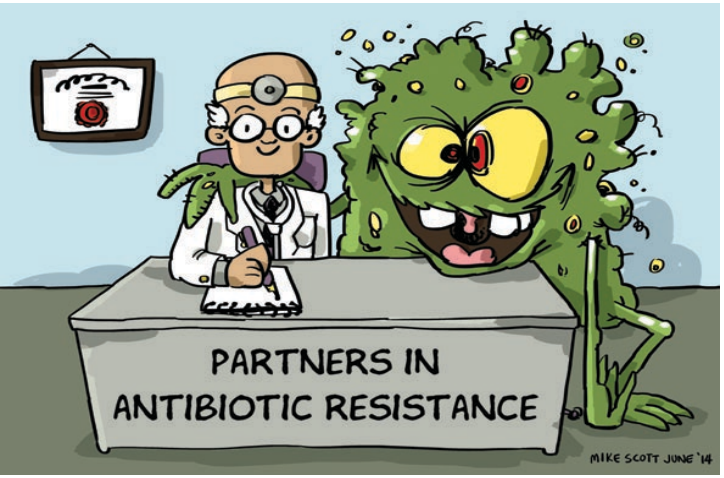


How to develop, implement and evaluate prescribing guidelines and post-prescription review

Jameela Alsalman, CBIC, CMQ

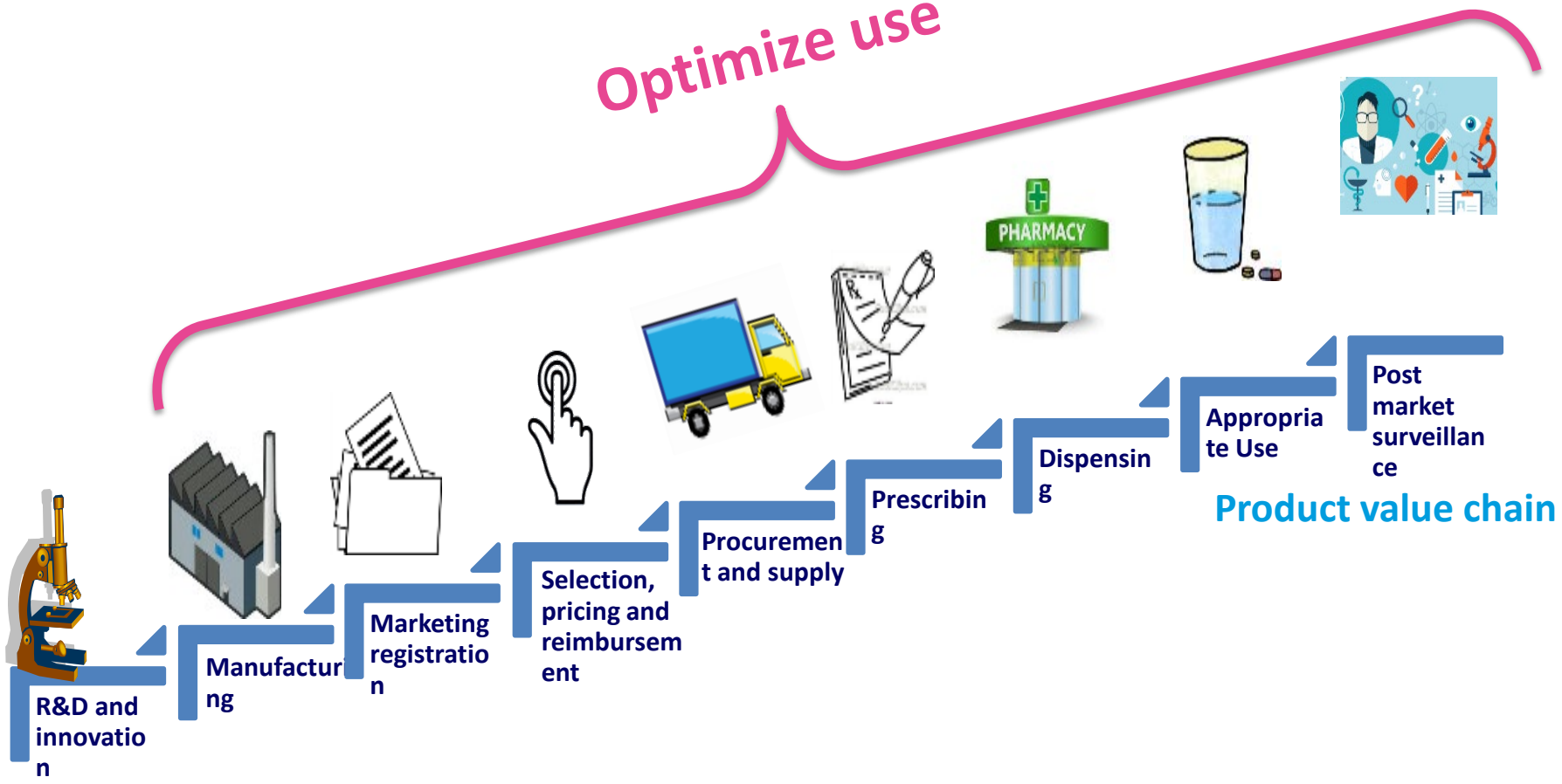
American Board in Internal Medicine, Geriatric and Infectious Diseases
Chairperson of HIV management team in MOH
Chairperson of Antibiotic committee in MOH, Kingdom of Bahrain
Chairperson of the geriatric services in secondary care
Associate Professor in Arabian Gulf University

Global Action Plan: 5 strategic objectives

1. Improve awareness and understanding of AMR	2. Strengthen knowledge through surveillance and research	3. Reduce the incidence of infection	4. Optimize the use of antimicrobial medicines	5. Ensure sustainable investment in countering antimicrobial resistance
Risk communication	National AMR surveillance	IPC, WASH, HAI	Access to qualified antimicrobial medicines, regulation, AMS	Measuring the burden of AMR
Education	Laboratory capacities	Community level prevention	Use in veterinary and agriculture	Assessing investment needs
	Research and development	Animal health: prevention and control		Establishing procedures for participation

Optimize the use of antimicrobials

Integrated approach to Stewardship, AWaRe & Surveillance

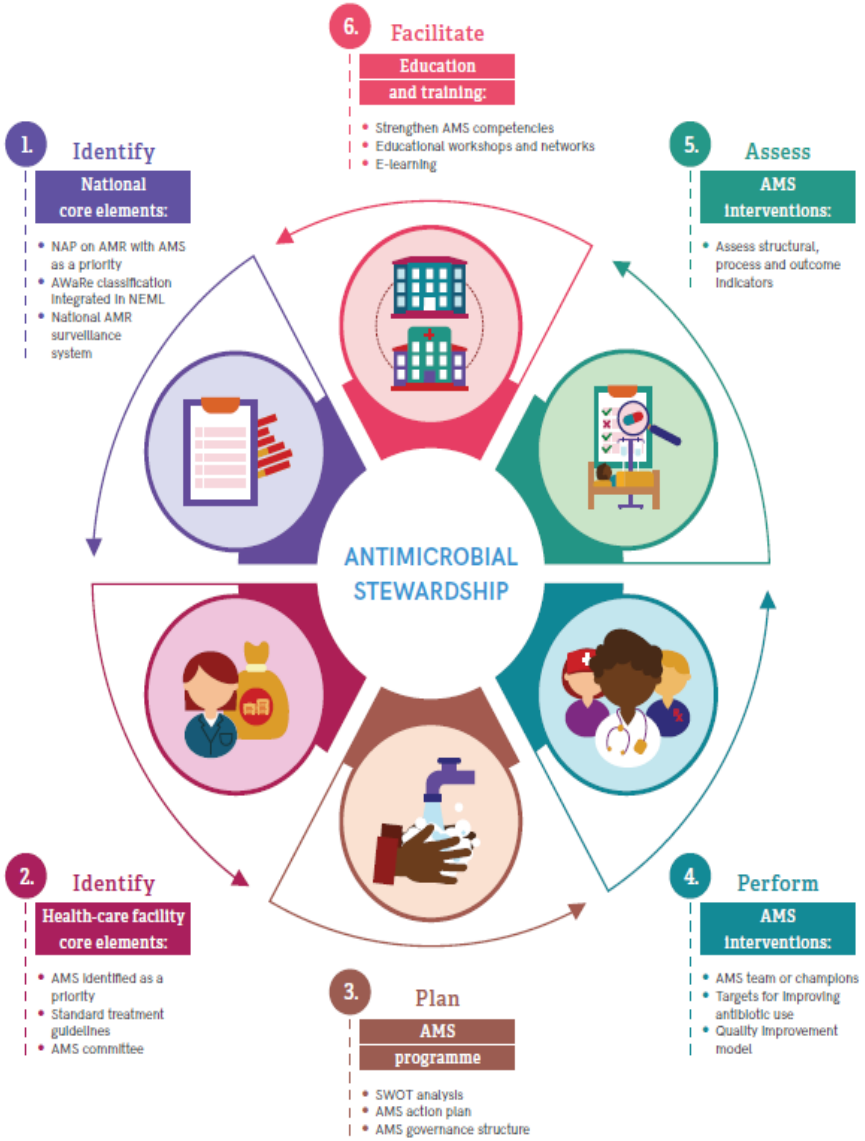


Optimize use: Integrated approach to Stewardship, AWaRe & Surveillance

- National Action Plan to Combat Antimicrobial Resistance in Hashemite Kingdom of Jordan (2018-2022):
  - **Vision:** Reduction of mortality, morbidity and economic impact of AMR in Jordan.

- By the year 2022:
  1. **10% reduction in AMR morbidity**
  2. **20% reduction in antimicrobial consumption in humans**
  3. 30% reduction in antimicrobial consumption in animals
  4. **30% reduction in diseases due to multidrug resistant organisms**
  5. **40% increase of public knowledge on AMR and awareness of appropriate use of antimicrobials**

WHO practical toolkit: AMS in health-care facilities (2019)



Antimicrobial stewardship (AMS) – definition, objective, action & outcome

Definition: A strategy & set of actions to promote using antimicrobials responsibly

Objective: To ensure effective antibiotic treatment for patients today & tomorrow

Action: Change prescribing practices and Abx use: No ABx when not needed; old ABx when sufficient; new ABx only when necessary

Outcome: Improve patient outcomes, prolong use of existing Abx, save lives & health-care costs, reduce emergence & spread of AMR

Hospital AMS Programme

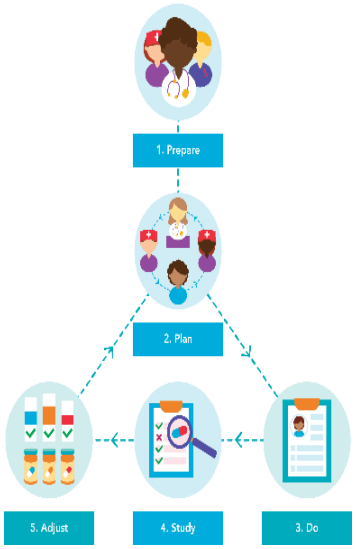
2. Hospital core elements

3. Planning AMS programmes

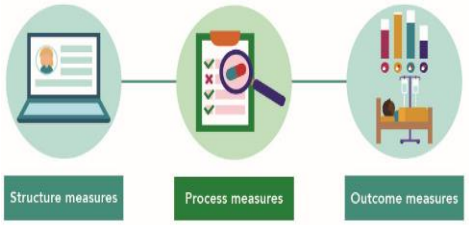
	HELPFUL	HARMFUL
INTERNAL/PRESENT FACTORS	**Strengths** *Core elements:* • AMR and AMS are a leadership priority. • IPC programme/committee is active. *Human resources:* • There is enthusiasm for AMS in the facility/wards. • There is clinical knowledge of AMS. *Antimicrobial use and resistance data:* • Prescription audit is conducted in one ward. • Facility aggregate antibiogram is available. *AMS activities:* • A pharmacist is involved in some AMS activities in one ward.	**Weaknesses** *Core elements:* • No medical record or prescription pad is available. *Human resources:* • No dedicated health care professional is available to lead the AMS team. *Antimicrobial use and resistance data:* • The supply of microbiology reagents is poor. • The supply of antibiotics is poor. *AMS activities:* • Health-care professionals have competing priorities and little time for AMS work.
EXTERNAL/FUTURE FACTORS	**Opportunities** *Core elements:* • Active implementation of the NAP on AMR • Increasing national awareness of AMR and its consequences for health *Human resources:* • Incorporating AMS responsibility into the IPC committee *Antimicrobial use and resistance data:* • Funds for conducting a facility PPS *AMS activities:* • Presenting findings from AMS activities to other wards/ health-care professionals	**Threats** *Core elements:* • Unstable access to essential antibiotics • Increased costs for antibiotics • Prioritization of issues other than AMS in the facility • Low facility budget *Human resources:* • Too many non-functional committees in the health-care facility *Antimicrobial use and resistance data:* • Increasing AMR rates, including carbapenem-resistant Enterobacteriaceae (CRE) *AMS activities:* • Opposition from clinical leaders

SWOT

4. Performing AMS Interventions



5. Assessing AMS Interventions



Health-care facility core elements

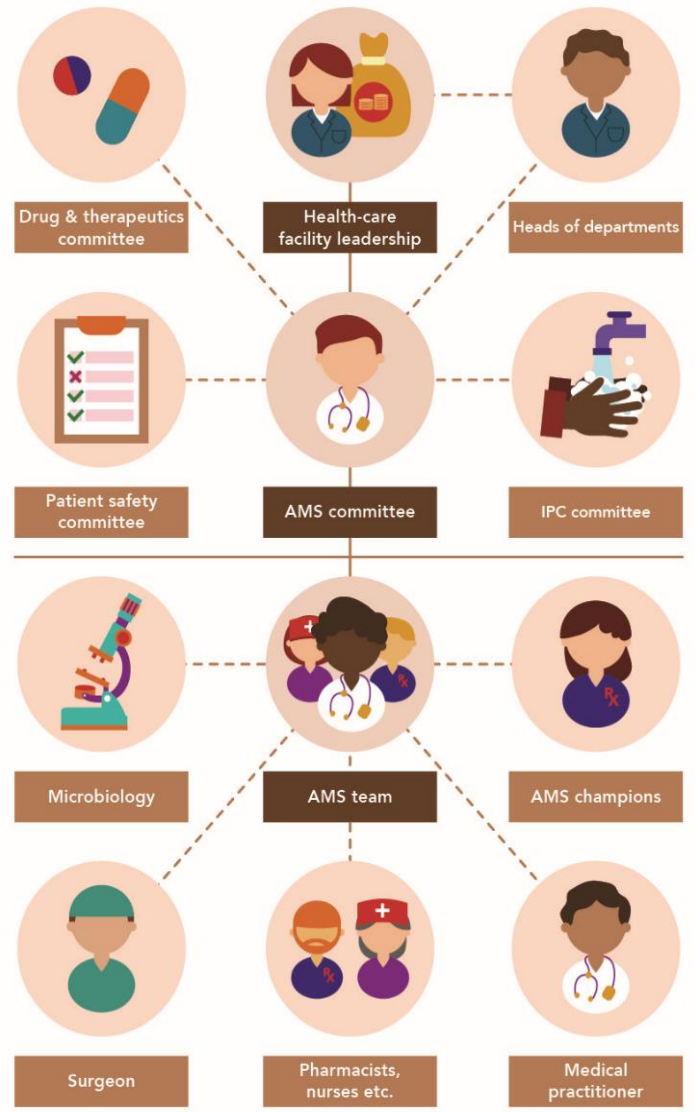
- ✓ Leadership – prioritize AMS
- ✓ Human resources
- ✓ Education and training
- ✓ Treatment guideline
- ✓ AMS interventions
- ✓ Monitoring ABx
- ✓ Reporting and feedback
- ✓ Links to IPC and WASH

Planning AMS programmes

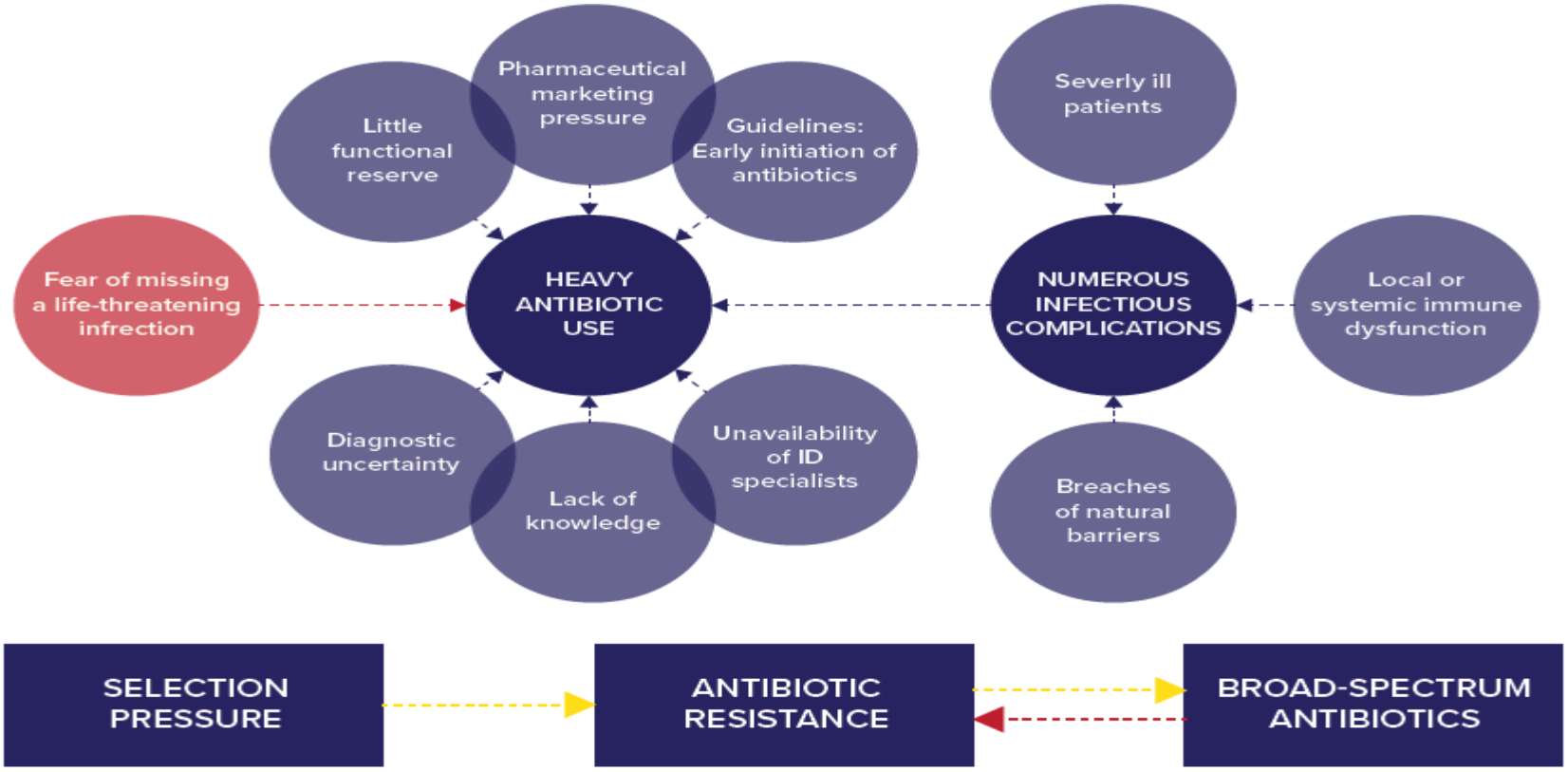
Situational or SWOT analysis	Conduct a SWOT analysis: • Structures, policies and guidelines • Human resources • Data: antimicrobials, resistance • AMS activities
Facility AMS action plan	To ensure accountability, prioritize activities and measure progress

Governance

- ✓ Responsabilities and accountability
- ✓ AMS team and/or AMS champions
- ✓ Link to other programmes/ committees



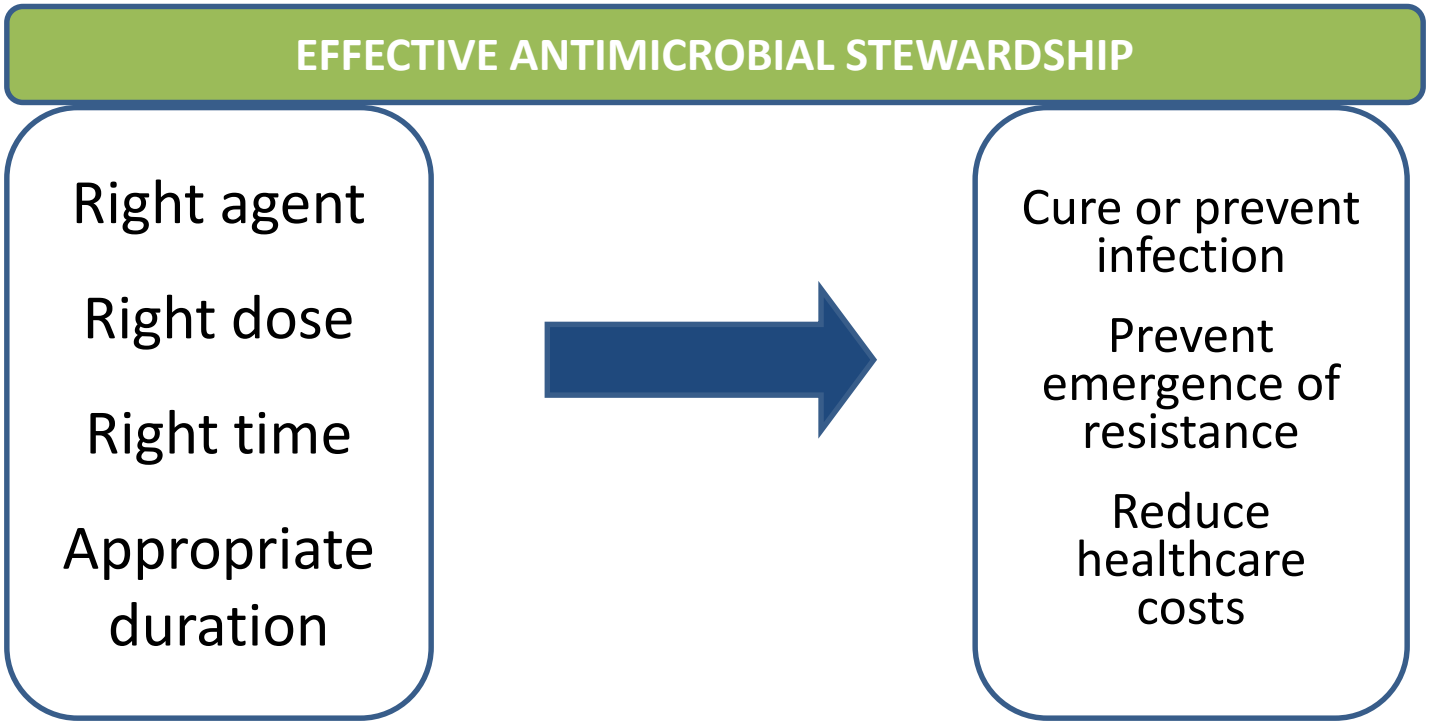
WHAT ARE THE DRIVERS FOR THE USE AND MISUSE OF ANTIBIOTICS?



BSAC : Antimicrobial stewardship from principals to practice
2018 British Society for Antimicrobial Chemotherapy

What are the Goals of Antimicrobial Stewardship?

- Antimicrobial stewardship is an organizational or healthcare system-wide approach to promoting and monitoring judicious use of antimicrobials to preserve their future effectiveness1,2
- Antimicrobial stewardship is a key strategy to overcome resistance by the careful and responsible management of antimicrobial use



- **1.** British Society for Antimicrobial Chemotherapy. A Practical Guide to Antimicrobial Stewardship in Hospitals. Available at: http://bsac.org.uk/news/practical-guide-to-antimicrobial-stewardship-in-hospitals/. Last accessed September 29, 2015.

Key Components of an Antimicrobial Stewardship Program

- A multidisciplinary antimicrobial stewardship program should include:
  - Infectious diseases physician and pharmacist and other key stakeholders as determined by the institution
  - Policy statement
  - Physician-directed or supervised multidisciplinary program with a minimum of one or more members trained in antimicrobial stewardship
- **Two core strategies were recommended**
  - **Prospective audit with intervention and feedback**
  - **Formulary restriction and authorization**
- Other recommended strategies
  - Education
  - Guidelines and clinical pathways
  - Order forms
  - Streamlining/de-escalation
  - Dose optimization
  - Intravenous-to-oral conversion

- British Society for Antimicrobial Chemotherapy. *A Practical Guide to Antimicrobial Stewardship in Hospitals.* Available at: http://bsac.org.uk/news/practical-guide-to-antimicrobial-stewardship-in-hospitals/. Last accessed September 29, 2015.

Clinical Infectious Diseases
IDSA GUIDELINE

Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America

Tamar F. Barlam,[1,a] Sara E. Cosgrove,[2,a] Lilian M. Abbo,[3] Conan MacDougall,[4] Audrey N. Schuetz,[5] Edward J. Septimus,[6] Arjun Srinivasan,[7] Timothy H. Dellit,[8] Yngve T. Falck-Ytter,[9] Neil O. Fishman,[10] Cindy W. Hamilton,[11] Timothy C. Jenkins,[12] Pamela A. Lipsett,[13] Preeti N. Malani,[14] Larissa S. May,[15] Gregory J. Moran,[16] Melinda M. Neuhauser,[17] Jason G. Newland,[18] Christopher A. Ohl,[19] Matthew H. Samore,[20] Susan K. Seo,[21] and Kavita K. Trivedi[22]

Goal of the 2016 guidelines

- Provide a guideline that diverse stakeholders find useful
- More detailed, implementation-oriented focus compared with prior guidelines
- Expand scope
  - e.g. pharmacologic optimization, the role of microbiology-relevant interventions, and metrics by which to assess programs
  - Reference special populations, settings
- Use the GRADE system to rank the guideline's recommendations and the level of evidence

Clin Infect Dis 2016;62(10):e51–e77

Select Examples

- Does the Use of Preauthorization and/or Prospective Audit and Feedback Interventions by ASPs Improve Antibiotic Utilization and Patient Outcomes?

  We recommend preauthorization and/or prospective audit and feedback over no such interventions (strong recommendation, moderate-quality evidence).

- Should ASPs Develop and Implement Facility-Specific Clinical Practice Guidelines for Common Infectious Diseases Syndromes to Improve Antibiotic Utilization and Patient Outcomes?

  We suggest ASPs develop facility-specific clinical practice guidelines coupled with a dissemination and implementation strategy (weak recommendation, low-quality evidence)

- Should ASPs Implement Interventions to Improve Antibiotic Use and Clinical Outcomes That Target Patients With Specific Infectious Diseases Syndromes?

  We suggest ASPs implement interventions to improve antibiotic use and clinical outcomes that target patients with specific infectious diseases syndromes (weak recommendation, low-quality evidence)

Select examples continued

- Should ASPs Implement Interventions Designed to Reduce the Use of Antibiotics Associated With a High Risk of CDI?

  We recommend antibiotic stewardship interventions designed to reduce the use of antibiotics associated with a high risk of CDI compared with no such intervention (strong recommendation, moderate-quality evidence)

- In Hospitalized Patients Requiring Intravenous (IV) Antibiotics, Does a Dedicated Pharmacokinetic (PK) Monitoring and Adjustment Program Lead to Improved Clinical Outcomes and Reduced Costs?

  We recommend that hospitals implement PK monitoring and adjustment programs for aminoglycosides (strong recommendation, moderate-quality evidence).
  We suggest that hospitals implement PK monitoring and adjustment programs for vancomycin (weak recommendation, low-quality evidence).

Select examples continued

- Should ASPs Implement Interventions to Increase Use of Oral Antibiotics as a Strategy to Improve Outcomes or Decrease Costs?

  We recommend ASPs implement programs to increase
  both appropriate use of oral antibiotics for initial therapy
  and the timely transition of patients from IV to oral antibiotics (strong recommendation, moderate-quality evidence)

- Should ASPs Advocate for Rapid Diagnostic Testing on Blood Specimens to Optimize Antibiotic Therapy and Improve Clinical Outcomes?

  We suggest rapid diagnostic testing in addition to conventional culture and routine reporting on blood specimens if
  combined with active ASP support and interpretation
  (weak recommendation, moderate-quality evidence)

- Should ASPs Implement Interventions to Reduce Antibiotic Therapy to the Shortest Effective Duration?

  We recommend that ASPs implement guidelines and strategies to reduce antibiotic therapy to the shortest effective duration (strong recommendation, moderate-quality evidence)

Current evidence on hospital antimicrobial stewardship objectives: a systematic review and meta-analysis

- Overall quality of evidence was low, but they concluded there was enough support for some interventions:
  - Following guidelines in administering empiric antibiotics
  - IV to PO
  - Antibiotic restrictions
  - ID consultations
  - therapeutic drug monitoring
  - De-escalation of therapy
- Conclusion: The overall evidence for these interventions shows significant benefits for clinical outcomes, adverse events, costs, resistance rates, or combinations of these. However, the included studies were generally of low quality.

Lancet Infect Dis 2016 published online March 2

Performing AMS interventions

Evidence based AMS interventions

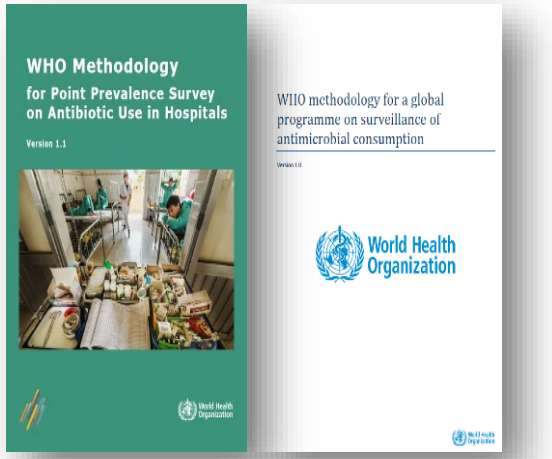
Interventions (examples)	
Education	• Formal/ informal • Treatment guidelines
Feedback	• Audit with feedback • Ward rounds
Structure	• Self-revision by prescriber • Computerized order entry
Restriction	• Pre-authorization • Automatic stop orders

Davey P. Interventions to improve antibiotic prescribing practices for hospital inpatients. Cochrane Database Syst Review 2013 Apr 30;4: CD003543.

How to do it

- 1. what are the most common infection in your institution ?
- 2. What are the steps to be followed ?
- 3. What are the elements to be addressed ?
- 4. How to analyze ? The goals
- 5. How to follow up ?

Assessing AMS programmes



- **Baseline**: Measure the **quantity** and **quality** of **antibiotic prescribing and use,** to identify priority areas for AMS interventions
- **Goal:** to **compare** results within a hospital, department or ward **over time; AB prescribing and use, patient outcomes etc**

- ✓ ***Structure measures***: core elements
- ✓ ***Outcome measures***: ABX use, patient outcomes
- ✓ ***Process measures***: proportions e.g. of pneumonia patients receiving appropriate antibiotic treatment

Education & Training

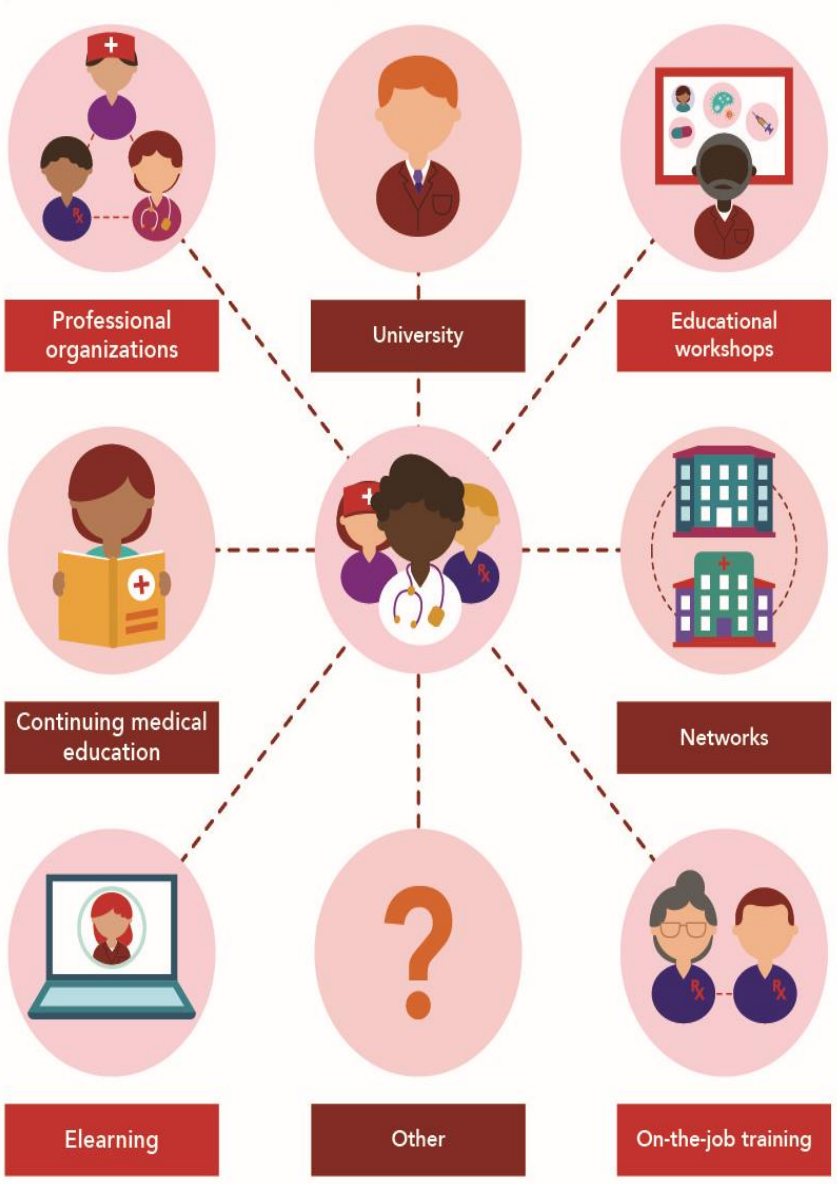
AMS competencies

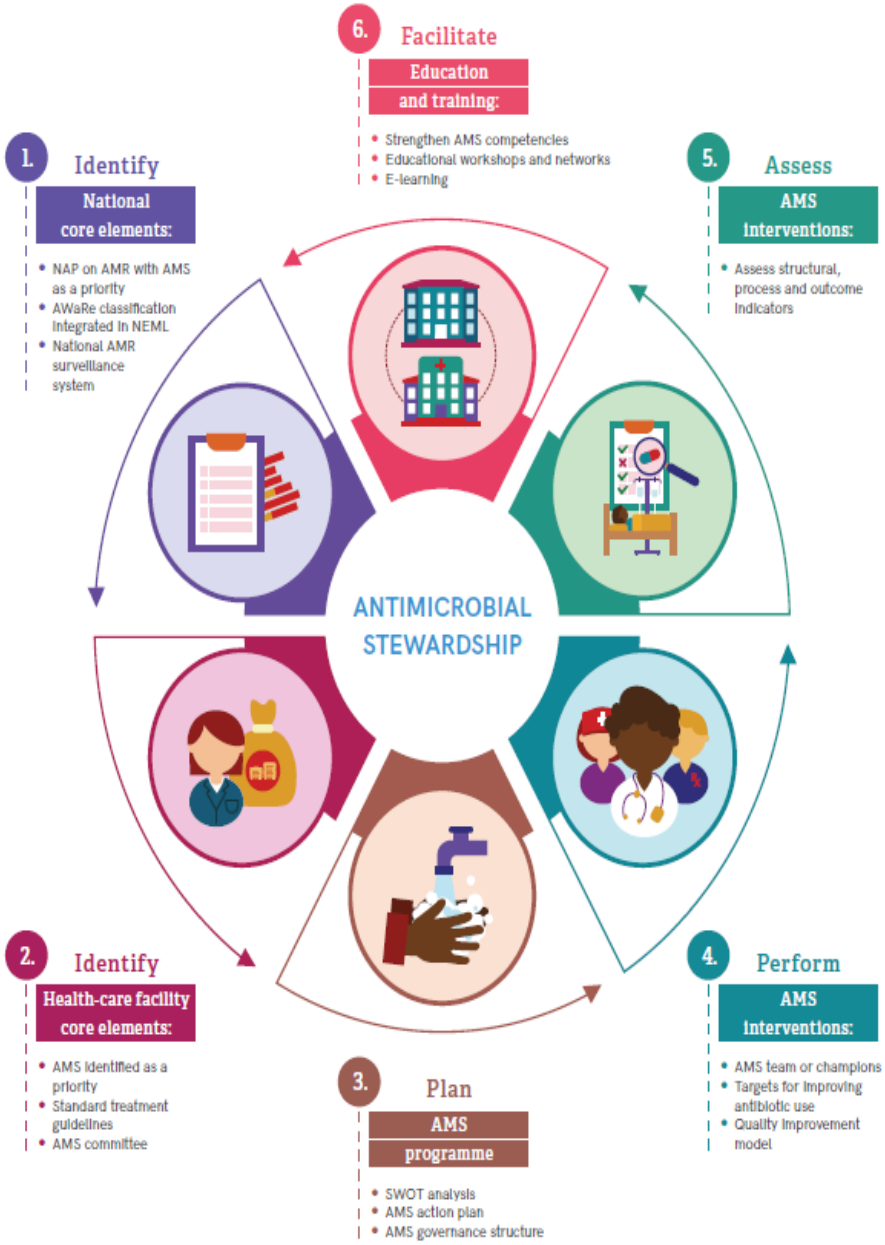
- ✓ Antibiotics
- ✓ Microbiology
- ✓ Infection management
- ✓ Plan and perform AMS interventions
- ✓ Monitor AMS interventions/ ABx use

Face to face workshops

Online e-learning resources

…





Summary

- 6 core components on AMS for health-care facilities
- Step-wise approach
- Build on what is existing, start small
- Build competency and team
- Quality improvement cycle

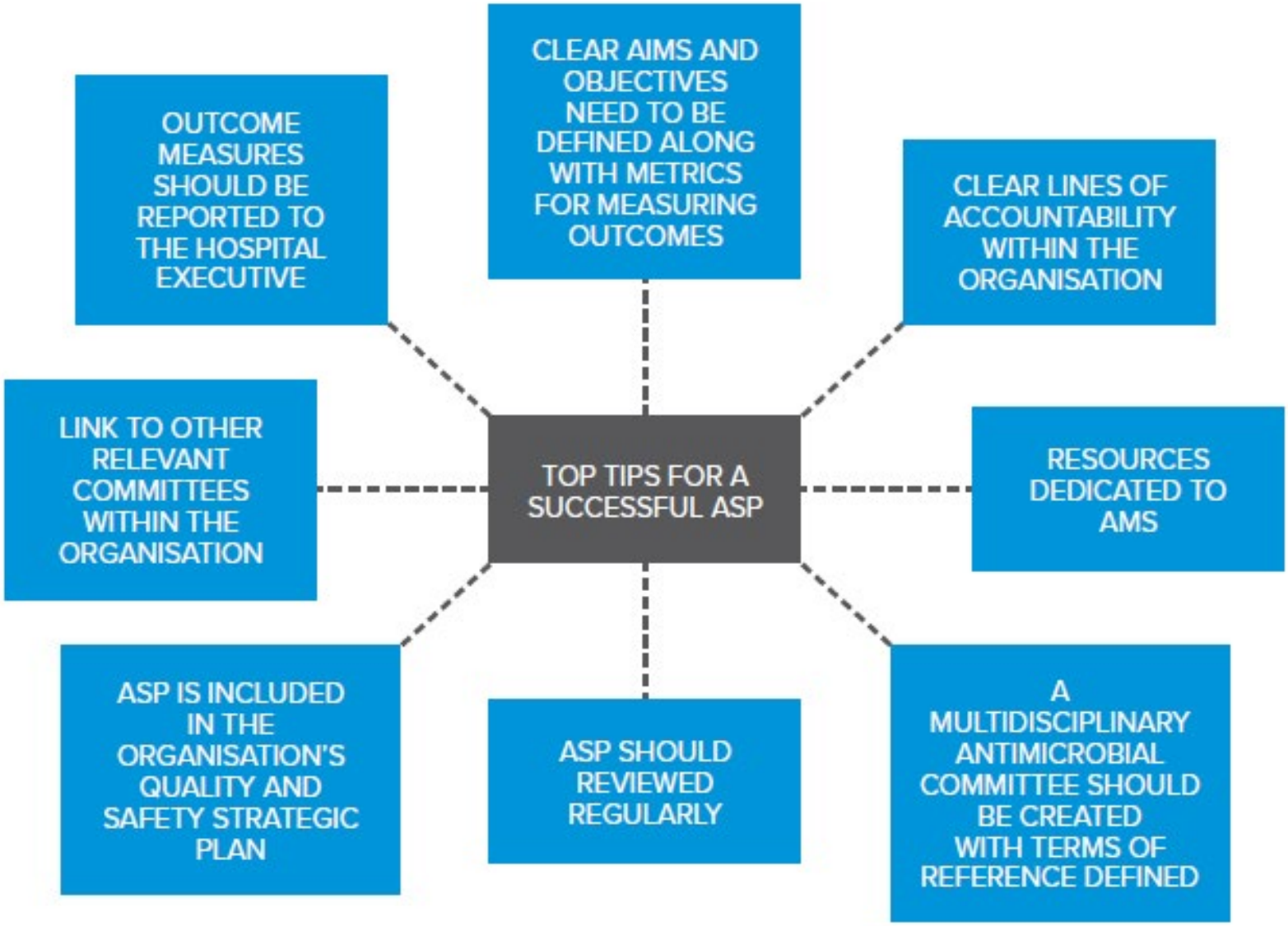
Elements to Consider Before Intervening

- Assess organizational culture
- Address organizational barriers
- Tailor education based on observed practice deficits
- Develop a usable intervention
- Solicit feedback from nurses and identify a nurse champion to develop education on proposed intervention
- Consider train the trainer or other team-based modalities
- Secure nursing and physician stakeholder support

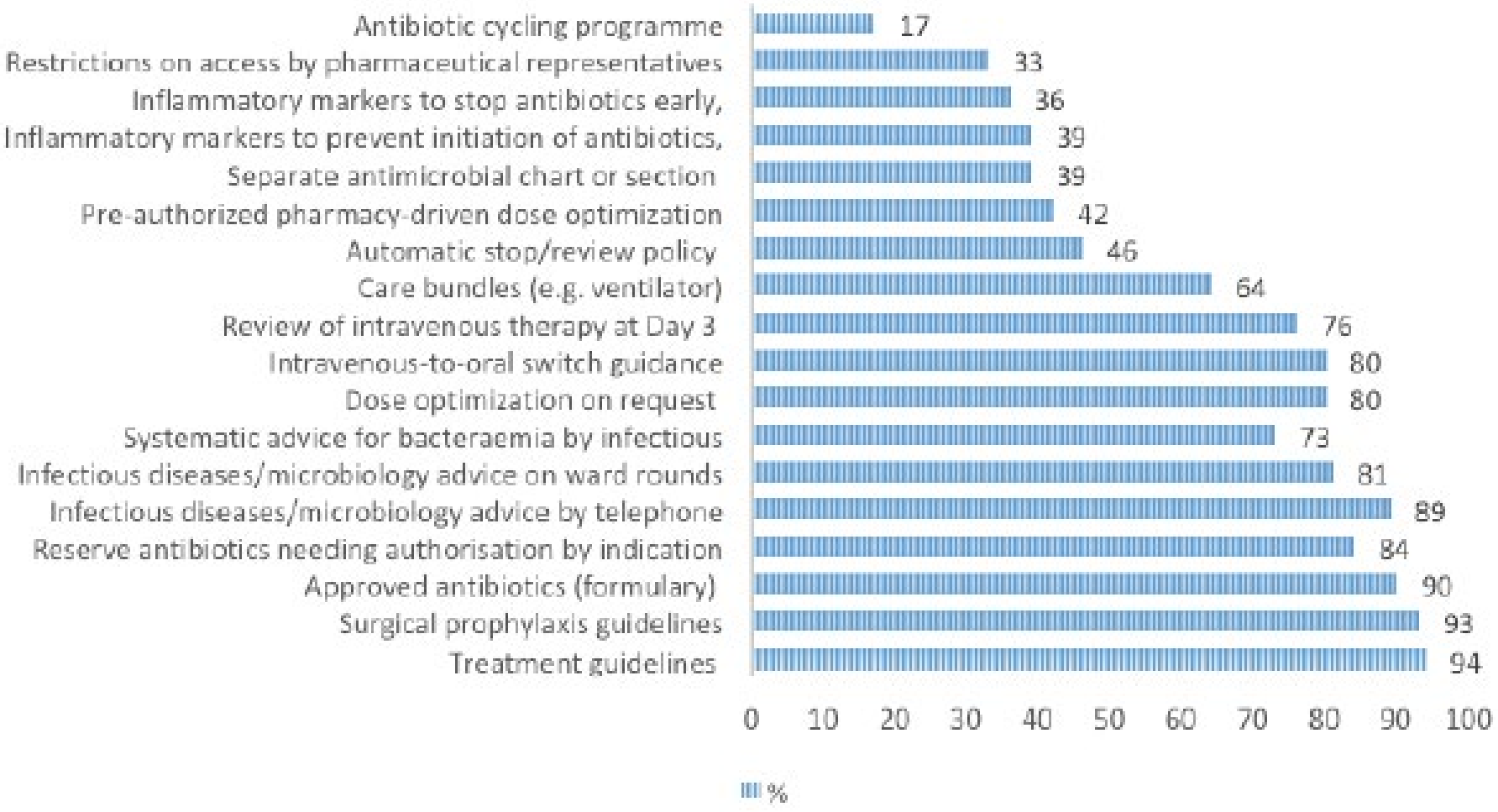
Monsees, et al. (2019) ICHE

Stewardship Goals	Possible Unintended Consequences
Reducing length of stay	Increasing rates of readmission
Reducing duration of surgical prophylaxis	Increasing rates of surgical site infections
Restricting or limiting specific antimicrobials to reduce inappropriate use	Increasing use of non-restricted antimicrobials (e.g. "squeezing the balloon")
	Delaying doses of antimicrobials due to restriction processes

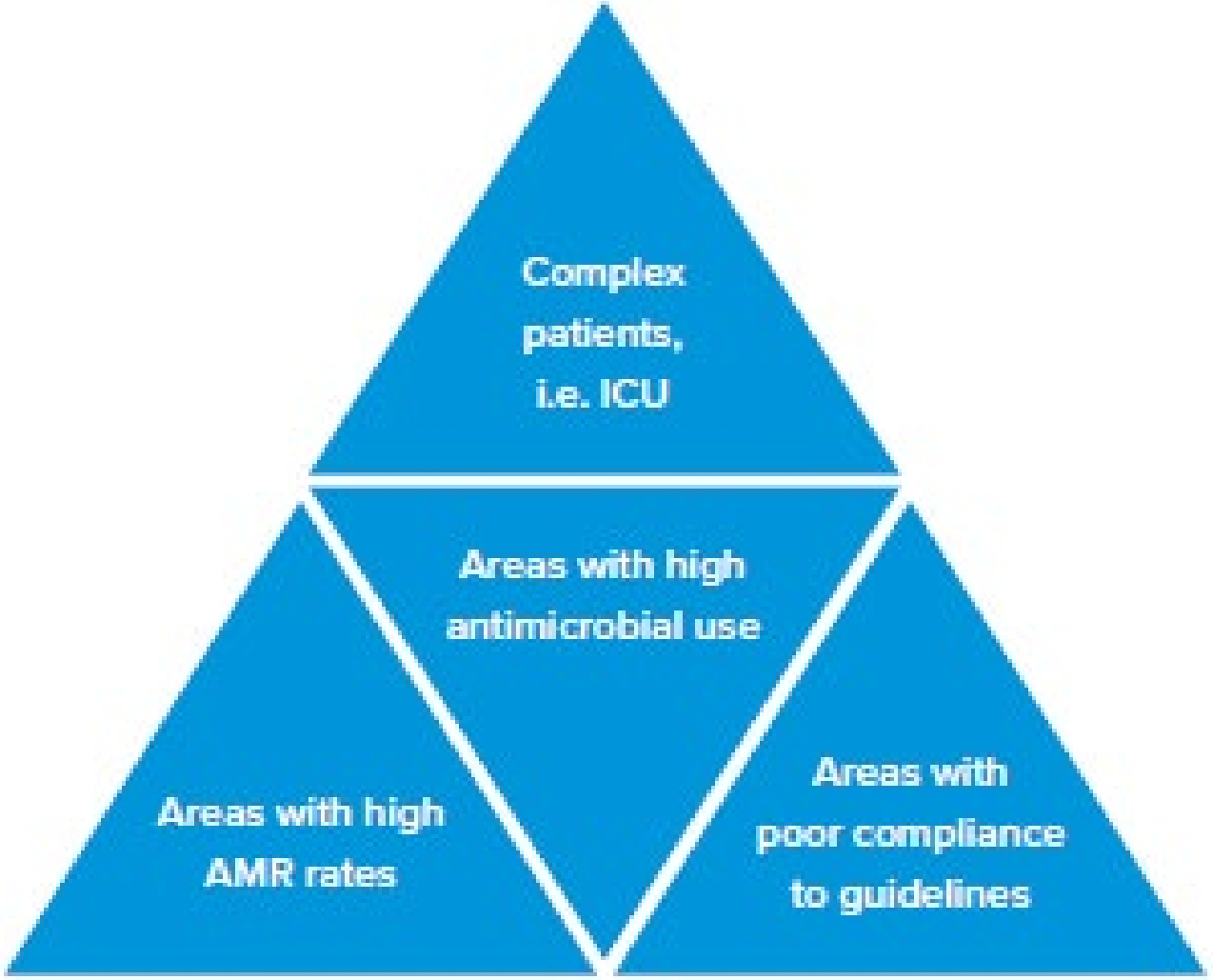
SOURCE
http://www.idsociety.org/Guidelines/Patient_Care/IDSA_Practice_Guidelines/Antimicrobial_Agent_Use/Implementing_an_Antibiotic_Stewardship_Program/



Top tips for a successful ASP



Results of a global survey on types of AMS interventions employed as part of an ASP



Suggested priority areas for targeting ASP

HOW DO I ASSESS THE EFFECTIVENESS OF AN ANTIMICROBIAL STEWARDSHIP PROGRAMME?

- There are many ways to assess the effectiveness of an ASP, including:
- • Audit of compliance with guidelines
- • Audit documentation – e.g. indication, stop/review date, 48-72 hour review
- • Audit time to 1st dose of antibiotic in sepsis
- • Monitor antibiotic consumption data, including benchmarking to similar institutions
- • Monitor antibiotic expenditure data
- • Monitor stewardship interventions and acceptance rates
- • Review adverse events in relation to antimicrobials
- Defined outcome measures should be defined as part of an organizations ASP strategy.

Suggested Measures

Measurement Area	Measure
Antibiotic consumption	• Days of therapy (DOT) per 1,000 patient days—overall and for specific agents or groups of agents • Defined daily dose (DDD) per 1,000 patient days (if DOT not available) • Standardized Antibiotic Administration Ratio*
Process measures	• Provision of indication with each antibiotic start • Percentage of cases where therapy is appropriate (especially for serious infections, such as sepsis) • Appropriate Treatment of Methicillin-Sensitive Staphylococcus aureus (MSSA) Bacteremia • Frequency at which de-escalation occurs • Timely cessation of antibiotics given for surgical prophylaxis • Antibiotics not prescribed to treat asymptomatic bacteria • Appropriate cultures obtained before starting antibiotics • Adherence to hospital-specific guidelines • Acceptance of ASP recommendations • Frequency of performance of antibiotic time outs or reviews • Timely administration of appropriate antibiotics in cases of suspected sepsis

Modified *Curr Infect Dis Rep* 2014; 16:433

Suggested Measures continued

Measurement Area	Measure
Outcome measures	• Length of stay • Cure of infection • Risk-adjusted mortality • Hospital readmissions for select infections • Hospital-onset C. difficile infections* • Adverse drug reactions (number/percentage/rate) • Antimicrobial resistance- focusing on hospital onset cases would most likely best reflect the impact of ASPs • Provider-level measures if available (e.g., treatment of *S. aureus* and bloodstream infections)
Financial	• Antibiotic cost per patient day • Antibiotic cost per admission • Total hospital cost per admission

*NQF-endorsed measure

Modified *Curr Infect Dis Rep* 2014; 16:433

Shorter is Better

Syndrome	Short Course Studied (days)	Long Course Studied (days)	Result	Updated IDSA guidelines?
Acute bacterial sinusitis	5	10	Equal	2013
COPD exacerbation	≤5	≥7	Equal	2018 Gold guidelines
Intra-abdominal infection	4	10	Equal	2010, in development
CAP	3-5	7-10	Equal	2007, in development
HAP/VAP	≤5	10-15	Equal	2016
Cystitis/Pyelo	3-5/5-7	10-14	Equal	2011
SSTI	5-6	10-14	Equal	2014

Adapted from B. Spellberg. J Hosp Med 2018

And Yet…

Syndrome	Admissions with durations >7 days*
PNA	761 **(76%)**
UTI	1324 **(79%)**
Intra-abdominal	594 **(89%)**
SSTI	828 **(90%)**

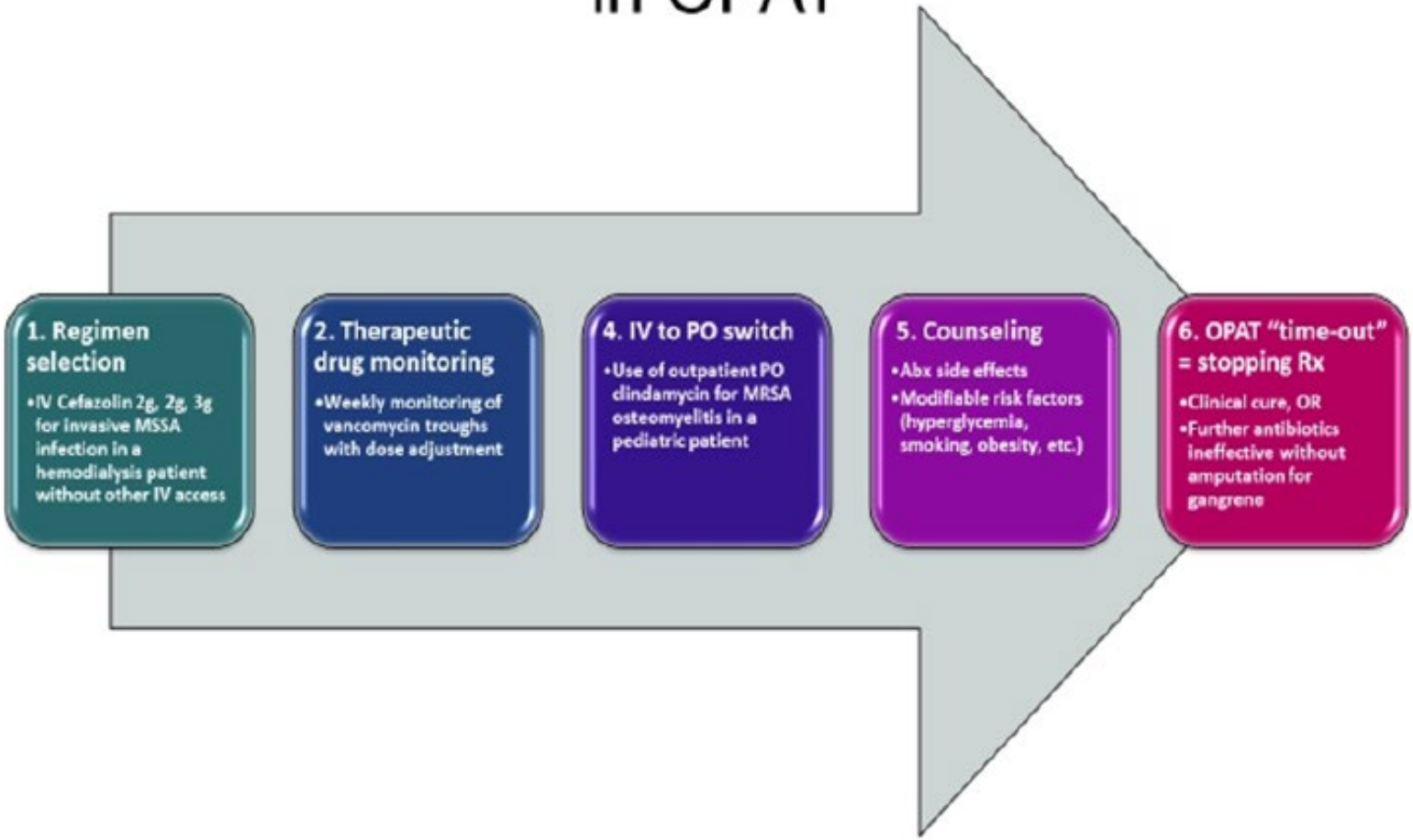
*admissions with both inpatient AND post-discharge antimicrobials

Adapted from Dyer et al. ICHE. August 2019

Discharge Best Practices

- ✓ Establish institutional guidelines with evidence-based, shortest effective durations
  - ➢ "shorter is better"
- ✓ Education
- ✓ Discharge audit/feedback
- ✓ Integrate data to capture both inpatient DOT and discharge prescriptions
- ✓ Document appropriately to reduce excess duration at d/c (especially ID consultants)

Continuum of Stewardship Activities in OPAT



IV to PO – Benefits

- ↓ LOS[1, 3, 5, 6]
- ↑early ambulation, patient comfort
- ↓ Antibiotic duration[1]
- ↓ 30-day readmission[1]
- ↓ *C. difficile* rates[1]
- ↓ Cost[2, 3, 6, 7]
- ↓ Incidence of line infections[4]
- ↓ Nursing workload

[1] Kuritzkes KE et al. *Clin Ther* 2016;38:1750-8
[2] Davis SL et al. *Clin Infect Dis* 2005;41:5136-143
[3] Omidvari K et al. *Respir Med* 1998;91:1032-9
[4] Laing RB et al. *J Antimicrob Chemother* 1998;42:107-11
[5] Park SM et al. *Infect Chemother* 2017;31-7
[6] Kuti JL et al. *Am J Health Syst Pharm* 2001;59:2209-15
[7] Palabindala V et al. *Am J med* 1999;151:442-70

Implementation – a systematic approach

Questions to address when applying the quality improvement model for AMS interventions

What are you trying to achieve ?	Set a goal for change in antibiotic use that is SMART (i.e. specific, measurable, achievable, relevant and time-bound).
How will you know that the change is an improvement?	Determine what quantitative measures to use to show improvement (measurements).
What changes can you make that will result in improvement?	Not all changes are an improvement. Identify the behaviour changes that will result in improvement (AMS interventions).

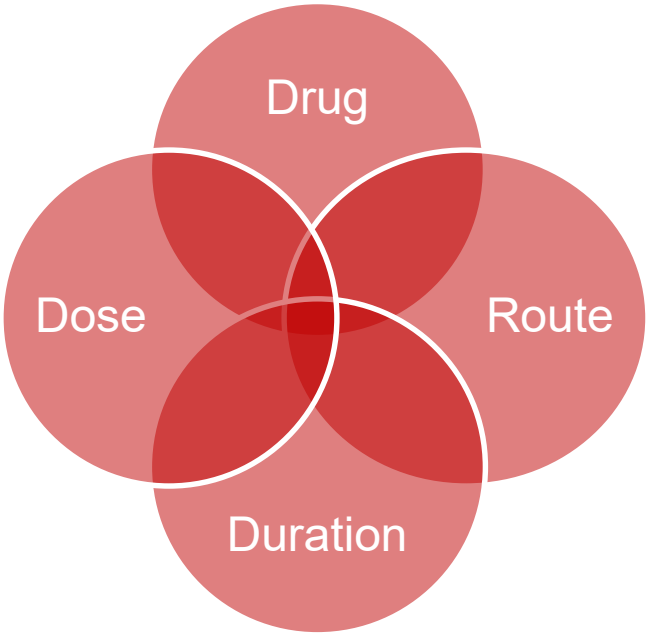
Implementation: Measure baseline, improve, measure again, report back

Adapting Evidence-based guidelines to the local setting

Local guidelines

HEALTH-CARE FACILITY CORE ELEMENTS	Yes	No
10. Up-to-date standard treatment guidelines The health-care facility has available, up-to-date recommendations for infection management based on international/national evidence-based guidelines and local/national susceptibility patterns (where possible), to assist with antibiotic selection for common clinical conditions (indication, agent, dose, route, interval, duration). A process is in place for regular review and updating of the guidelines based on new evidence or other external input.	☐	☐

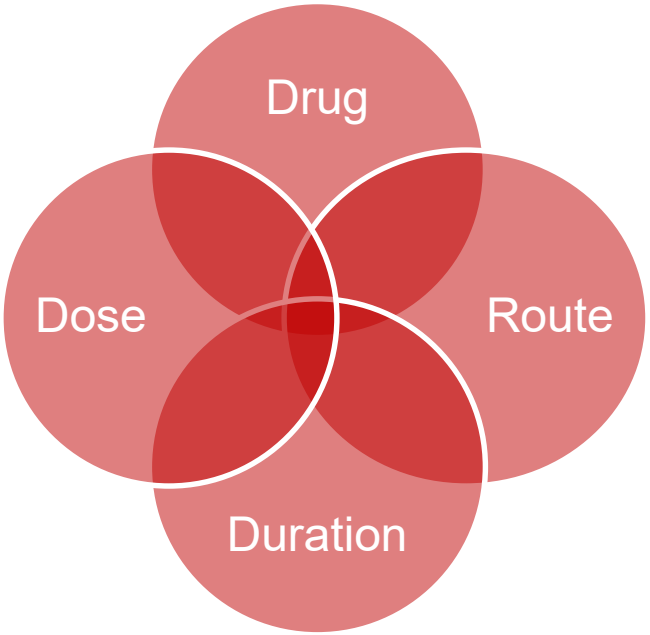
Why develop local guidelines for common infections?



Principles of Antimicrobial Stewardship

- Reduce variability in clinical practice
- Ensure use of best available evidence in patient care
- Educational tool
- Used in metrics
- Empowers other team members (pharmacists, nurses, etc.)
- Cost-savings, reduced length of stay

Why develop **local** guidelines for common infections?



Principles of Antimicrobial Stewardship

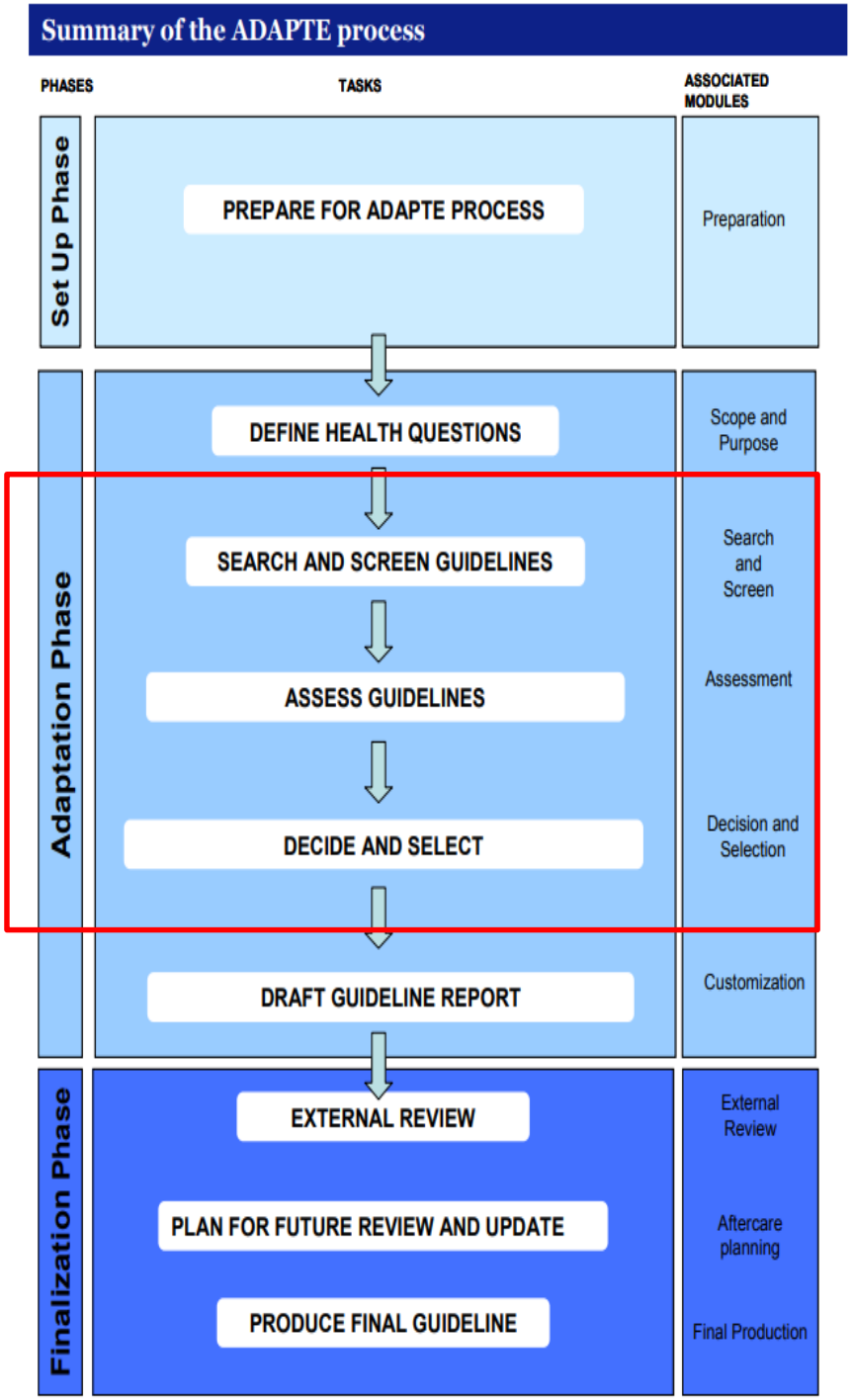
Why **Local**?

- Local epidemiology
- Drug availability/formulary
- Relevant diagnostics
- Designed with implementation in mind
- Team-building

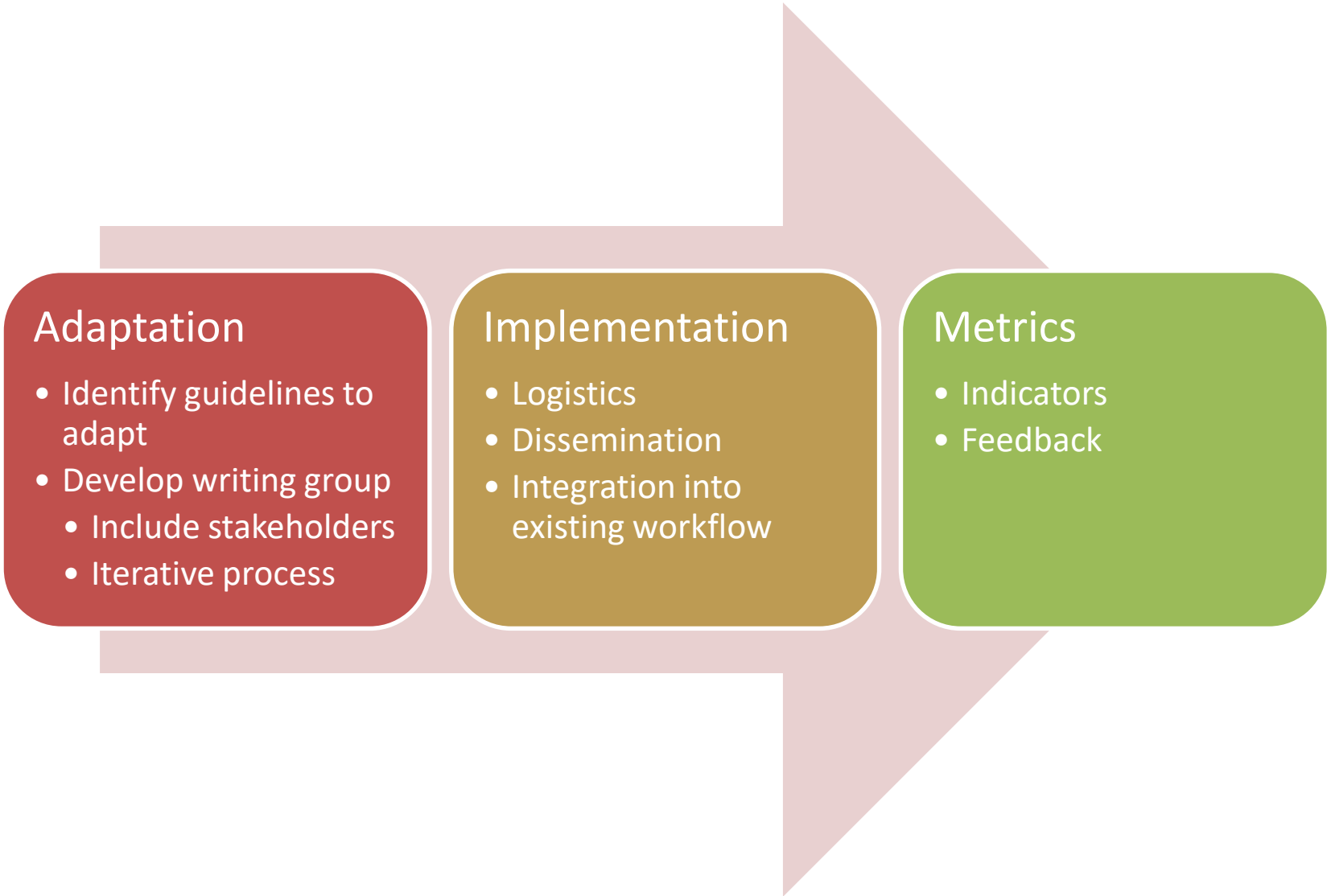
ADAPTE PROCESS

- Other frameworks include: PGEAC, SGR, AAP, CAN-IMPLEMENT, and Adapted ADAPTE
- One group used evidence-based guidelines developed using GRADE to simplify this process. CHEST2014; 146(3): 727 - 734

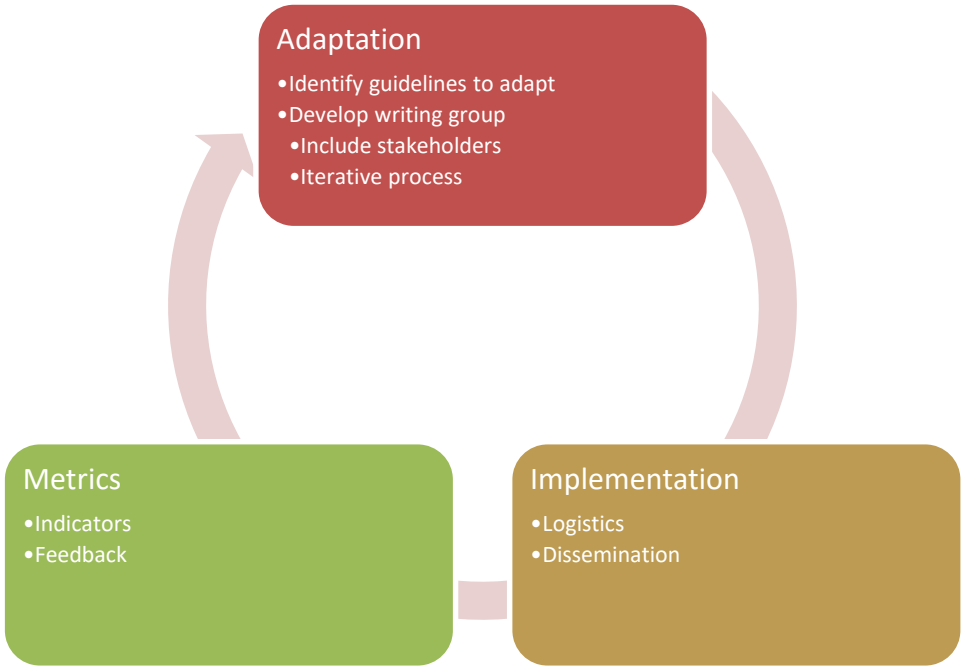
The ADAPTE Collaboration (2009). The ADAPTE Process: Resource Toolkit for Guideline Adaptation http://www.g-i-n.net



One approach



One approach



Metrics: Local guideline

Process Metrics	Outcome Metrics
Adherence to guidelines: • Accurate diagnosis • Empiric antibiotic choice • Adjustment of antibiotic with microbiologic data • Timing of antibiotic (surgical prophylaxis) • Duration of therapy • …….	Antibiotic utilization Patient outcomes
	Cost (antibiotic saved)
Utilization of orderset (or order sheets, etc.)	Length of stay
	Adverse drug effects

Stewardship target:
Management of common infections

New evidence-based guidelines released

Diagnosis and Treatment of Adults with Community-acquired Pneumonia

An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America

Joshua P. Metlay*, Grant W. Waterer*, Ann C. Long, Antonio Anzueto, Jan Brozek, Kristina Crothers, Laura A. Cooley, Nathan C. Dean, Michael J. Fine, Scott A. Flanders, Marie R. Griffin, Mark L. Metersky, Daniel M. Musher, Marcos I. Restrepo, and Cynthia G. Whitney; on behalf of the American Thoracic Society and Infectious Diseases Society of America

This official clinical practice guideline was approved by the American Thoracic Society May 2019 and the Infectious Diseases Society of America August 2019

- Empiric antibiotic therapy
- Defined specific risk factors for infection with MDROs --- NO MORE HCAP
- Duration = 5 days

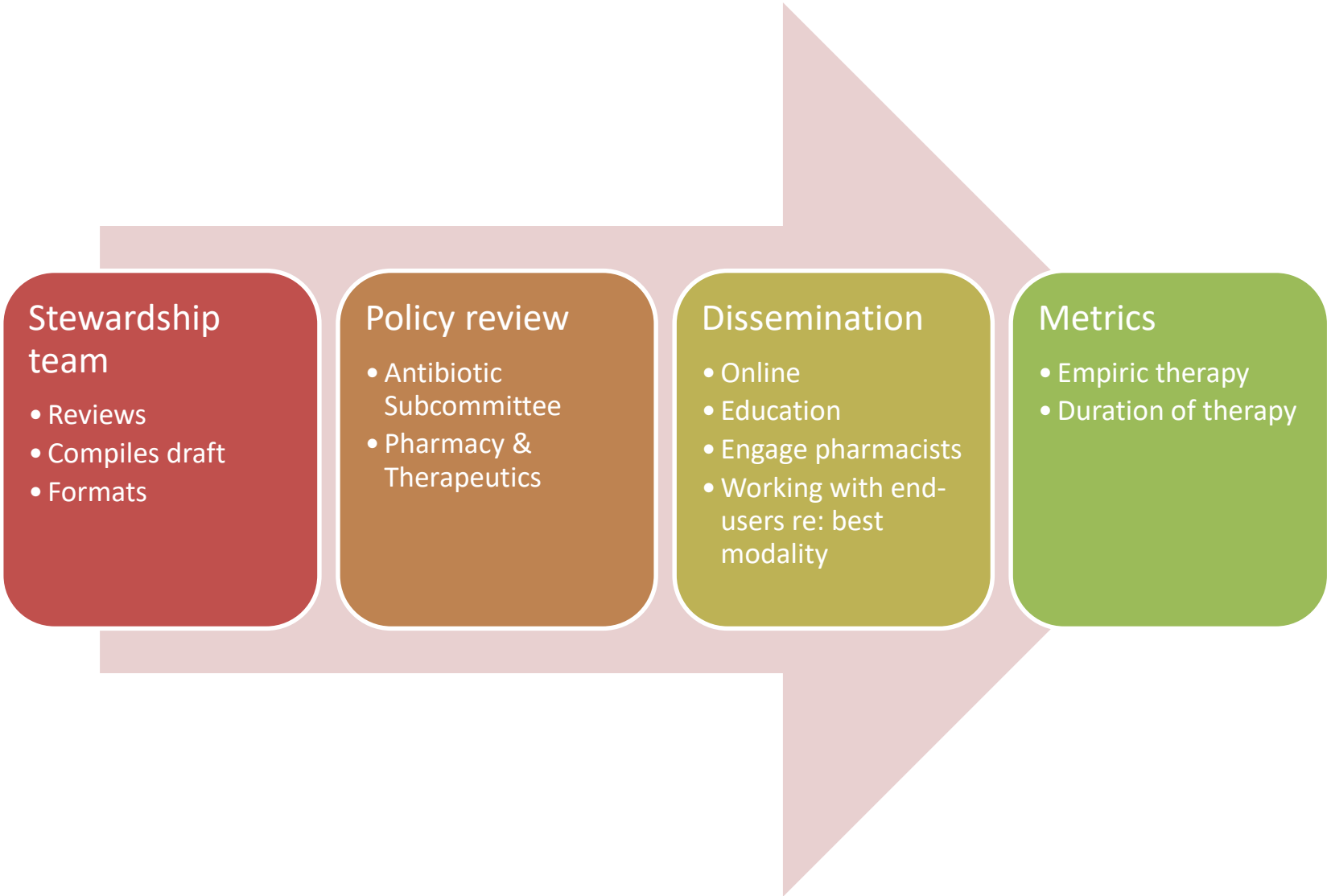
Excess duration of therapy is associated with patient harm

- 43 Michigan hospitals January 2017 – 2018
- 6,481 patients hospitalized with pneumonia
- Excess days = (expected treatment duration – actual duration)
- 67.8% patients (n= 4391) received excess Rx
- 93% of these excess days were after discharge
- No difference in survival, readmissions, repeat ED visits - but **5% per day increase risk of AEs**

Target: antibiotic upon discharge from hospital

Ann Intern Med. 2019 Aug 6;171(3):153-163

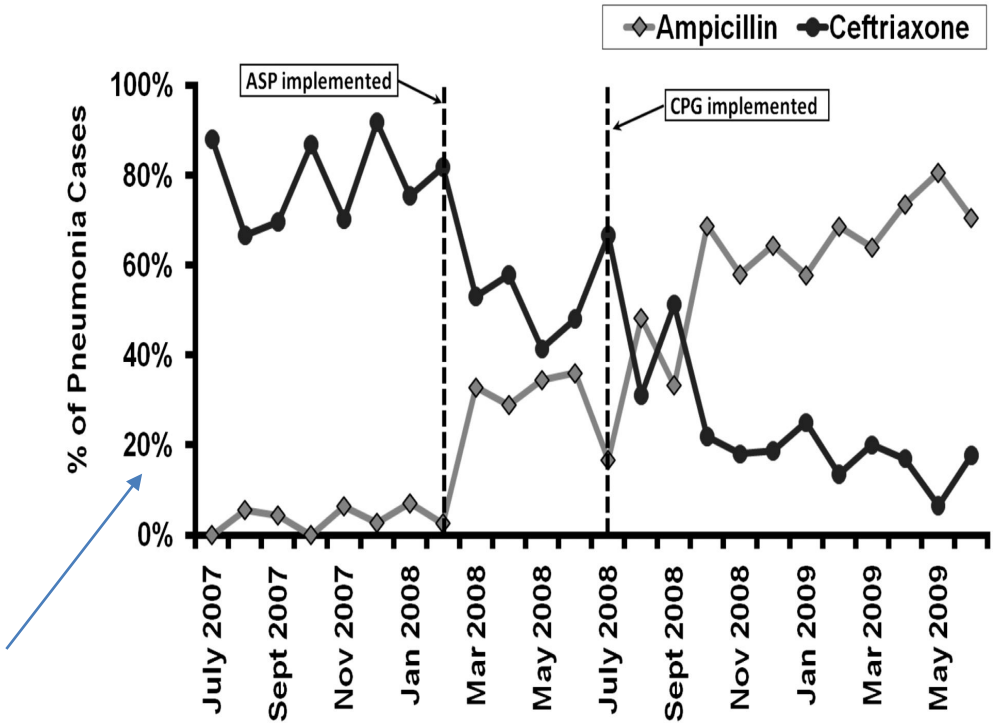
One approach



Example 1

- Before/after study including >1000 children with CAP
- Narrower spectrum antibiotic upon admission & discharge
- No change in treatment failure

Metric: Empiric antibiotic therapy



Pediatrics. 2012 Mar;129(3):e597-604.

Metric: Duration of therapy

Example 2

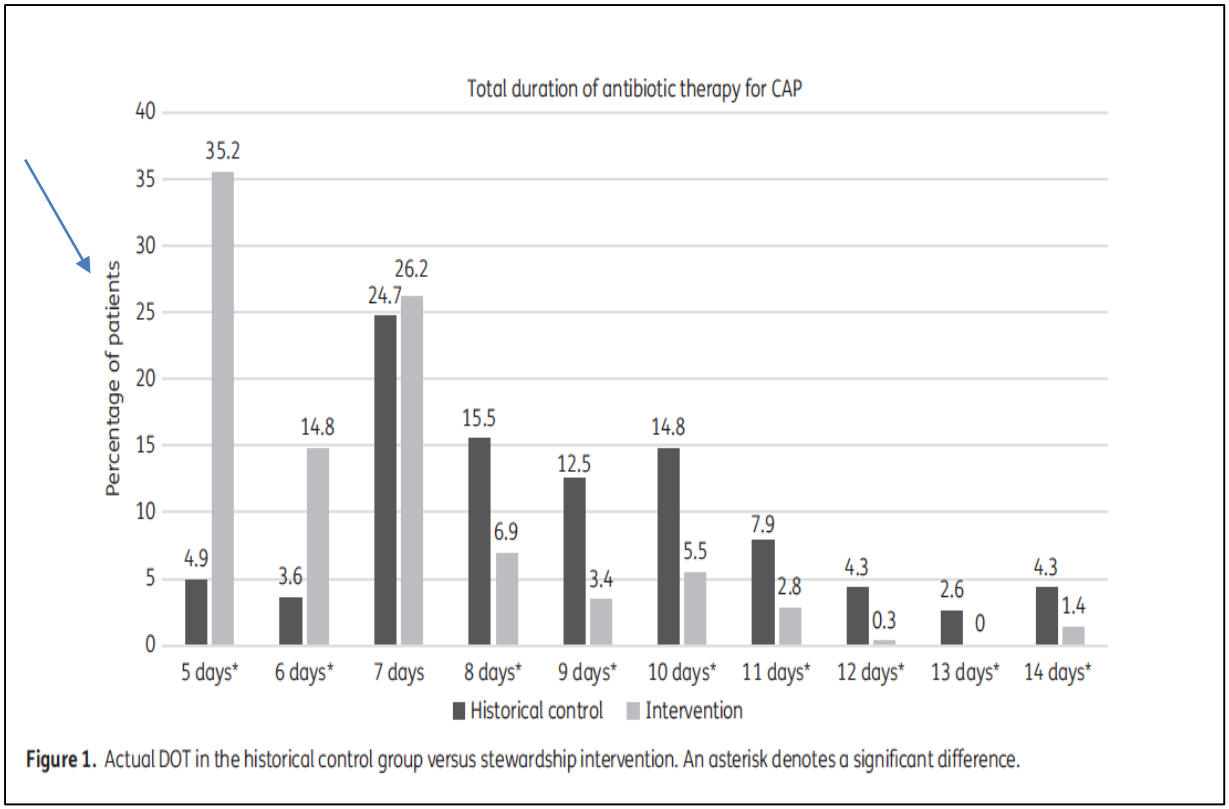


Figure 1. Actual DOT in the historical control group versus stewardship intervention. An asterisk denotes a significant difference.

- Multifaceted approach to improve abx for community-acquired pneumonia:
  - Guidelines
  - Education
  - Audit and feedback

J Antimicrob Chemother. 2018 Feb 16. doi: 10.1093/jac/dky021.

Example 3

Process metrics

Dissemination strategy:

- weekly clinical meetings (real cases of hospitalized patients were used)
- the distribution of educational material (pocket booklets)
- posters

Table 1 - Characteristics of the patients hospitalized for community-acquired pneumonia between July of 2007 and October of 2008 at the Marília School of Medicine *Hospital das Clínicas de Marília*, located in the city of Marília, Brazil[a]

Characteristic	Pre-implementation period	Post-implementation period	Total	p
Diagnosed patients, n	48	20	68	
Male	28 (58.3)	14 (70.0)	42 (61.8)	0.36
Female	20 (41.7)	6 (30.0)	26 (38.2)	
Age, in years[b]			68.5 ± 19.2	
Recording of SpO_2 on the medical chart	9 (19)	6 (30)	15 (19)	0.42
CURB-65 score ≥ 3	27 (56.3)	12 (60.0)	39 (57.4)	0.77
Severe sepsis	19 (39.6)	13 (65.0)	32 (47.1)	0.056
Prescribed antimicrobial agents				
Ceftriaxone	26 (54.2)	17 (85.0)	43 (63.2)	0.01
Ciprofloxacin	9 (18.8)	0 (0.0)	9 (13.2)	0.009
Clindamycin	15 (31.3)	3 (15.0)	18 (26.5)	0.16
Azithromycin	4 (8.3)	15 (75.0)	19 (27.9)	0.0001
β-lactam + macrolide	3 (6.3)	15 (75.0)	18 (26.5)	0.0001
Hospital stay, in days[b]	17.8 ± 22	16.1 ± 13.4	17.2 ± 19.8	0.32
Death	17 (35.4)	3 (15.0)	20 (29.4)	0.09

CURB-65: (mortality prediction score) mental Confusion, Urea, Respiratory rate, Blood pressure, and age > 65 years. [a]Values expressed as n (%), except where otherwise indicated. [b]Values expressed as mean ± SD.

J Bras Pneumol. 2011 Mar-Apr;37(2):152-9.

Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America[a]

Lindsay E. Nicolle,[1] Kalpana Gupta,[2] Suzanne F. Bradley,[3] Richard Colgan,[4] Gregory P. DeMuri,[5] Dimitri Drekonja,[6] Linda O. Eckert,[7] Suzanne E. Geerlings,[8] Béla Köves,[9] Thomas M. Hooton,[10] Manisha Juthani-Mehta,[11] Shandra L. Knight,[12] Sanjay Saint,[13] Anthony J. Schaeffer,[14] Barbara Trautner,[15] Bjorn Wullt,[16] and Reed Siemieniuk[17]

- Recommend screening or treating for asymptomatic bacteriuria in **very few targeted** populations
  - Pregnant women
  - Prior to urologic surgery where mucosal injury is anticipated

- Recommend against screening (and treating) asymptomatic bacteriuria in almost all other groups – including elderly with altered mental status or after a fall unless there are **<u>symptoms</u>** of a urinary tract infection

Prevalence of ASB

Population	Prevalence, %
Children	
Boys	<1
Girls	1 – 2
Healthy women	
Premenopausal	1 – 5
Pregnant	2 – 10
Postmenopausal	3 – 9
Diabetes mellitus	
Women	11 – 16
Men	1 – 11
Elderly in community	
Women	11 – 16
Men	4 – 19

Population	Prevalence, %
Elderly in LTCF	
Women	25 – 50
Men	15 – 50
Spinal cord injury	
Intermittent catheter	23 – 69
Kidney transplant	
First month after	23 – 24
1 month – 1 year after	10 – 17
>1 year after	2 – 9
Indwelling catheter use	
Short-term	3 – 5%/day
Long-term	100

Adapted from Nicolle LE. *Clin Infect Dis* 2019 Mar 21 [Epub ahead of print]

2019 Infectious Diseases Society of America Guideline Update

Screening for and treatment of ASB indicated for:

- Pregnant women
- Invasive urological procedures

Do NOT screen for or treat ASB:

- Elderly
- Diabetics
- Indwelling urinary catheters
- Spinal cord injury
- Long term care facility residents
- Elective, non-urologic surgeries including prosthetic joints*
- Neutropenia*
- Renal or other solid organ transplant*
- Children*

*** Not addressed in 2005 IDSA guideline**

Nicolle LE. *Clin Infect Dis* 2019 Mar 21 [Epub ahead of print]

2019 IDSA Guideline Recommendations for Specific Clinical Scenarios

"In older patients with functional and/or cognitive impairment with bacteriuria and delirium without local genitourinary symptoms or other systemic signs of infection, we recommend assessment for other causes and careful observation rather than antimicrobial treatment"

(strong recommendation, low-quality evidence)

Nicolle LE. *Clin Infect Dis* 2019 Mar 21 [Epub ahead of print]

Two key approaches to reduce antibiotic treatment of ASB

1) Prevent identification of ASB to begin with

- Eliminate inappropriate or unnecessary urinalyses and urine cultures

2) Prevent antibiotic treatment when ASB identified

- Increase recognition/diagnosis of ASB
- Understand antibiotics not indicated
- Appropriately withhold antibiotics

Summary

- Multifaceted intervention → diagnostic/ treatment algorithms, audit and feedback, education
- Targeted ordering of urine cultures *and* decision to treat positive cultures
- Reduced total volume of urine cultures and rate of antibiotic treatment of ASB
- More effective on long-term care wards than acute medical wards
- Ongoing study in non-catheterized patients

Potential areas of focus

When is a urine culture appropriate?

When indicated, appropriate collection techniques to reduce contamination

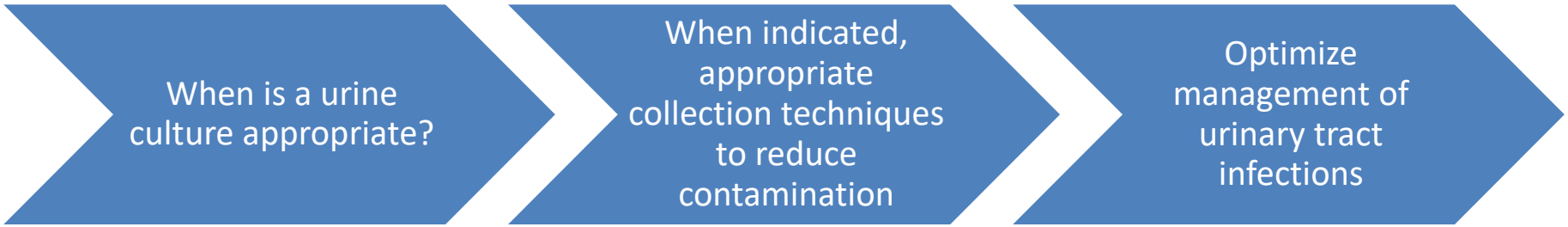
Optimize management of urinary tract infections

Inappropriate treatment of asymptomatic bacteriuria is associated in negative outcomes.

- In one study of >2700 hospitalized patients, abx for ASB was associated with longer hospitalizations.

JAMA Intern Med. 2019;179(11):1519-1527.
doi:10.1001/jamainternmed.2019.2871

Potential areas of focus

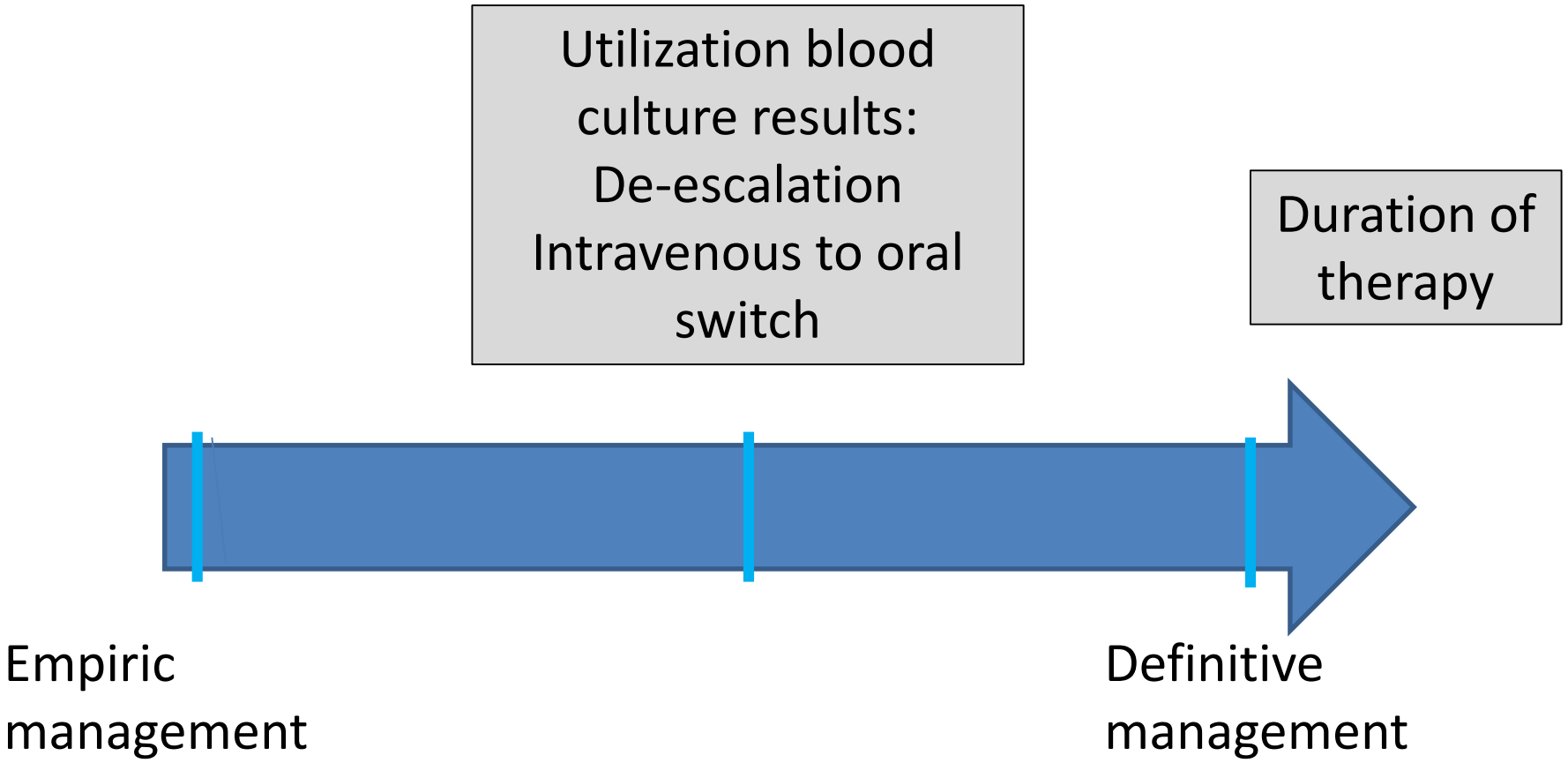


Interventions:

- Education
- Policy
- Engage stakeholders
- Standardized orders
- …….

JAMA Intern Med. 2019;179(11):1519-1527.
doi:10.1001/jamainternmed.2019.2871

Bacteremia: De-escalation



Annex IV: Sample AMS review form

Patient information		
Date:	Department:	Ward:
Patient name:	Age:	Sex: Male ☐ or Female ☐

Antibiotic prescriptions				
Antibiotics prescribed	Dose	Route	Interval	Start date

48-hour review of antibiotic treatment				
Is antibiotic treatment reviewed? Yes ☐ No ☐			If yes, what action?	
Escalate ☐	Continue ☐	De-escalate ☐	Stop ☐	IV-oral switch ☐
Why is antibiotic treatment being continued?				
Continuing clinical signs of infection ☐	Confirmed infection ☐	Other (comment):		
Microbiology specimens collected? ☐ Date:	Microbiology results received? ☐ Date:	Microbiology results acted upon? ☐ Comment:		

Targets for stewardship: common infections

1 - appropriate utilization of **urine cultures**

2 - ensure appropriate **duration of therapy** for community acquired pneumonia

3 - promote **re-evaluation of blood culture results** and modify antibiotic course

The Approach to the Problem Prescriber

- Carefully plan your approach:
  - Pick your battles
  - Timing is important
  - Avoid heat of the moment confrontations (generate light not heat)
- Do your homework
  - Gather as much data as possible
    - DUE: Service and physician specific for several drugs
    - Discuss with Clinical PharmDs and discretely other MDs
    - Discuss with CMO/Chief of staff
  - Understand the MD's Practice and Patient Population

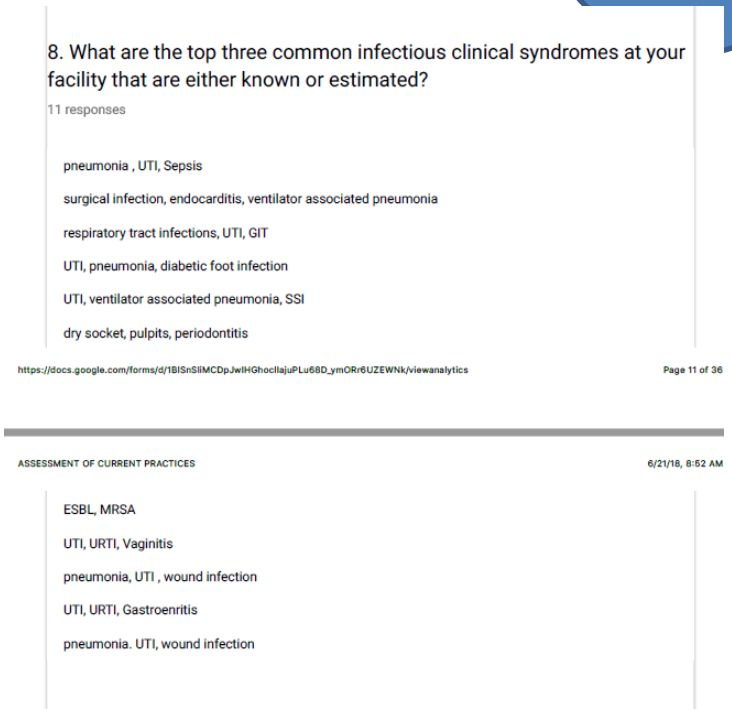
Critical Success Factors Identified

- Collegial and educational relationship
- Daily review of antimicrobial orders by a consistent accountable team
- Support of hospital/medical leadership
- Development of criteria and guidelines for anti-infective use
- Formulary restriction
- Education of prescribers to insure compliance
  - **But the most important one is investing in the human factor**

The Guidelines

To be Finalized (it toke 8 months)

- The most common syndromes:
- 1. sepsis
- 2. UTI
- 3. Pneumonia (CAP / HAP)
- 4. soft tissue infection
- 5.diabetic foot
- 6. URTI
- 7. Antibiotic surgical prophylaxis
- 8. Endocarditis



8. What are the top three common infectious clinical syndromes at your facility that are either known or estimated?

11 responses

pneumonia , UTI, Sepsis

surgical infection, endocarditis, ventilator associated pneumonia

respiratory tract infections, UTI, GIT

UTI, pneumonia, diabetic foot infection

UTI, ventilator associated pneumonia, SSI

dry socket, pulpits, periodontitis

https://docs.google.com/forms/d/1BISnSliMCDpJwIHGhocIlajuPLu68D_ymORr6UZEWNk/viewanalytics Page 11 of 36

ASSESSMENT OF CURRENT PRACTICES 6/21/18, 8:52 AM

ESBL, MRSA

UTI, URTI, Vaginitis

pneumonia, UTI , wound infection

UTI, URTI, Gastroenritis

pneumonia. UTI, wound infection

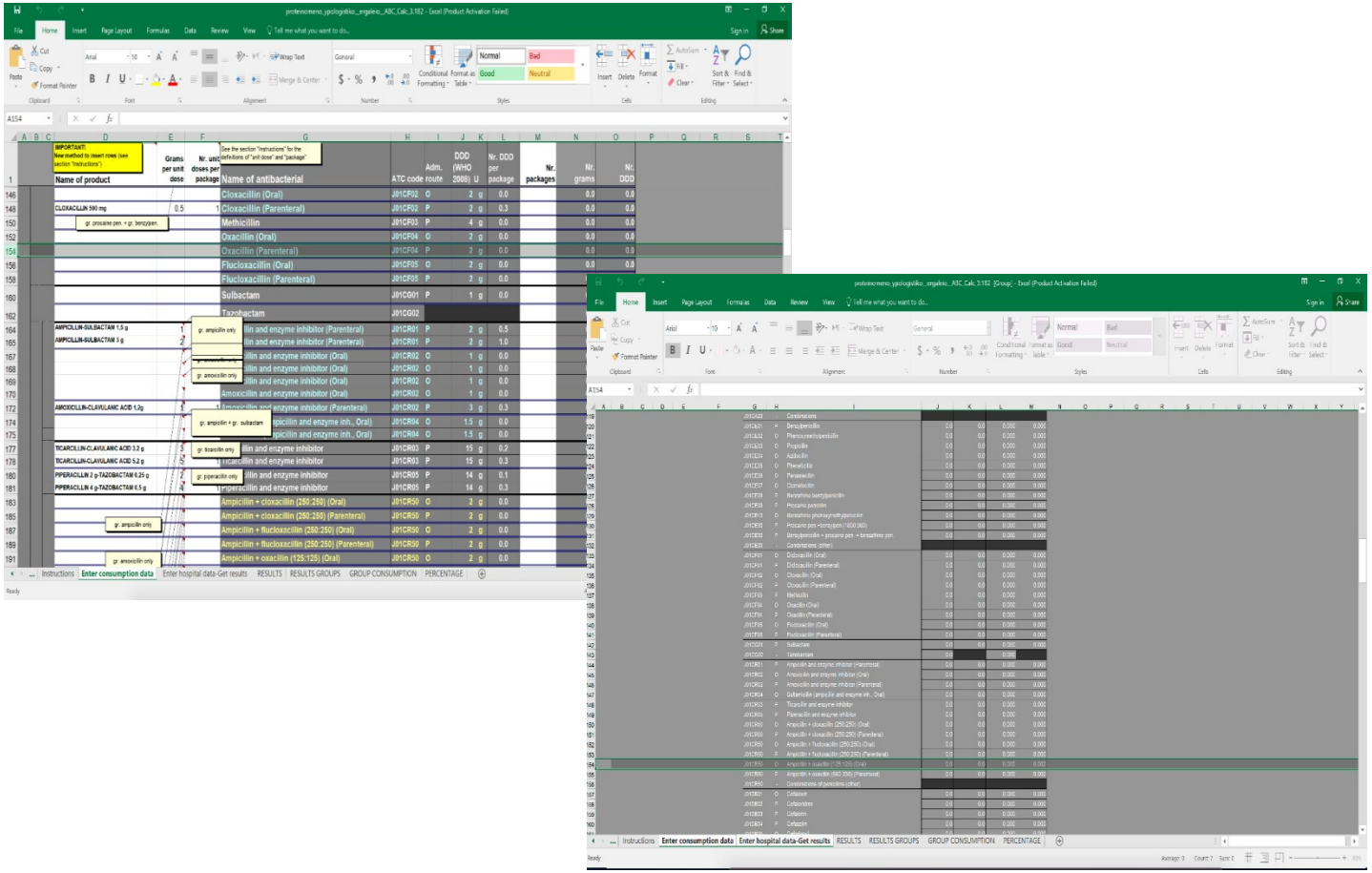
Infection	Most likely organisms	1st line empiric treatment	In penicillin allergy	Comments
Cellulitis (non–diabetic)	*S. aureus Streptococci*	cloxacillin 1-2g q6h iv If erysipelas Or streptococcal infection suspected add Benzylpenicillin 1.2-2.4g q6h Iv Or Cefazolin 1 gm IV q 8 hr Oral switch: cloxacillin 1g qds po If erysipelas or streptococcal infection suspected ADD Amoxicillin 500mg q8h po	Clindamycin 300 mg PO/IV Q8H Or Doxycycline 100 mg po bid Or trimethoprime-sulfamethaxazole double strength tablets po q 12 hrs If severe cellulitis/ risk of MRSA consider adding (Vancomycin 15mg/kg q12h iv)	Duration 7-14 days Consider oral switch following clinical improvement.
Line Infection	*S. aureus, Coagulase negative staphylococci and other organisms*	Vancomycin ± Cefepime 1-2 g IV Q8H (use higher dose if pseudomonas suspected)	Take blood cultures prior to commencing antibiotics (Vancomycin 15mg/kg q12h iv) If gram negative organisms are suspected add Ciprofloxacin 400mg q12h iv / 500mg q12h po Or broad antibiotics if suspected multidrug resistant organisms	
Necrotizing fasciitis	*Multiple organisms including Group A Streptococci*	cloxacillin 2g q6h iv + Benzyl penicillin 2.4g q6h iv + Ciprofloxacin 400mg q12h iv + Metronidazole 500mg q8h iv	Clindamycin 600mg q6h iv + [Ciprofloxacin 400mg q12h iv ± Gentamicin] + Vancomycin 15mg/kg q12h iv	Seek urgent surgical advice
Gas gangrene	*Clostridium perfringens and other gas producing organisms*	Benzyl penicillin 2.4g q6h iv + Ciprofloxacin 400mg q12h iv + Metronidazole 500mg q8h iv	Clindamycin 600mg q6h iv + Ciprofloxacin 400mg q12h iv	Seek urgent surgical advice For mixed infection (aerobic/anaerobic) use broad spectrum antibiotics (imipenem /meropenem/Tazocin)
Infected burns	*Send swabs for cultures and sensitivities to direct therapy*	Apply silver sulphadiazine 1% cream to the affected areas. Co-amoxiclav 1.2g q8h iv / 625mg q8h po OR Tazocin/meropenem/doripenem/imipenem + vancomycin or Daptomycin		
Surgical wound	*Following clean surgery*	Co-amoxiclav 1.2g q8h iv / 625mg q8h po	trimethoprime-sulfamethaxazole double strength one tablet po q 12 hrs	Based on culture and sensitivity results and location of surgicalsite:
		Co-amoxiclav 1.2g q8h iv / 625mg q8h po		

The education

First part submitted to NHRA for CME hours

- **First part** : Basic concepts in AMR antimicrobial resistance and general guidelines :
  - Part a for physicians : please see attached
  - Part b for nurses please see attached
- **The second** training type will be hands on the program Tools ; will be provided later
- Second part (hand on training)
- 1. MDRO (WHOnet/ GLASS)
- 2. Antibiotic consumption
- 3. HAI surveillance
- **The third part**:
  - Method of implementation and reporting
  - Competencies needed
  - Policies
  - Accreditations

Antibiotic Stewardship Program

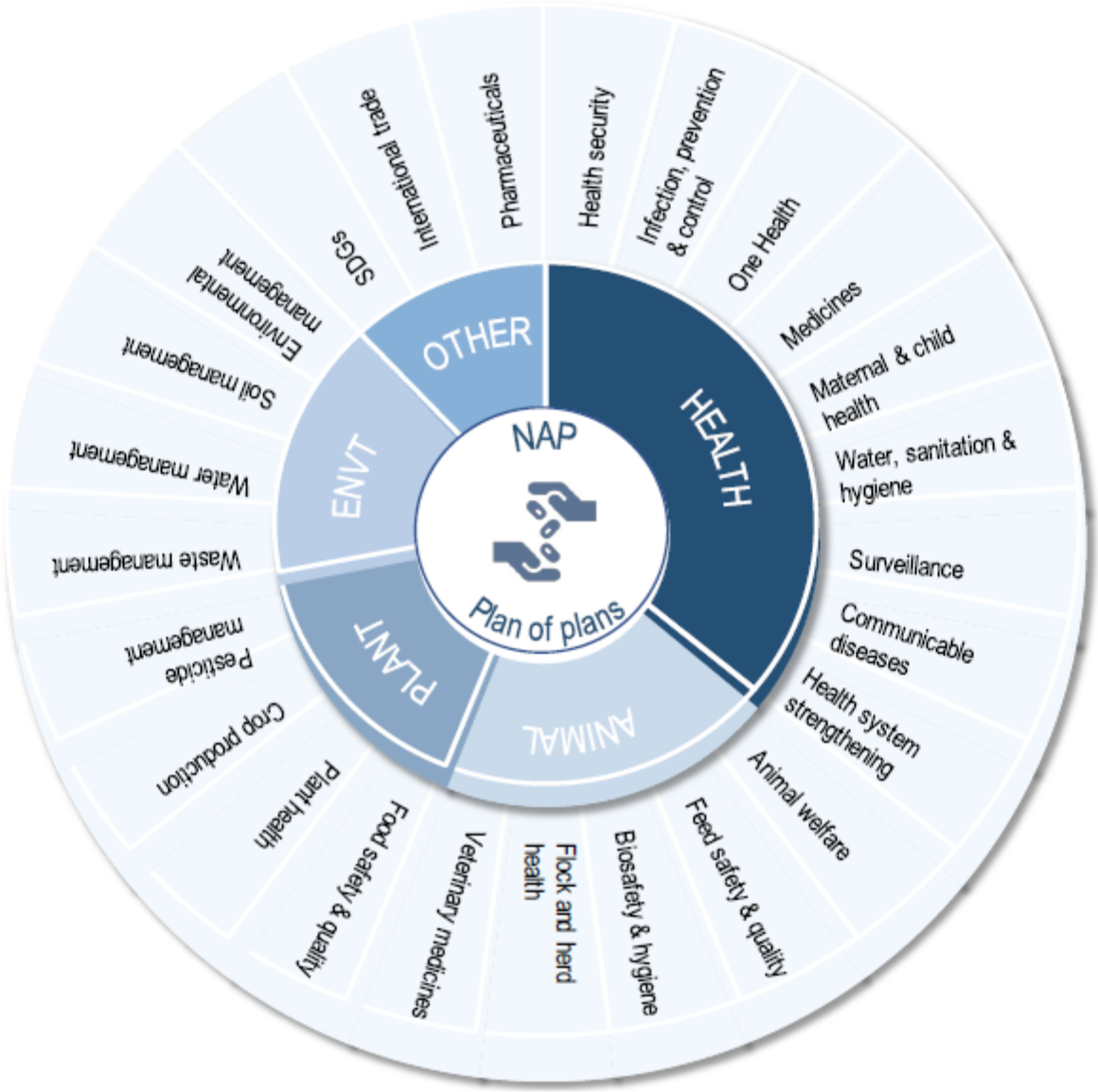


Quality indicators for the strategic plan (for 5 years)

- **Outcome measures**
- Rate of c diff
- mortality rate due to infections
- Length of stay in all hospitals
- The rate and types of antibiotic use per the suggested syndromes
- Compliance with surgical antibiotic prophylaxis
- Number of trained staff /sessions./ workshops
- Number of isolate suggested and their trend and patterns of resistance
- Calculating ddd or dot
- Cost in animals for antibiotic
- Cost in humans
- Rate for compliance with guidelines

- **Process measures**
- Duration of treatment
- Iv to po

Figure 7: With links to many different national plans and strategies, NAPs are often a 'plan of plans'



Lessons I've Learned…

- Take your time and do your homework
- Culture matters and dictates everything else
- Obtain dedicated FTE from Hospital Administration (Consider home in Quality)
- Reporting structure matters…
  - Pharmacists and MDs can be pulled away if managers don't buy-in to stewardship
- Obtain leadership skills (local and national workshops)
- Stewardship burnout is real…Pursue scholarly work and outside networking

ELEMENTS OF AN EFFECTIVE ANTIMICROBIAL STEWARDSHIP PROGRAM

Team success

"The ultimate difference between a company and its competition is, in fact, the ability to execute."

- Larry Bossidy

One size does not fit all

Thank you

Put your leadership and communication skills together to sell your results to the people in suits

What I've learned through the years