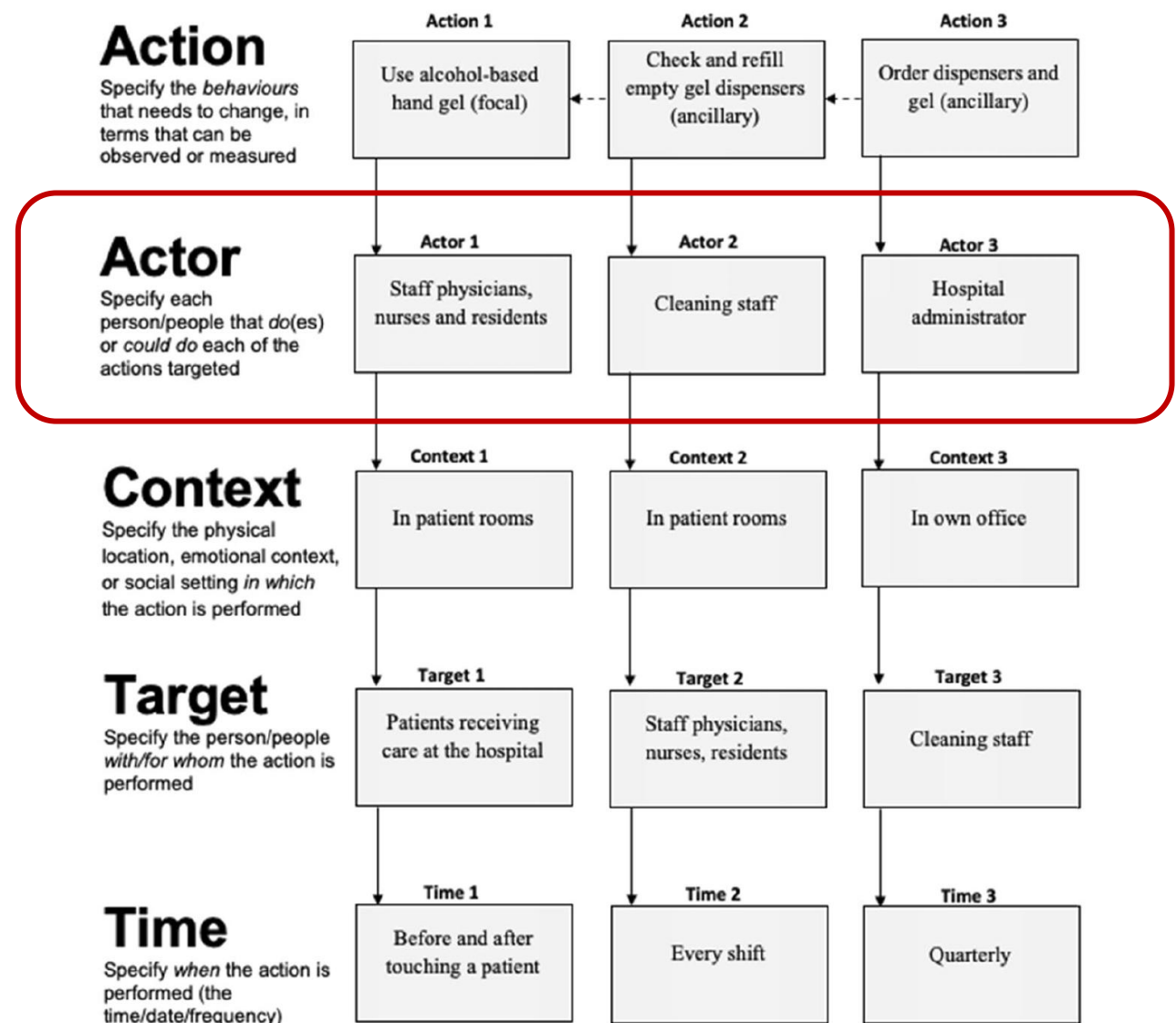
- clarify evidence-practice gaps
- who needs to do what differently
- identifies barriers and enablers
- design interventions
- provides an indicator of what to measure to evaluate an intervention's effect on behaviour change



# Example

The AACTT framework using  
hand hygiene improvement

Sepsis pathways would be  
another example!



**Fig. 2** AACTT specification for focal and ancillary Actions of multiple Actors, Contexts and Times, with worked example applied to improving hand hygiene



**Action:** Defined in 100% studies (starting, stopping Px or Rx antibiotics)

**Actor:** *Defined in 55% (80% for starting, 50% stopping)*

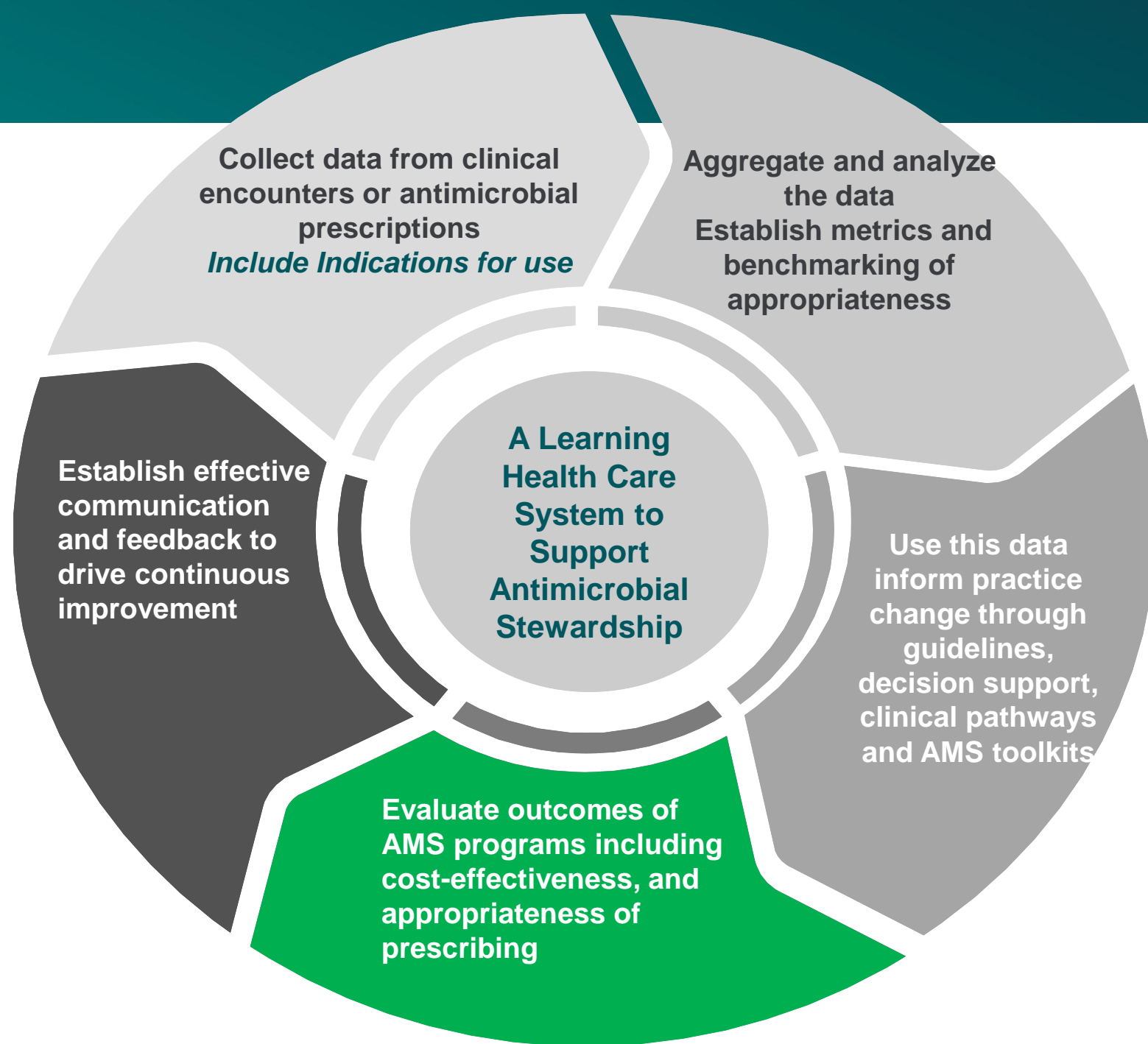
Poorly defined for ward studies e.g 'treating physician'

**Context:** Defined in 100% (e.g ICU, wards, surgery)




**Target:** Patient population defined in 100% (e.g sepsis, CAP, HAP)

**Timing:** *Defined in 76% (esp. stopping therapeutic Abs)*

*Few AMS interventions included in this review specified more than one actor and only one specified an actor who was not a doctor which fails to reflect the multi-professional care-delivery system of antibiotics in hospitals*



## Antimicrobial Stewardship Measures - Hospital Setting

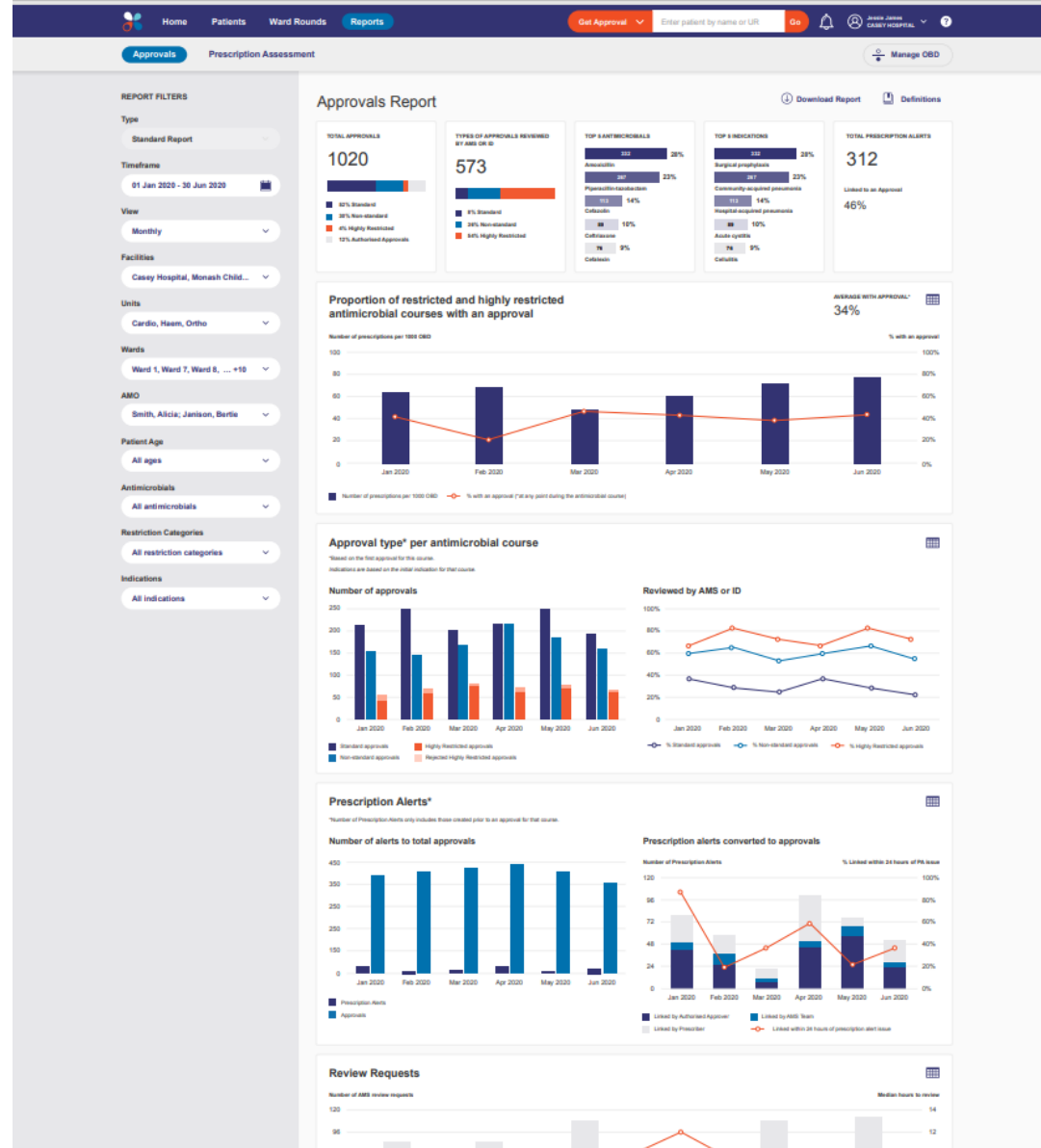
Structural Measures 	Process Measures 	Outcome Measures 
Policy	Access to guidelines & toolkits ★	Reduced antimicrobial consumption
Accountability & Leadership	Access to decision support systems ★	Decreased rates of AMR
Expertise	Prospective audit & feedback ★	Improved clinical outcomes
Educational Resources & Training	Educational Resources & Training ★	Reduced Clostridioides difficile infections
Classification systems (e.g., WHO AWaRe classification <sup>15</sup> )	Formulary restriction and pre-authorisation requirements	Cost savings
	Post-prescription review interventions Intravenous to oral conversion De-escalation of therapy Dose optimization	
	Antibiotic time-outs or stop orders	
	Antibiotic cycling or rotation	
	Rapid diagnostic testing	

★ Effective AMS behaviour change interventions

# Example

Interactive, on-demand reporting

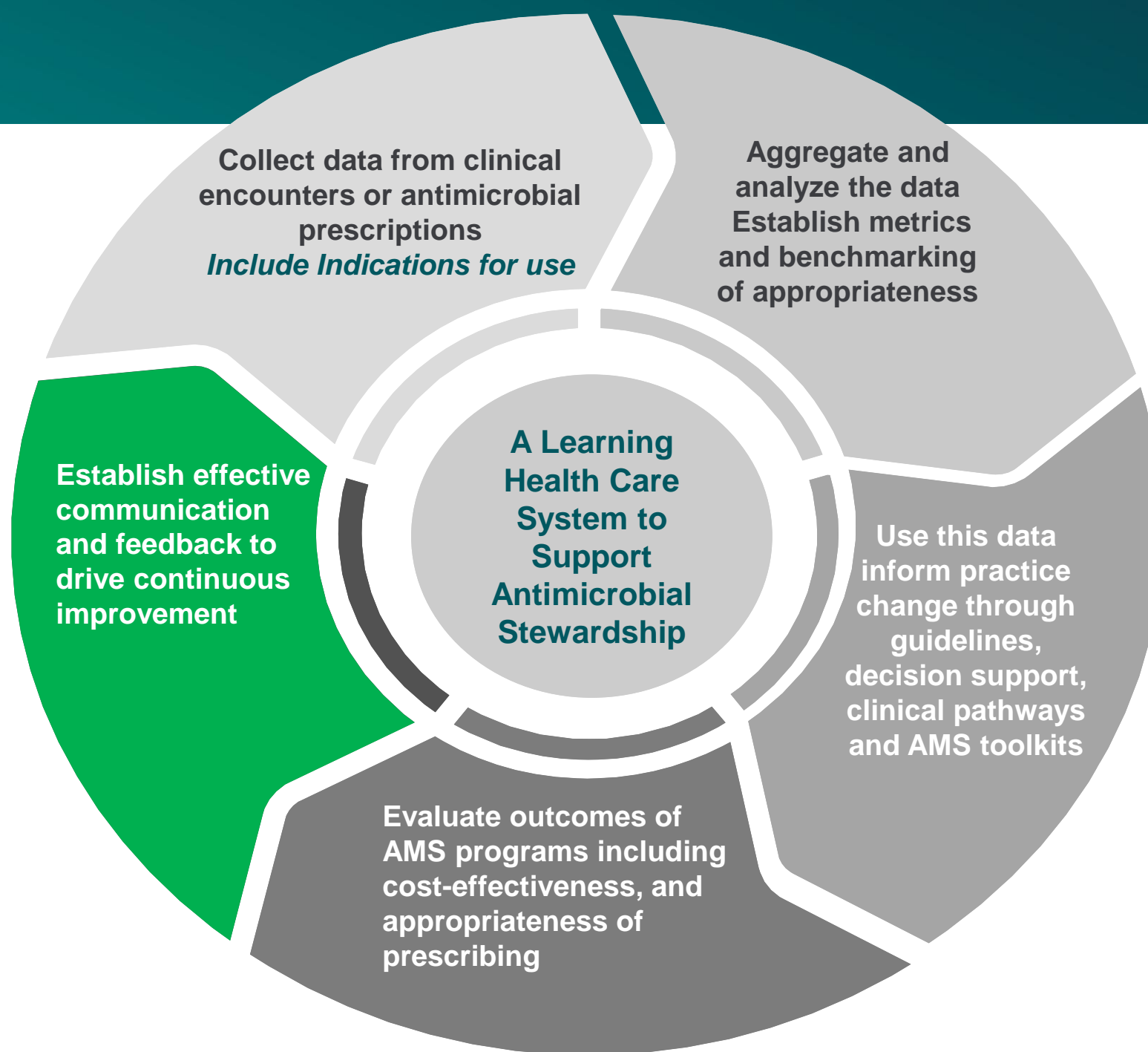
Significant time savings on report generation



Option to design customised reports

Data can be extracted for further analysis

Able to incorporate data into business intelligence systems



Tool	Description	Example
<b>Audit and Feedback</b>	Structured feedback comparing prescribing practices to guidelines or peers.	Monthly review of antibiotic prescribing practices with feedback on adherence to stewardship protocols.
<b>Behavioural Nudges</b>	Subtle cues or system changes that make desired behaviours easier or more prominent.	Setting up “antibiotic timeout” reminders in electronic health records to encourage reassessment of prescriptions.
<b>Educational Outreach</b>	One-on-one or small group sessions to address misconceptions and provide guidance on best practices.	Targeted sessions to correct misconceptions about antibiotic use in viral infections.
<b>Social Influence &amp; Peer Comparison</b>	Uses social norms and peer performance data to encourage alignment with best practices.	Sharing peer compliance rates for antibiotic guidelines to improve adherence.
<b>Digital/Mobile Reminders</b>	Prompts via mobile apps, emails, or SMS at critical moments to encourage adherence to protocols.	Automated alerts for clinicians to review and potentially de-escalate antibiotic therapy after 48 hours.
<b>Commitment &amp; Goal-Setting</b>	Encourages personal goal-setting with periodic follow-up and accountability.	Setting monthly goals for reducing unnecessary broad-spectrum antibiotic use, with follow-up on progress.
<b>Motivational Interviewing</b>	Person-centered counseling style to explore and resolve ambivalence about antibiotic use.	Discussing concerns with clinicians hesitant to reduce antibiotic use in mild cases due to resistance concerns.

# Expert systems

- Most current CDSS or computer-assisted/aided tools
- Stereotyped architecture inc. knowledge base and inference engine
- Knowledge-intensive/knowledge based systems
- “Translating human expertise into rules”
- e.g *Prescribing for community acquired pneumonia based on severity, allergy profile, pregnancy status*

The image displays three screenshots of expert systems used in clinical decision support.

**Top Left: Medications List**

- Non-Purulent/Diffuse erythema - suspicion for streptococcus species (Select One)**
  - ☐ penicillin G potassium IVPB 3 million units/50 mL D5W 3 Million Units, intravenous, EVERY 4 HOURS, for 10 days
  - ☐ If beta-lactam allergy: clindamycin (CLEOCIN) IVPB 600 600 mg, intravenous, EVERY 8 HOURS for 10 days
  - ☐ If tolerating PO: amoxicillin (AMOXIL) capsule 500 mg 500 mg, Oral, THREE TIMES DAILY, for 10 days
  - ☐ If tolerating PO and beta-lactam allergy: clindamycin (CLEOCIN) capsule 600 mg 600 mg, Oral, THREE TIMES DAILY, for 10 days
- Localized Purulence/Abcess/Known MRSA Colonization or history of MRSA in physical exam (Select One)**
  - ☐ Vancomycin 25 mg/kg loading dose then 15 mg/kg with pharmacy consult 2 Tab, Oral, TWICE DAILY, for 10 days
  - ☐ If tolerating PO: sulfamethoxazole-trimethoprim (BACTRIM DS) tablet 800 mg-160 mg 100 mg, Oral, TWICE DAILY, for 10 days
  - ☐ If tolerating PO: doxycycline (VIBRA-TABS) 100 mg tablet 100 mg, Oral, TWICE DAILY, for 10 days
  - ☐ If tolerating PO: Doxycycline 100 mg + Amoxicillin 500 mg
- Infected Ulcer (No Previous ABX)/ASO or DNaseB or MRSA (+)/Unable to detect physical exam (Select One)**
  - ☐ Vancomycin 25 mg/kg loading dose then 15 mg/kg with pharmacy consult
  - ☐ If tolerating PO: Bactrim DS + Amoxicillin 500 mg
  - ☐ If tolerating PO: Doxycycline 100 mg + Amoxicillin 500 mg
- Bite Wound/Periorbital cellulitis (Select One)**
  - ☐ *IT consult recommended*

**Top Right: TREAT Steward Summary and Treatment**

456789-1245 Tom Tomsen (55y, male)

Worklist | Sepsis Presentation | Patient Background | Site of Infection | **Summary and Treatment** | Infection note | Statistics

Demography  
Admission: 22-09-2015 08:46 | Episode onset: 22-09-2015 08:46 | Encounter: 22-09-2015 08:46 | Department: Acute ward

Background  
Place of acquisition: Community | Lung disease: **COPD** | Urinary catheter: **Yes**

Vital Parameters  
Temperature: **38.9°C** | Temperature site: Oral | SBP: 102 mmHg | DBP: **59 mmHg**  
Heart rate: 87 bpm | Respiratory rate: **22 /min** | SaO2 oximetry: 87 %

Local Findings  
Cough: **Productive** | Dysuria: **Yes** | Leukocyturia: **Yes** | Chest X-ray: **Lobar infiltrate**

Lab values  
WBC: **15.6 K/uL** | Neutrophils: **8.2 K/uL** | Hematocrit: 40 % | Platelets: 170 K/uL  
Sodium: 139 mEq/L | Glucose: **130 mg/dL** | Urea: 43 mg/dl | Creatinine: 1.33 mg/dl  
Albumin: **4.0 g/dL** | AST: 26 U/L | Total bilirubin: 0.88 mg/dl | Alkaline phosphatase: 99 mEq/L  
pH: **7.31** | PvO2: **33.9 mmHg** | PvCO2: **69.5 mmHg** | HCO3: **34.0 mEq/L**  
Lactate: **28 mg/dL**

Microbiology  
Date | Sample type | Location | Pathogen | Quantity/Result | ESB | Amika | Amp | AmoxCl | Cftaz | Cftria | Cefur | Cipro | Colis | Erta  
14-05-2015 | Culture | Urine | E. Coli | 10^4-4/ml | + | S | R | S | R | R | R | R | S | S  
14-05-2015 | Culture | Blood | No growth | Q/3 bottles | - | - | - | - | - | - | - | - | - | -

Advice  
Diagnosis and sepsis degree  
Suggested diagnosis | Select diagnosis | In-vivo coverage: Ampicillin IV [47%] | All coverages | Treatment | Recommendation | Coverage | Cost | Benefit  
Pneumonia: 91% | S. pneumoniae (LRT): 43%  
Cystitis: 22% | E. coli (UTI): 15%  
Urosepsis: 5% | Moraxella (LRT): 15%  
Pyelonephritis: 2% | Viruses (LRT): 10%  
Hemophilus (LRT): 6%  
Antimicrobials not effective: 4%

**Bottom Left: vancomycin IV Approval Tool**

1. ANTIMICROBIAL  
vancomycin IV
2. INDICATION  
Sepsis, unknown source, community acquired
3. ADULT OR CHILD  
Adult
4. ADDITIONAL CRITERIA  
MDR gram-negative pathogen not suspected
5. ADDITIONAL CRITERIA 2  
No penicillin hypersensitivity
6. ADDITIONAL CRITERIA 3  
Neisseria meningitidis not suspected
7. ADDITIONAL CRITERIA 4  
None of the above

**Recommendation**

**The indication does not meet the approval criteria for vancomycin IV.**

Select the antimicrobials you want approval for:  
You may wish to consider the following guideline recommendations instead.

**Preferred Recommendation** | View details

☐ gentamicin  
☐ flucloxacillin  
Non-recommended - no approval required

**Bottom Right: Empirical regimens for adults with community-acquired sepsis or septic shock, source not apparent**

No resources available for vancomycin IV  
Sepsis, unknown source, community acquired  
NATIONAL Guidelines

Empirical regimens for adults with community-acquired sepsis or septic shock, source not apparent  
NATIONAL Guidelines

The following empirical regimens are intended for initial therapy only (up to 48 hours). Modify therapy as soon as additional information is available (eg source of infection; results of Gram stain, culture and susceptibility testing). Evaluate appropriateness of antimicrobial therapy daily, with consideration given to the patient's clinical status and the principles of antimicrobial stewardship.

The empirical regimens are intended for initial therapy only (up to 48 hours)—modify as soon as additional information is available.

For advice on recognizing sepsis and septic shock and early intervention, see [Principles of managing sepsis and septic shock](#).

Modified empirical regimens are included below for patients:

- hypersensitive to penicillins
- at risk of infection with a multidrug-resistant Gram-negative bacterium (see [Box 2.30](#) for risk factors)
- in tropical regions of Australia ([Note 1](#)) where infection with *Burkholderia pseudomallei* is possible.

The following empirical regimens may also need to be modified according to local epidemiology, if known.

For adults with community-acquired sepsis or septic shock without an apparent source of infection, use:

gentamicin intravenously over 3 to 5 minutes; see [Principles of aminoglycoside use for principles of use \(Note 2\)](#)

adults with septic shock or requiring intensive care support, but without known



# Can we use AI?

## Artificial Intelligence

Computer systems capable of activities normally associated with cognitive effort

### Machine Learning

Training machines to recognize patterns. Using labelled (supervised) or unlabeled (unsupervised) data

### Deep Learning

Subfield of machine learning using layered neural networks to learn from vast amounts of data

### Generative AI

Subfield of deep learning that relates to the generation of new data (text, audio, video, images)



# MACHINE LEARNING CDSS

Ability to automatically learn and improve from experience without been explicitly programmed (machine learning)

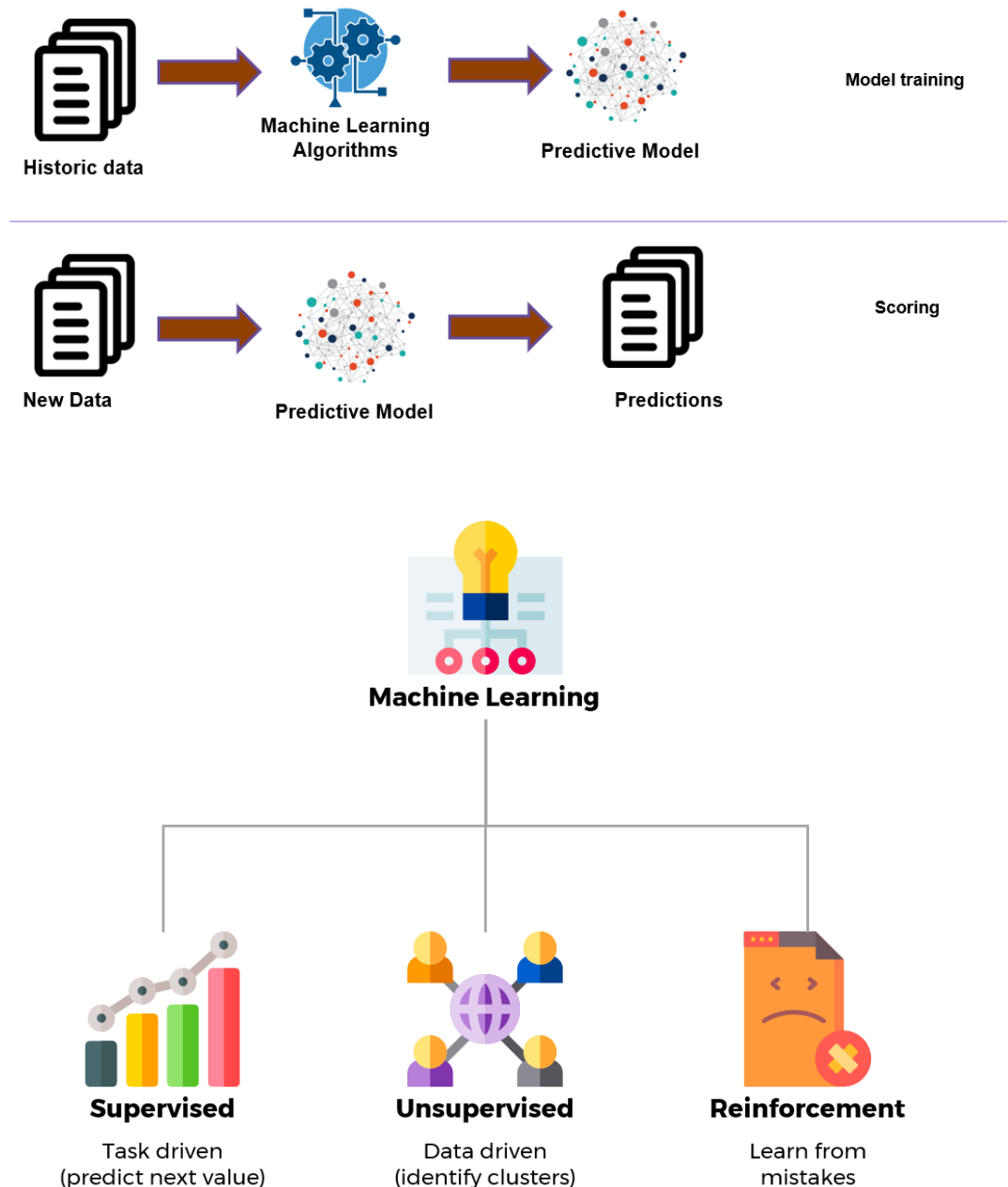
Use of algorithms

Most medical applications use supervised learning

Data-intensive – quality of patient data is very important

“Programming algorithm than can automatically extract rules from data”

*e.g Sepsis prediction programs*



# Machine Learning CDSS

90% high income countries/90% adult  
40% ICU and 25% ID consultation

## **Demonstrated effectiveness with**

1. **Prediction and early detection of sepsis**
2. **Diagnosis of infections**
3. **Assist with identification of appropriate therapy**
4. **Prediction of AMR**

Rare use of **unstructured clinical data (i.e natural language processing)**

For bacterial infection models: missing key inputs e.g transmission risk, antibiogram

Almost all retrospective studies

**Scarce clinical implementation of models (with mixed results)**

# Practical use cases for AMS

## DEVELOP GUIDANCE

- Create custom antibiotic stewardship GPTs
- Develop new guidance documents using prior
- Examples

## SUMMARIZE

- Shorten long documents and articles
- Identify key messages from podcasts and videos
- Act as a personal meeting note-taker

## TRANSLATE & SIMPLIFY

- Translate to/ from English
- Simplify language to a specific reading level or audience

## EDUCATE

- Generate quizzes from existing content
- Create analogies to explain concepts
- Develop infographics and presentations

## RESEARCH

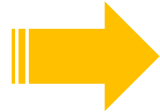
- Perform a literature search
- Critique your scientific writing
- Write statistical analysis code

## MANIPULATE DATA

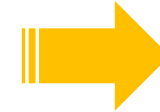
- Visualize quantitative data
- Summarize and categorize qualitative data

# Our experience: Bringing data science into quality improvement for AMS

## Research



## Translation



## Technology



# Objectives

- Harness data from electronic health records from hospitals, primary care and vet clinics
- Establish common data models for antimicrobial use metrics and infection indications across sectors
- Support automation and scaling and benchmarking of future antimicrobial prescribing surveillance
- Drive better patient outcomes while limiting the emergence of antimicrobial resistance

# Considerations

- What are the data sources?
- What are the ethics and governance arrangements?
- Where can the data be stored securely during analysis and later, for implementation?
- What expertise is required?

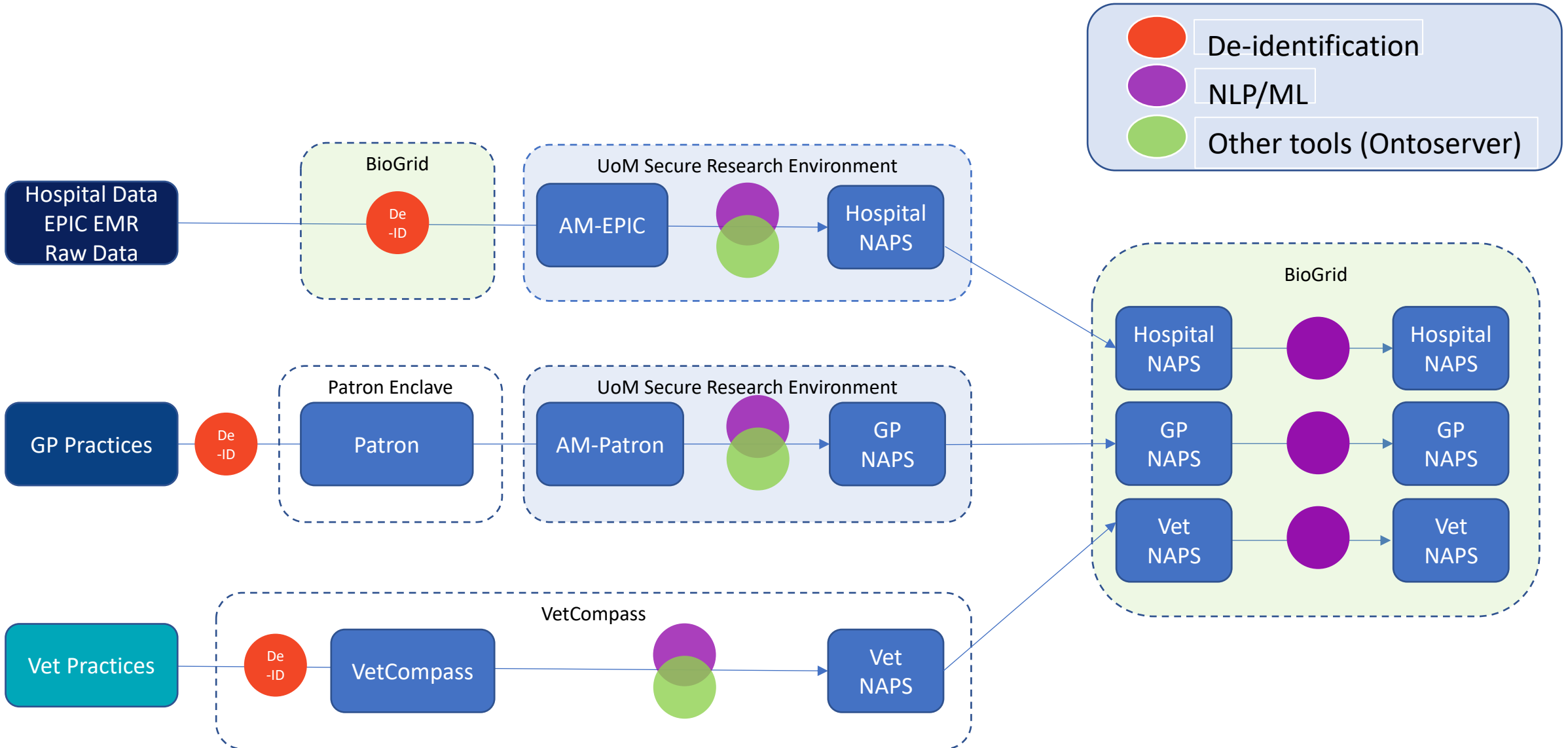


# The team

- **Clinicians**
  - Infectious Diseases Physicians
  - Vets, GPs
  - Pharmacists
  - Microbiologists
  - Infection prevention experts
- **IT**
  - Software Developers
  - Informaticists
  - Data scientists
- **Epidemiologist**
- **UI/UX specialists**
- **Researchers**
  - MPhil, PhDs and Post Docs



# Data pipelines



# Establish clinical working groups

Stakeholders identified for each domain (Hospital, PC, Animal Health)

Identify priority indications for algorithm development:

- The most common indications
- Known poor rates of appropriateness from Hospital NAPS data
- Commonly prescribed or target antimicrobials (e.g quinolones)
- Indications common across animal and human health
- Can be used to generate data meaningful for national QI programs

# Plan

Use NLP and ML algorithms to

- augment data pipelines to support the automation of antimicrobial quality of prescribing assessments
- streamline data capture from unstructured free text
- automatically classify the appropriateness of antimicrobial prescriptions

# Questions?

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