ANTIMICROBIAL STEWARDSHIP -

SYSTEMS AND PROCESSES FOR EFFECTIVE ANTIMICROBIAL MEDICINE USE

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If we use antibiotics when not needed, we may not have them when they are most needed." - ***Dr. Tom Frieden, Director U.S. CDC***

Antibiotic Resistance

The use of antibiotics is the single most important factor leading to antibiotic resistance around the world

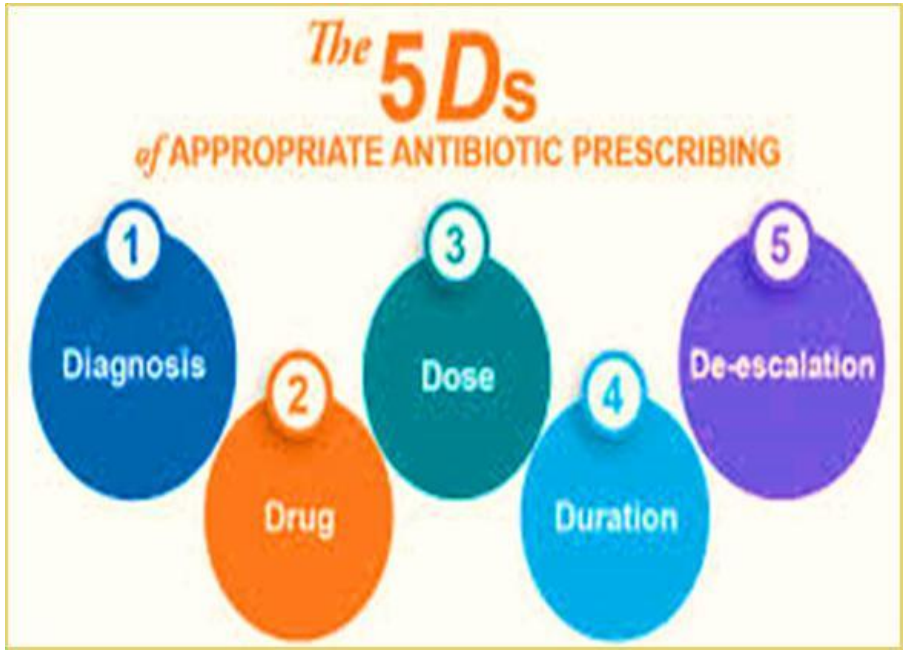
Antibiotic Resistance Threats in the United States, 2013. Centers for Disease Control and Prevention

ANTIMICROBIAL STEWARDSHIP PROGRAM (AMSP)

Antimicrobial stewardship refers to **coordinated Interventions** designed to improve and measure the appropriate use of antimicrobials, improves patient outcomes and reduces microbial resistance by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy and route of administration.

5 D's OF ANTIMICROBIAL STEWARDSHIP

- Diagnosis
  - Does the condition require antimicrobial therapy?
- Drug
  - Is the organism susceptible?
- Dose
  - What is the recommended dose?
- Duration
  - What is the recommended duration?
- De-escalation
  - Can the drug be switched from IV to oral?



GOALS OF ANTIMICROBIAL STEWARDSHIP PROGRAM

- The primary goal of AMS is preventing emergence of AMR and to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use, including toxicity. A secondary goal of AMS is to reduce healthcare costs without adversely impacting quality of care.

Goal 1:Combat antimicrobial resistance:

- Restricting antibiotic use results in reduction of antibiotic pressure, which in tum prevents the development of antimicrobial resistance.
- Restricting antibiotic use can reduce colonization or infection with gram-positive or gram-negative resistant bacteria.

Goal 2: Improve patient outcomes

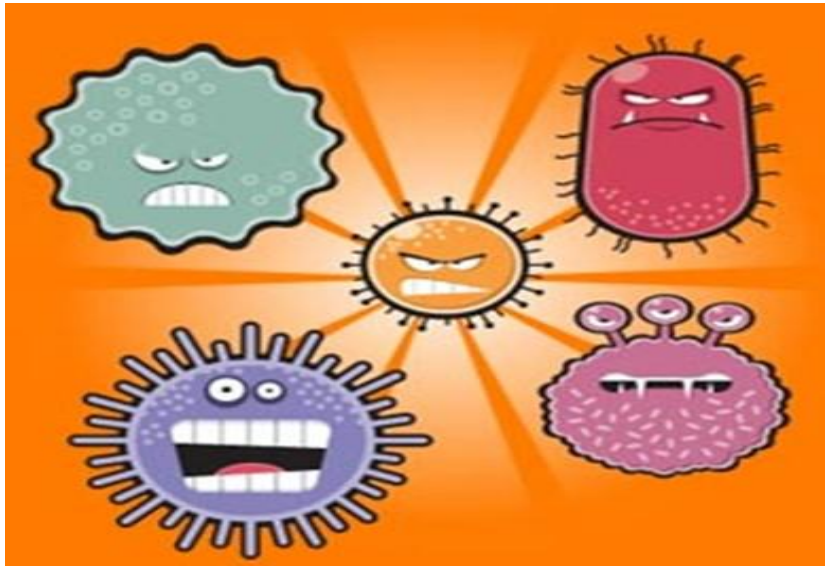
- Improve infection cure rates
- Reduce surgical site infection rates
- Reduce mortality and morbidity.

cont.....

Goal 3:Improve patient safety through minimizing unintended consequences of antimicrobials.

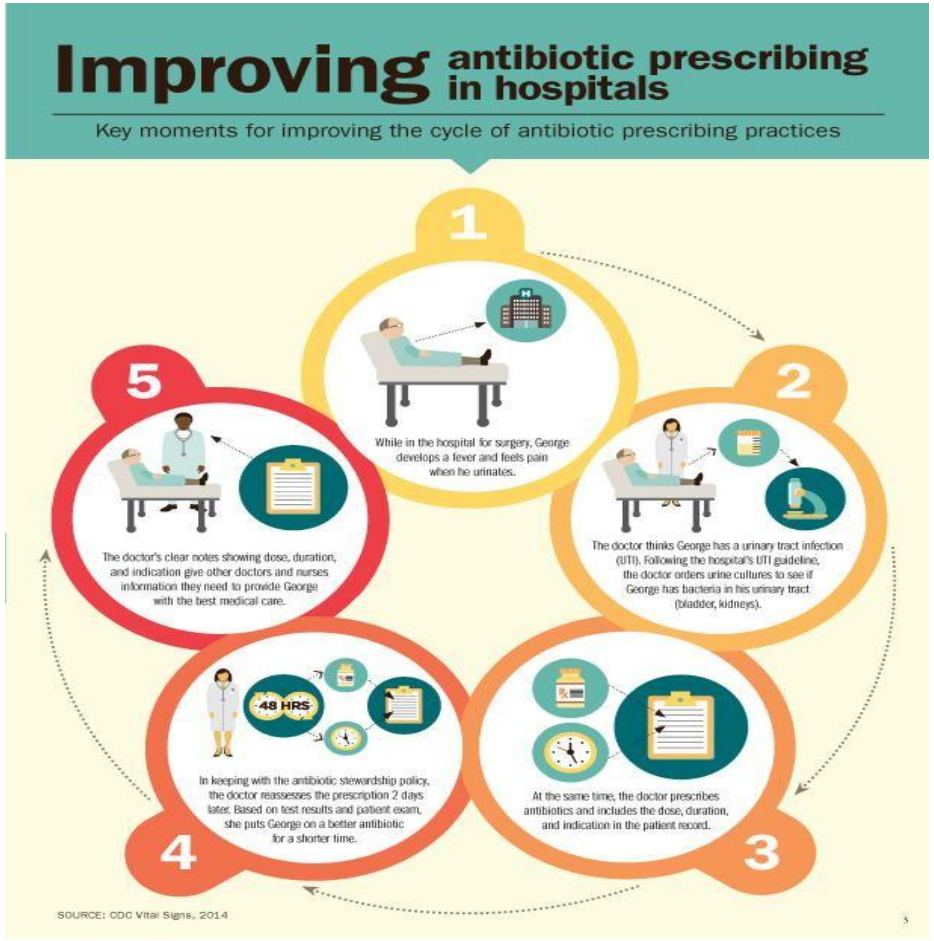
- Reduce antimicrobial consumption , without increasing mortality or infection related readmissions, e.g. 22- 36% reduction in antimicrobial use .
- Reduce C. difficile colonization or infection by controlling the use of "high -risk " antibiotics .

Goal 4: Reduce healthcare costs toward antin1icrobiale expenditure without adversely impacting quality of care.



CDC RECOMMENDS ALL HOSPITALS IMPLEMENT ANTIBIOTIC STEWARDSHIP PROGRAMME

- Leadership commitment
- Accountability
- Drug expertise
- Action
- Tracking
- Reporting
- Education



Implementation of antimicrobial Stewardship Programs

1. Assess the motivations :

•Analyze your situation and what problems you want to address. There are many international guidelines available, but you will need to adapt them to your local situation.

• What can be implemented will depend on local needs/issues, geography, available skills / expertise and other resources.

For example, easier or less costly approaches can include:

-Simple clinical algorithms

-Prescribing guidance for treatment, surgical prophylaxis

-Intravenous (JV) to oral conversion

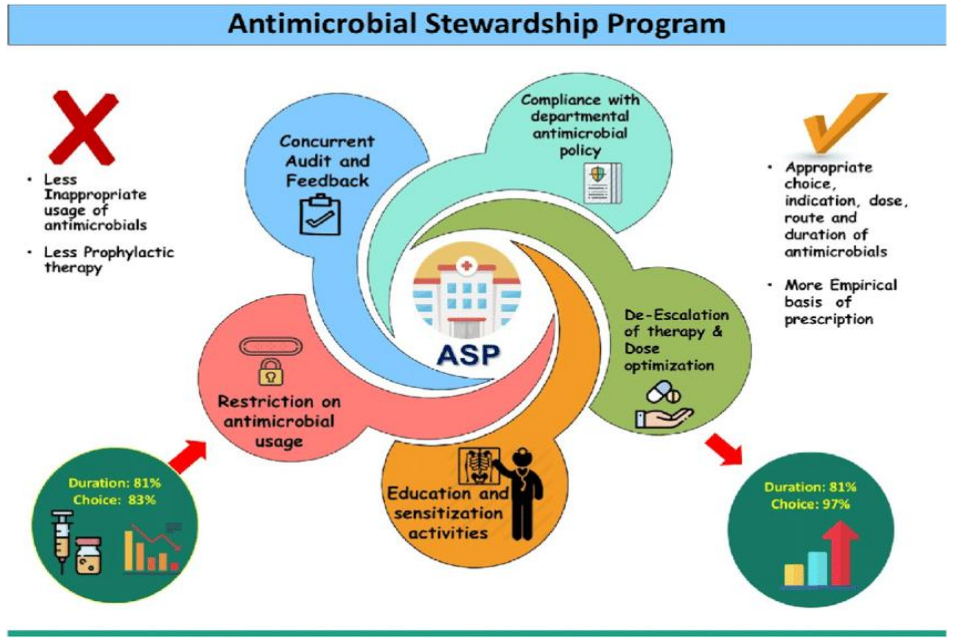
-Provision of microbiological support

-Restricting availability of certain antibiotics (formulary restriction)

- Automatic therapeutic substitution

-IV antimicrobial batching

-Promoting education.



2. Ensure accountability and leadership

To ensure a successful Antimicrobial Stewardship Program:

•The program should be supported by the senior hospital management, who are accountable for the outcomes.

• A tea1n of people and resources should be allocated by the head of the organization to implement and evaluate the program.

•The ASP team members must possess power, expertise, credibility and leadership. These individuals need to convince managers and healthcare staff of the added value of the program.

3. Set up structure and organization

- The key components of the structure and governance of the ASP are :
- - Dedicated resources, including dedicated personnel time for stewardship activities, education, and measuring/monitoring antimicrobial use.
- - A multidisciplinary AS team with core membership of:
- An infectious diseases physician (or lead doctor or physician champion)
- A clinical microbiologist
- A clinical pharmacist with expertise in infection.
- Other members could be specialist nurses, for example infection prevention or stewardship nurses, quality improvement /risk management/patient safety managers and clinicians with an interest in infection.
- Governance within the hospital's quality improvement and patient safety governance structure
- Clear lines of accountability between the chief executive, clinical governance, drug and therapeutics committee, infection prevention and control committees, and the AST.

4. Define priorities and how to measure progress and success

•The objectives of the ASP and how they are going to be achieved and measured need to be agreed by all the key stakeholders and communicated clearly.

One way of doing this is to produce a driver diagram. A Driver Diagram is a logic chart with three or more levels, including:

)> A goal or vision,

)> The high-level factors needed to achieve this goal (called 'primary drivers')

)> Specific projects and activities that would act upon these factors.

For more complex goals, each primary driver could have its own set of 'secondary drivers' (or lower level drivers).

Driver diagrams can help an ASP team to:

?Explore the factors that need to be addressed to achieve a specific overall goal,

? Show how the factors are connected,

?Act as a communication tool for explaining a change strategy

)> Provide the basis for a measurement framework.

5. Identify effective interventions for your setting

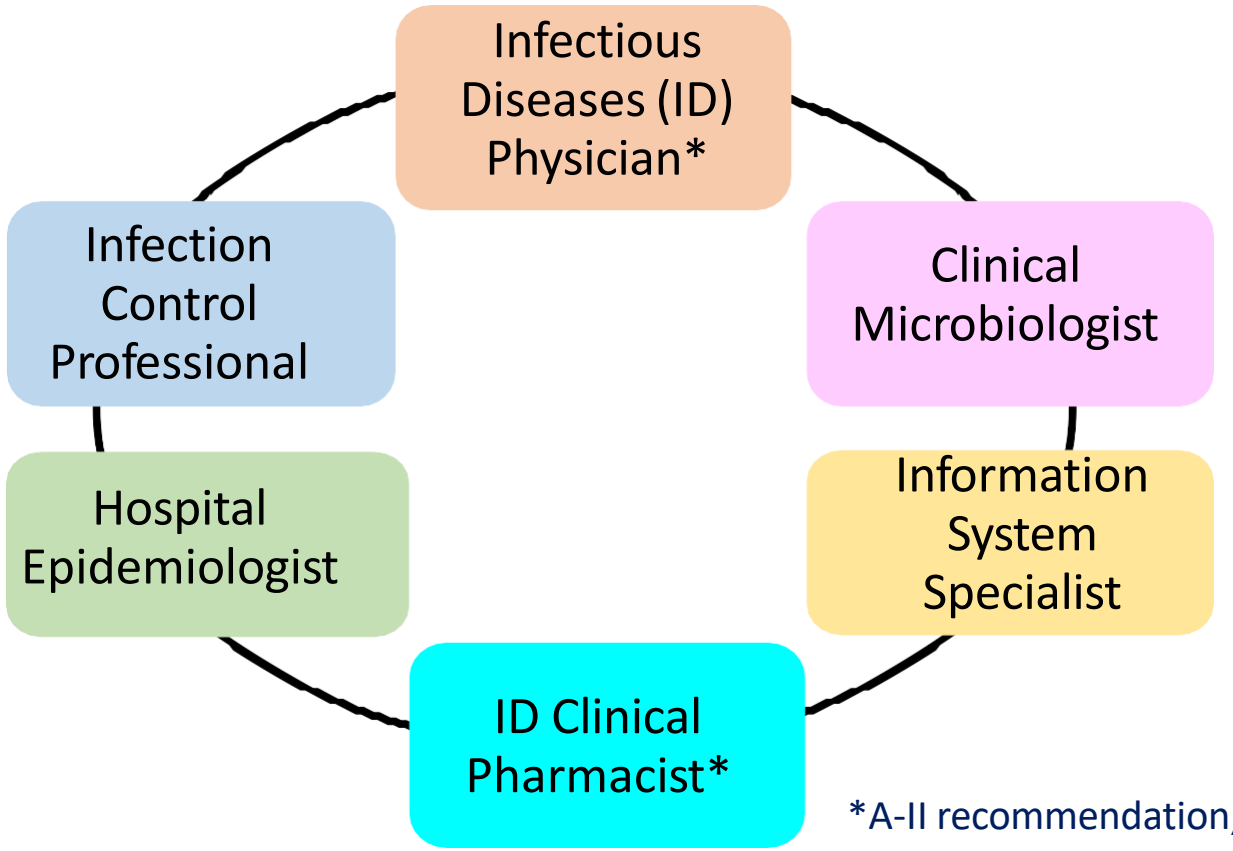
when establishing a new stewardship program, it is best to start with the core strategies and focus on achieving and maintaining them before adding some of the supplemental strategies.

Core Strategies	Supplemental Strategies
Formulary restrictions and preauthorization*	Streamlining / timely de-escalation of therapy
Prospective audit with intervention and feedback*	Dose optimization*
Multidisciplinary stewardship team.	Parenteral to oral conversion*
	Guidelines and clinical pathways*
	Antimicrobial order forms
	Education
	Computerized decision support, surveillance
	Laboratory surveillance and feedback Combination therapies
	Antimicrobial cycling

MULTI DISCIPLINARY ANTIMICROBIAL STEWARDSHIP CORE TEAM

- Share goals such as minimising antimicrobial resistance.
- Expert in initiative development.
- Liaison for dual initiatives.

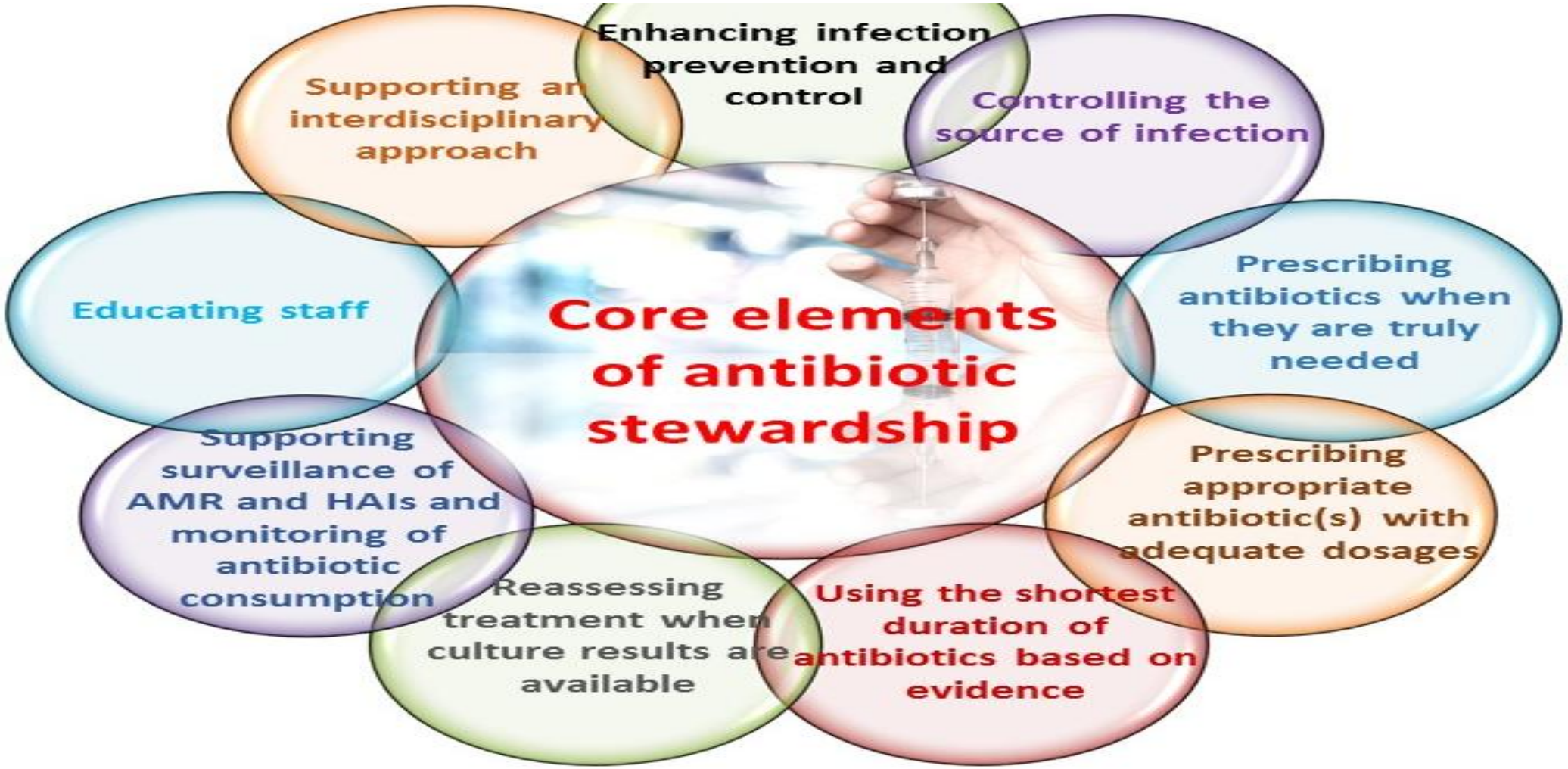
- Expert in analyzing population-level data.
- Support research study design and outcomes reporting.



- Compile raw isolate and susceptibility data.
- Implement micro-driven initiatives.

*A-II recommendation, others are A-III

"A team game with the patient at the center and it's the teamwork that makes the dream work." - Unknown


Enhancing infection prevention and control
Supporting an interdisciplinary approach
Controlling the source of infection
Educating staff
Core elements of antibiotic stewardship
Prescribing antibiotics when they are truly needed
Supporting surveillance of AMR and HAIs and monitoring of antibiotic consumption
Prescribing appropriate antibiotic(s) with adequate dosages
Reassessing treatment when culture results are available
Using the shortest duration of antibiotics based on evidence

ANTIMICROBIAL STEWARDSHIP STRATEGIES

Primary Strategies:

1. Formulary restriction and preauthorisation (BII).
2. Prospective audit with intervention and feedback (AI).

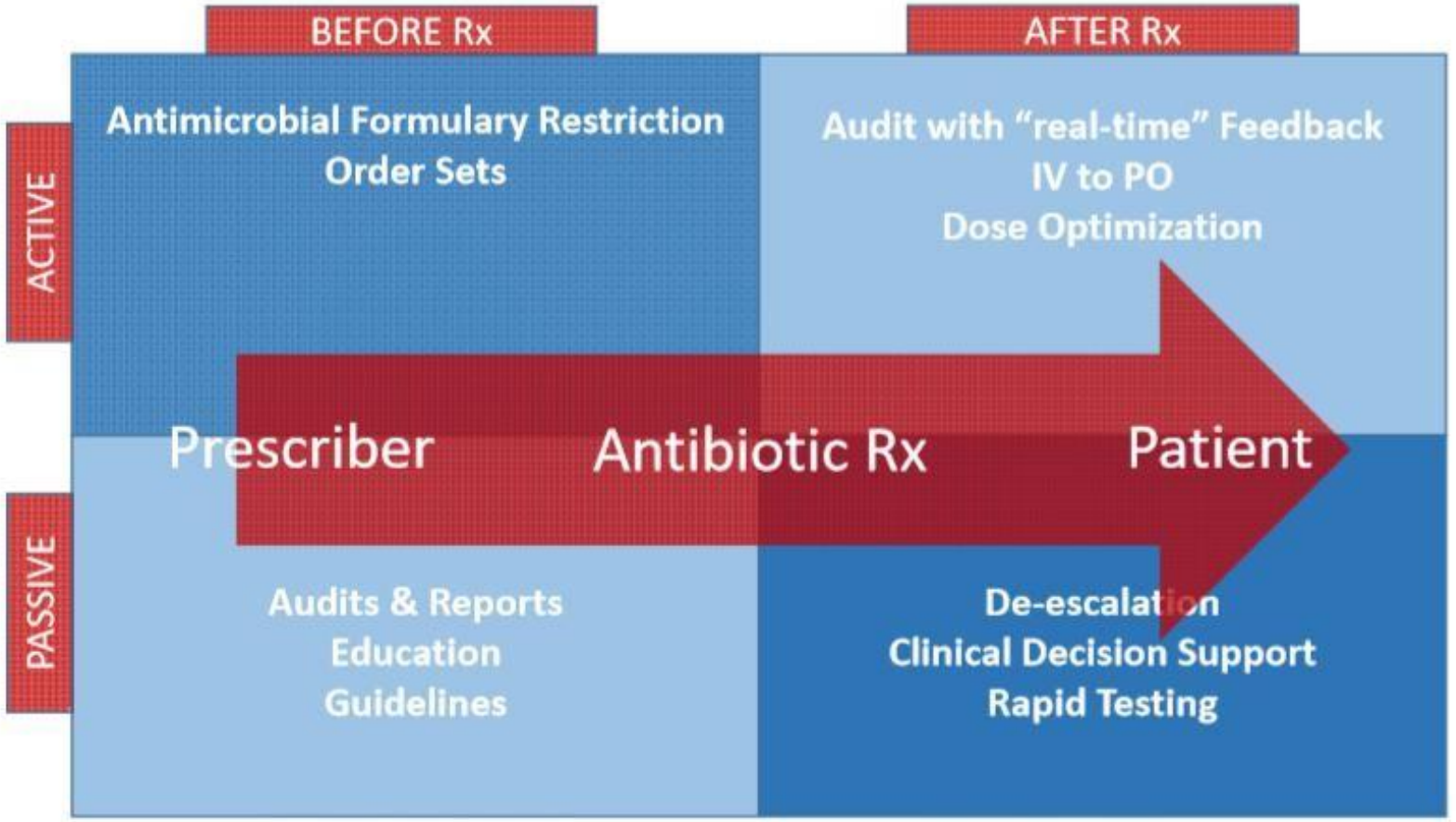
Secondary Strategies:

1. Education (AII).
2. Guidelines and clinical pathways (AI).
3. Antimicrobial cycling (CII).
4. Antimicrobial order forms (BII).
5. Streamlining or de-escalation (AII).
6. IV to oral conversion (AI).

IDSA Grading System for Ranking Recommendations in Clinical Guidelines

Category, grade	Definition
Strength of recommendation	
A	Good evidence to support a recommendation for use
B	Moderate evidence to support a recommendation for use
C	Poor evidence to support a recommendation for use
Quality of evidence	
I	Evidence from ≥1 properly randomized, controlled trial
II	Evidence from ≥1 well-designed clinical trial, without randomization; from cohort or case-controlled analytic studies (preferably from >1 center); from multiple time-series; or from dramatic results from uncontrolled experiments
III	Evidence from opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees

AMSP Strategy Framework



Core strategies	Advantages	Disadvantages
Prospective audit with direct intervention and feedback	• May reduce inappropriate antimicrobial use. • May serve an educational purpose to modify future prescribing. • Allows prescribers to maintain autonomy.	•Difficulty Identifying patients with inappropriate therapy and communicating with prescribers.
Formulary restriction and preauthorization requirements	•May result in immediate and substantial reductions in antimicrobial use and costs.	• May increase staffing requirements. • May delay order implementation while approval is obtained from an authorized prescriber with the potential for adverse patient outcomes. • May increase use of and resistance to alternative antimicrobial agents. • Perceived loss of prescriber autonomy.
Education	• May influence prescribing behavior and promote acceptance of ASP strategies.	•Only marginally effective in modifying prescribing behavior when used without active intervention.
Evidence-based guidelines and clinical pathways	• May improve antimicrobial use and eliminate practice variations.	• Adherence may be poor.

Core strategies	Advantages	Disadvantages
Antimicrobial cycling (not routinely recommended in IDSA/SHEA guidelines)	•May minimize resistance by providing diversity in antimicrobial use.	•Insufficient data available demonstrating long-term effectiveness in reducing antimicrobial resistance. •Many patients excluded because of drug allergies. toxicity, or other concerns. •Potential of non adherence due to prescriber. lack of awareness of currently scheduled agent. •May increase antibiotic costs.
Antimicrobial order forms	•May reduce inappropriate antimicrobial use. •May facilitate implementation of guidelines and clinical pathways.	•Potential for inappropriate interruption in therapy due to automatic stop orders.
Combination therapy (not routinely recommended in IDSA/SHEA guidelines)	•May improve clinical outcomes and prevent resistance in certain types of patients and situations.	•Often redundant and unnecessary. • insufficient data available demonstrating improved clinical outcomes and prevention of resistance.

Core strategies	Advantages	Disadvantages
Streamlining or de-escalation of therapy	•Reduces antimicrobial exposure, selection of resistant pathogens. and health care costs.	•Prescriber reluctance to de-escalate therapy when cultures are negative and clinical improvement has been observed.
Dose optimization	• Tailors therapy to patient characteristics causative organism, site of infection, and pharmacokinetic and pharmacodynamics characteristics of the antimicrobial agent.	•Nursing staff concerns about incompatibilities when prolonged infusions are used based on pharmacok1netoc considerations.
Parenteral to oral conversion	• May decrease length of hospital stay and health care costs. • May reduce the risk of complications from intravenous access.	• Difficulty identifying patients 1n whom conversion is appropriate.

AMS RECOMMENDATION BY ICMR - 2018

- ***Structure:*** The antibiotic stewardship team.
- **Capacity for stewardship programmes** such as monitoring, reporting and audit, computer technology,.
- ***Antibiograms and antibiotic policy:*** Antibiograms should be generated periodically based on hospital antibiograms should be drafted. The policy should be based on site of infection.
- ***Formularies and guidelines:*** Approvals for prescribing and dispensing specific drugs.
- ***Training:*** Periodical training and certification of hospital staff on AMSP is mandatory, and prescribers should be given stringent training on “Therapeutic guidelines for antimicrobial use”.
- ***Monitoring and reporting antibiotic use:*** Expenditure on antibiotics over time must be monitored systematically.
- ***Goals and measurable outcomes:*** The process & outcome measures.

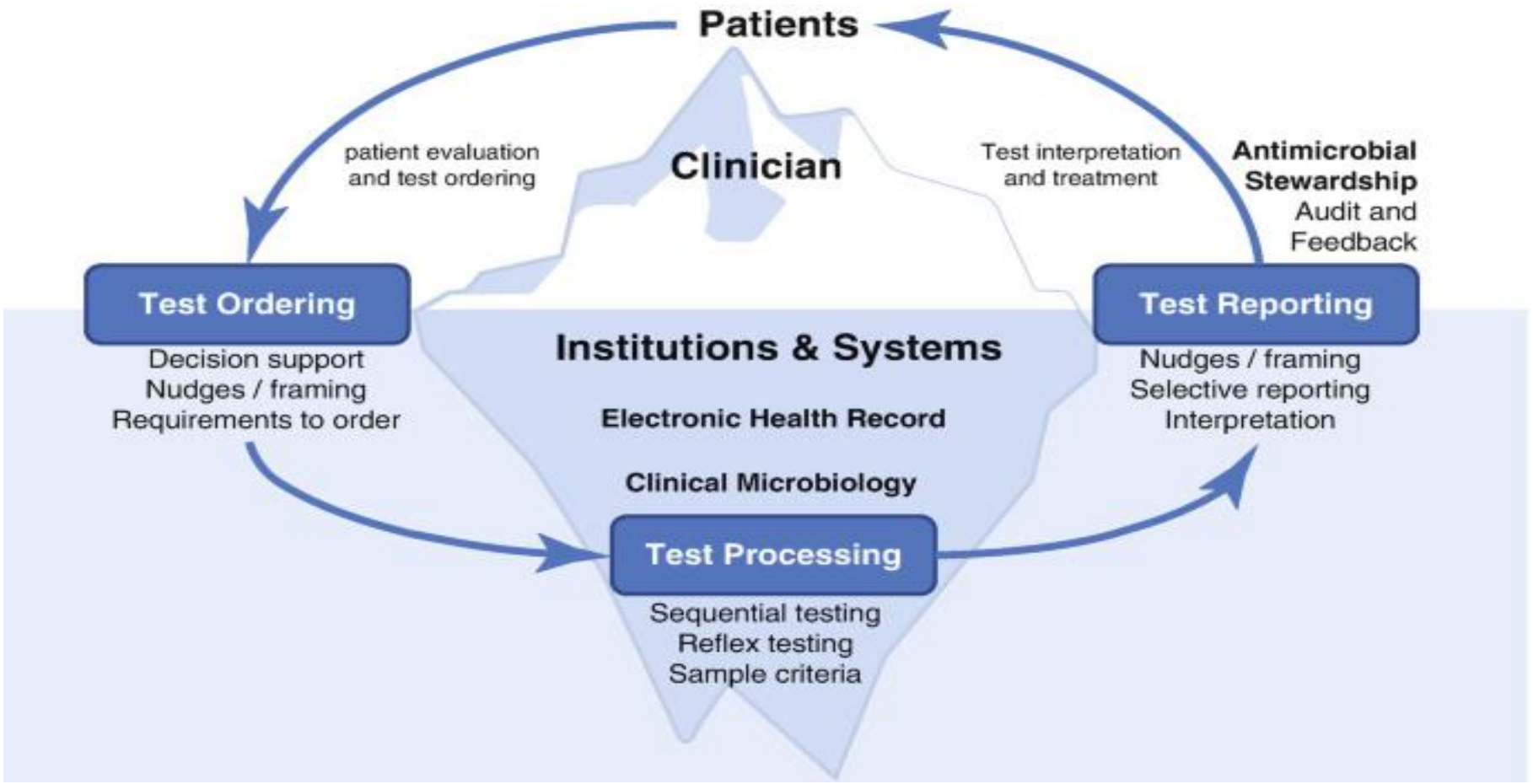
AMS RECOMMENDATION BY ICMR - 2018

Audit and feedback	These are two important processes to monitor the implementation which includes review of prescriptions, laboratory results, clinical notes etc. and most importantly audit of carbapenem and polymyxin use in ICU.
Interventions	Therapy based on standard guidelines and patients' clinical status should be ensured to control use of restricted antimicrobials for empirical treatment. Other important interventions include directed therapy based on early microscopy tests, immunological and rapid molecular tests, antibiotic "time outs", de-escalation of therapy, dose optimization, change of broad-spectrum antibiotics after culture results are available and shortening treatment duration in prophylactic use

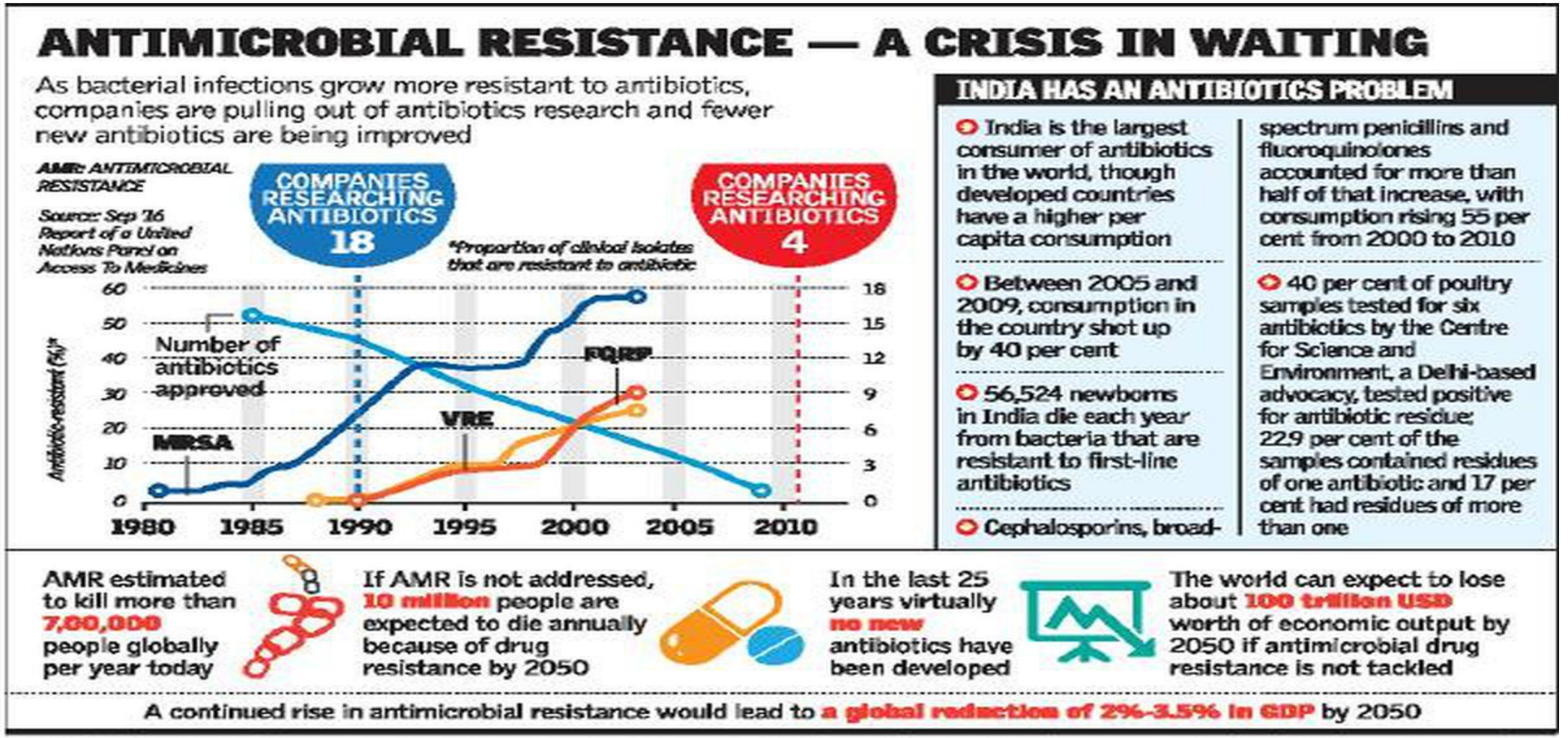
AMS RECOMMENDATION BY ICMR - 2018

Education and awareness	Medical education curriculum should include AMSP as part of the main course for physicians, microbiologists, pharmacologists, nurses and pharmacists. It is also important to create awareness among patients, healthcare workers, administrators and governing authorities through advertising, media and messages.
Research on AMSP	AMS research focused on novel strategies of stewardship, implementation and impact of AMS programs, point prevalent studies, effective interventions, surveillance and management of antimicrobial usage data, needs be devised for Indian settings

PATIENT TO SURVEILLANCE



IS AMS POSSIBLE IN INDIA ??



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SPECIAL ARTICLE
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Antimicrobial stewardship programme – from policies to practices: A survey of antimicrobial stewardship programme practices from 25 centres in India

- 11 govt -8 accredited
- 15 - AMSP
- Lead by – Physicians & Clinical microbiologist- 40% each
- 1-12 meetings in a year
- Monitoring - IT software– 14 centres – WHONET in 11
- Ward rounds – 11 centres
- Prescription audit , feedback & antibiotic consumption data – 10

Indian perspective

THE TIMES OF INDIA | India

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Bad bugs rate 40 % higher in Indian ICUs than general ward

TNN Dec 29, 2012, 02.13AM IST

Tags: intensive care units | ICU | bad bugs

NEW DELHI: Intensive Care Units (ICUs) - believed to be the safest part of any hospital â€" are teeming with bad bugs.

Contrary to popular belief, scientific evidence shows that Indian ICUs are a hot bed for bad infections.

This was also the primary fear of doctors treating the 23-year-old gang-rape victim Nirbhaya.

Deputy medical superintendent of Safdarjung Hospital Dr T K Bhowmick said infection rate in Indian ICUs are almost 40% higher than even general wards. "That's why our primary focus was to wheel out Nirbhaya from the ICU into a general ward at soon as possible. ICUs can cause serious life-threatening infections. The primary reason is that patients admitted in ICUs have multiple tubes inserted into them like the ventilator, IV lines or catheters, all of them being major source of infections."

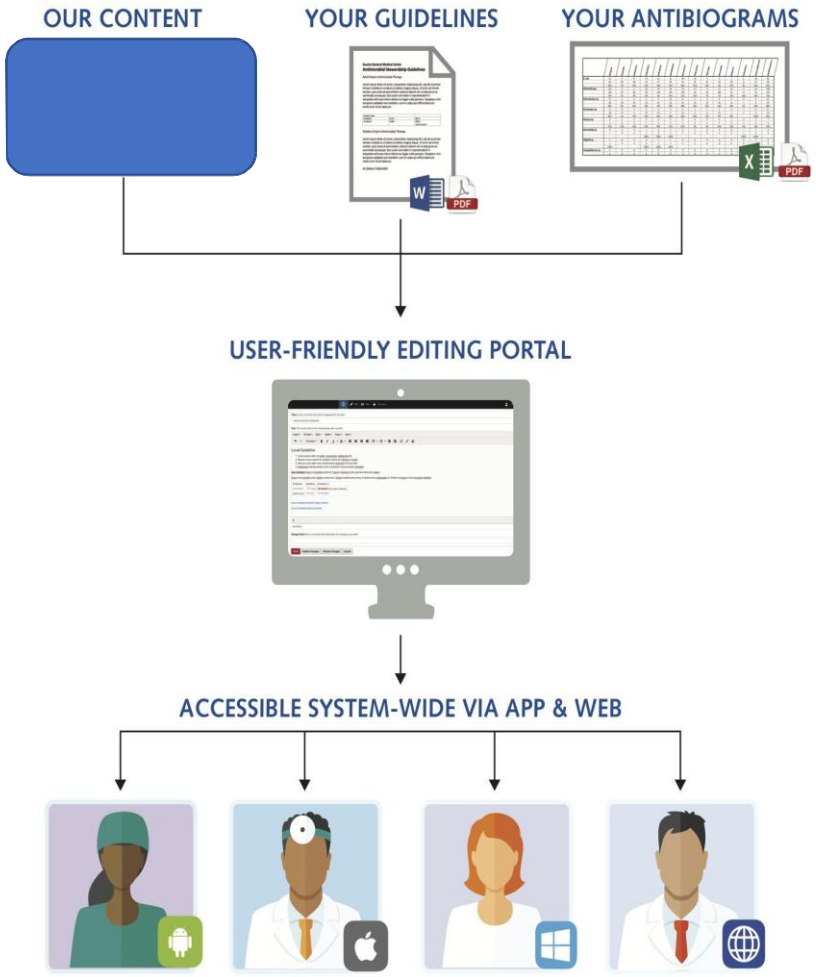
BARRIERS AND FACILITATORS TO IMPLEMENTING STEWARDSHIP PROGRAMS

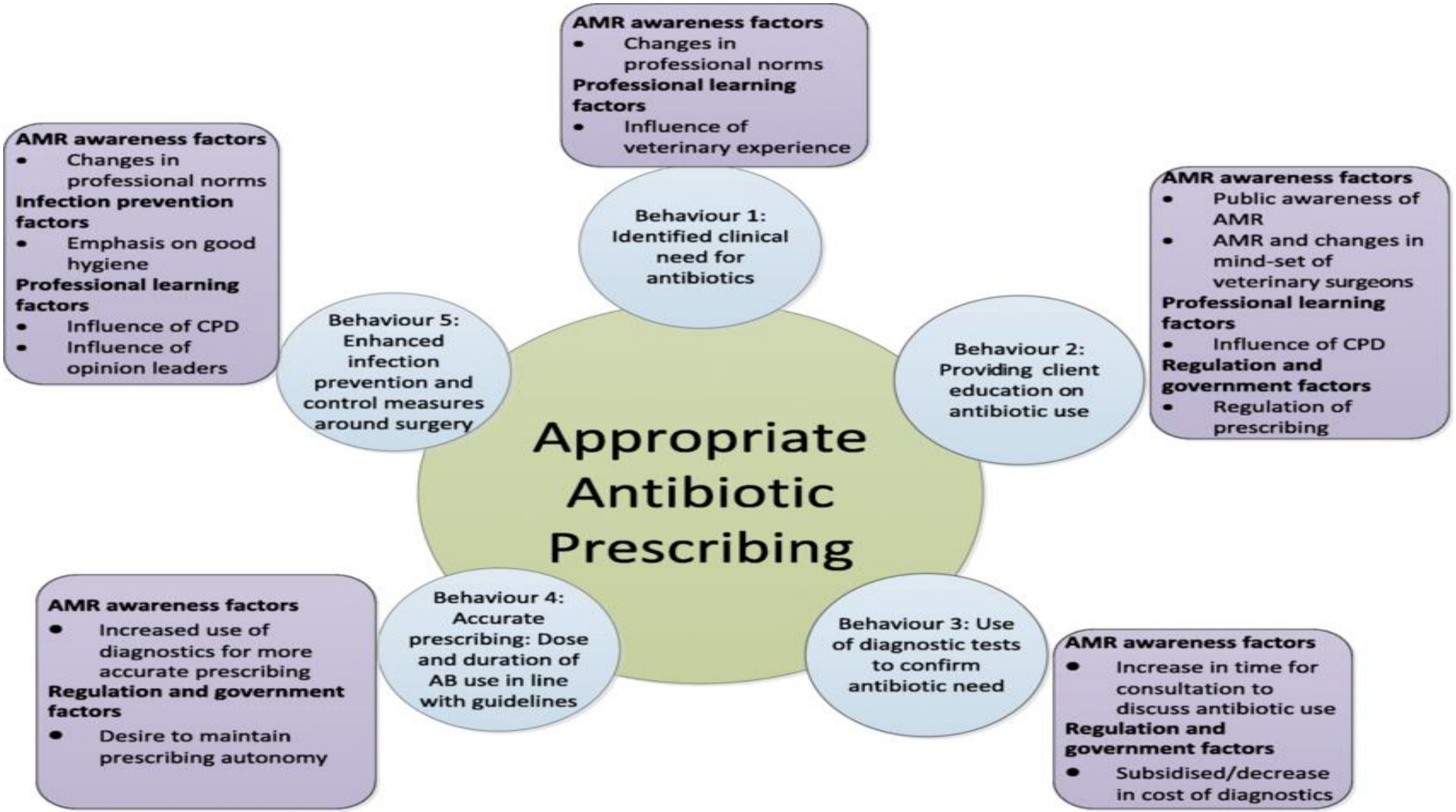
Theoretical domains	Subthemes within each domain
Environmental context and resources	Lack of key personnel (e.g., infectious disease clinicians, pharmacy staff, microbiologist)
	Problems with data and information systems (e.g., inadequate information technology, lack of dedicated IT assistant, lack of good quality data, and resources to utilize it)
	The influence of adequacy of financial resources
	Lack of time
	Inadequate supply of laboratory provisions
	Problem of limited antibiotic options available in settings with prevalent multi drug resistant bacteria

Goals/Social influences	Other higher priority initiatives hindering the ASP's use
	Resistance from medical staff
	The influence of clinical leadership (e.g., pharmacists, infectious diseases physicians, senior clinicians)
	Lack of leadership from hospital administration
	Poor communication, including interpersonal, within teams (e.g., inconsistency or conflict) and between private and public sectors
	Perceived unhelpful attitudes of oncology clinicians
Knowledge	Lack of knowledge of patient test or results
	Lack of knowledge about ASPs (e.g., due to poor education or inevitable loss of knowledge due to high staff turnover)
	Lack of knowledge of current use of antibiotics
Intentions	Lack of willingness to change
Reinforcement	A specific antimicrobial stewardship strategy not being covered by a reimbursement system
Skills	Medical professionals lacking relevant skills for a specific antimicrobial stewardship strategy (e.g., training in clinical microbiology)

INCREASING AWARENESS AMONG PRESCRIBERS

- Effective advocacy and communication
- Pocket guidebook
- Laminated posters - Reminder
- Hospital newsletter
- Posting - Hospital intranet / E-mail to prescribers
- Smart phone or tablet applications
- Education and training
- Empowerment and networking




AMR awareness factors
• Changes in professional norms
Professional learning factors
• Influence of veterinary experience
AMR awareness factors
• Changes in professional norms
Infection prevention factors
• Emphasis on good hygiene
Professional learning factors
• Influence of CPD
• Influence of opinion leaders
Behaviour 1: Identified clinical need for antibiotics
Behaviour 5: Enhanced infection prevention and control measures around surgery
Behaviour 2: Providing client education on antibiotic use
AMR awareness factors
• Public awareness of AMR
• AMR and changes in mind-set of veterinary surgeons
Professional learning factors
• Influence of CPD
Regulation and government factors
• Regulation of prescribing
Appropriate Antibiotic Prescribing
Behaviour 4: Accurate prescribing: Dose and duration of AB use in line with guidelines
Behaviour 3: Use of diagnostic tests to confirm antibiotic need
AMR awareness factors
• Increased use of diagnostics for more accurate prescribing
Regulation and government factors
• Desire to maintain prescribing autonomy
AMR awareness factors
• Increase in time for consultation to discuss antibiotic use
Regulation and government factors
• Subsidised/decrease in cost of diagnostics

Structural, process and outcome measures for assessing AMS programmes[79]

Structure measure	Process measures	Outcome measures
Updated antibiotic policy	Documented indication for antibiotic use	Length of Hospital stay
Multidisciplinary AMSP team	Stop/review date	MDR organisms (e.g. MRSA, ESBL-E/CPE, MDR Pseudomonas etc..
Training	De-escalation	Readmission within 30 days after discharge:
	Length of therapy by indication	In-hospital mortality
	Compliance with current clinical treatment guidelines	Antibiotic consumption (DDD/DOT)
	Compliance with current guidelines for surgical prophylaxis (antibiotics)	
	Surgical prophylaxis within the previous 60 minutes	


we're not
scared of
antibiotics!
there's just
no stopping us...

THANK YOU

ANTIBIOTICS
USE - RESPONSIBLY