

**Summer Training at
Soni Manipal Hospital,
Jaipur**

Antimicrobial Stewardship: Program Implementation Plan

**By
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**MBA Hospital and Health Management
2015-2017**



**The IIHMR University, Jaipur
2016**

CERTIFICATE

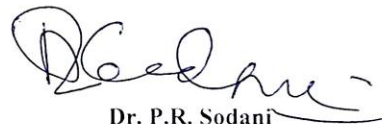
This is to certify that **Dr Vandana Rathore** student of MBA hospital and health management (MBA-HM) from IIHMR University, Jaipur has undergone summer training at **Soni Manipal Hospital, Jaipur from 1st April 2016 to 31st May 2016.**

The candidate has successfully carried out the study designated to her during summer training and her approach to the study has been sincere, scientific and analytical. The summer training is in fulfillment of the course requirements.

I wish her all success in future endeavors.



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SMH/HR/TC/2016/57

Date: 1st June 2016

To whomsoever it may concern

This is to certify that **Dr.Vandana Rathore** pursuing her Post Graduate Diploma in Hospital Management at IIHMR, Jaipur has completed her summer internship on "**Antimicrobial Stewardship: Program Implementation Plan**" in Quality department from **1st April 2016 to 31st May 2016** in **Soni Manipal Hospital**, Vidhyadhar Nagar, Sikar Road Jaipur.

During this period we found her sincere and hard working.

We wish her all success in future.

For Soni Manipal Hospital
(A Unit of Manipal Hospitals (Jaipur) Pvt.Ltd.)


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LIST OF ACRONYMS

ASP	Antimicrobial stewardship program
AMC	Antimicrobial calculator
A/b	Antibiotics
BSI	Blood stream infection
CA-UTI	Catheter urinary tract infection
CPOE	Computer physician order entry
DDD	Daily defined dose
ICU	Intensive care unit
ID	Infectious disease
ICP	Infection control program
IVF	In vitro fertilization
IV	Intra venous
NABL	National Accreditation Board for testing & Calibration Laboratories
NABH	National Accreditation board for Hospitals & Healthcare Providers
OPAT	Out patient antibiotic therapy
PD	Provisional diagnosis
PDD	Prescribed daily dose
SSI	Surgical site infection
VAP	Ventilator associated pneumonia

SONI MANIPAL HOSPITAL, JAIPUR: OVERVIEW

Soni Manipal Hospital is a part of India's 3rd largest healthcare chain- Manipal Hospital. It is internationally recognized by NABL (National Accreditation Board for Testing & Calibration Laboratories, India) NABH (National Accreditation Board for Hospitals & Healthcare Providers, India) for world-class healthcare. The focus at Soni Manipal Hospital is to develop an affordable tertiary care framework with multi specialty healthcare facilities. Over the past few years, they have not only focused on delivery of comprehensive treatment, but also on the quality aspect of healthcare services. Their insistence on the quality parameter in healthcare paved the way for Soni Manipal Hospital to become the largest NABH & NABL accredited hospital in Rajasthan. Their clinical Excellence is rooted in a brilliant team of doctors/medical specialists, who are well versed with the latest advancements in their respective field of medical expertise. This is further complemented by teams of highly trained nurses and paramedical people. They are at the leading edge of technological advancements in the medical world. This, along with state-of-the-art infrastructure and facilities, the finest minds in Rajasthan and a genuine desire for providing the best healthcare, drives them to deliver path-breaking care for their patients on a day-to-day basis. They pride ourselves in the way we deliver healthcare by solving the smallest as well as the most complex medical problems.

Specialties Offered

- Accident and emergency
- Cardiac science
- Dental Medicine
- Dermatology
- Diabetes and endocrinology
- Ear, nose and throat
- Gastrointestinal sciences
- General Surgery
- Genetics
- Health checks

- ICU and critical care
- Internal Medicine
- IVF & Reproductive Medicine
- Laboratory Medicine and Diagnosis
- Neurosciences
- Obstetrics and gynaecology
- Oncology
- Ophthalmology
- Orthopaedics
- Paediatrics
- Plastic and cosmetic surgery
- Psychiatry and psychology
- Renal Sciences
- Respiratory Medicine
- Sports medicine and rehabilitation

HOSPITAL ACQUIRED INFECTIONS

INTRODUCTION

“Nosocomial” term is used for any disease acquired by patient under medical care. It is an infection acquired by patient during hospital stay. Recently, a new term, “healthcare associated infections” is used for the type of infections caused by prolonged hospital stay and it accounts for a major risk factor for serious health issues leading to death. About 75% of the burden of these infections is present in developing countries. Asymptomatic patients may be considered infected if these pathogens are found in the body fluids or at a sterile body site, such as blood or cerebrospinal fluid . Infections that are acquired by hospital staff, visitors or other healthcare personnel may also be considered as nosocomial

To be classified as a nosocomial infection, the patient must have been admitted for reasons other than the infection. He or she must also have shown no signs of active or incubating infection. These infections occur:

- up to 48 hours after hospital admission
- up to 3 days after discharge
- up to 30 days after an operation

Hospital-acquired infections appeared before the origination of hospitals and became a health problem during the miraculous antibiotic era. Due to these infections, not only the costs but also the use of antibiotics increased with an extended hospitalization. This resulted in elevated morbidity and mortality. Nosocomial infections can be caused by any organisms but few organisms are particularly responsible for hospital-acquired infections.

Bacteria are responsible for about ninety percent infections, whereas protozoans, fungi, viruses and mycobacteria are less contributing compared to bacterial infections

Types of hospital acquired infections

Simplified criteria for surveillance of nosocomial infections

Type of nosocomial infection	Simplified criteria infection
Surgical site infection	Any purulent discharge, abscess, or spreading cellulitis at the surgical site during the month after the operation
Urinary infection	Positive urine culture (1 or 2 species) with at least 10 ⁵ bacteria/ml, with or without clinical symptoms
Respiratory infection	Respiratory symptoms with at least two of the following signs appearing during hospitalization: — cough — purulent sputum — new infiltrate on chest radiograph consistent with infection
Vascular catheter infection	Inflammation, lymphangitis or infection purulent discharge at the insertion site of the catheter
Septicaemia	Fever or rigours and at least one positive blood culture

1. Urinary infections

This is the most common nosocomial infection; 80% of infections are associated with the use of an indwelling bladder catheter. Urinary infections are associated with less morbidity than other nosocomial infections, but can occasionally lead to bacteraemia and death. Infections are usually defined by microbiological criteria: positive quantitative urine culture ($\geq 10^5$ microorganisms/ml, with a maximum of 2 isolated microbial species). The bacteria responsible arise from the gut flora, either normal (*Escherichia coli*) or acquired in hospital (multiresistant *Klebsiella*).

2. Surgical site infections

Surgical site infections are also frequent: the incidence varies from 0.5 to 15% depending on the type of operation and underlying patient status. These are a significant problem which limit the potential benefits of surgical interventions. The impact on hospital costs and postoperative length of stay (between 3 and 20 additional days) is considerable. The definition is mainly clinical: purulent discharge around the wound or the insertion site of the drain, or spreading cellulitis from the wound. The infection is usually acquired during the operation itself; either exogenously (e.g. from the air, medical equipment, surgeons and other staff), endogenously from the flora on the skin or in the operative site or, rarely, from blood used in surgery. The infecting microorganisms are variable, depending on the type and location of surgery, and antimicrobials received by the patient. The main risk factor is the extent of contamination during the procedure (clean, clean-contaminated, contaminated, dirty), which is to a large part dependent on the length of the operation, and the patient's general condition.

3. Nosocomial pneumonia

Nosocomial pneumonia occurs in several different patient groups. The most important are patients on ventilators in intensive care units, where the rate of pneumonia is 3% per day. There is a high case-fatality rate associated with ventilator-associated pneumonia, although the attributable risk is difficult to determine because patient comorbidity is so high. Microorganisms colonize the stomach, upper airway and bronchi, and cause infection in the lungs (pneumonia): they are often endogenous (digestive system or nose and throat), but may be exogenous, often from contaminated respiratory equipment.

4. Nosocomial bacteraemia

These infections represent a small proportion of nosocomial infections (approximately 5%) but casefatality rates are high — more than 50% for some microorganisms. The incidence is increasing, particularly for certain organisms such as multiresistant coagulase-negative Staphylococcus and Candida spp. Infection may occur at the skin entry site of the intravascular device, or in the subcutaneous path of the catheter (tunnel infection). Organisms colonizing the catheter within the vessel may produce bacteraemia without visible external infection. The resident or transient cutaneous flora is the source of infection. The main risk factors are the length of catheterization, level of asepsis at insertion, and continuing catheter care

Other nosocomial infections

These are the four most frequent and important nosocomial infections, but there are many other potential sites of infection. For example:

- Skin and soft tissue infections: open sores (ulcers, burns and bedsores) encourage bacterial colonization and may lead to systemic infection.
- Gastroenteritis is the most common nosocomial infection in children, where rotavirus is a chief pathogen: Clostridium difficile is the major cause of nosocomial gastroenteritis in adults in developed countries.
- Sinusitis and other enteric infections, infections of the eye and conjunctiva.
- Endometritis and other infections of the reproductive organs following childbirth.

Factors that predispose to nosocomial infection

Related to underlying health status

- Advanced age
- Malnutrition
- Alcoholism
- Heavy smoking
- Chronic lung disease

- Diabetes

Related to acute disease process

- Surgery
- Trauma
- Burns

Related to invasive procedures

- Endotracheal or nasal intubation
- Central venous catheterisation
- Extracorporeal renal support
- Surgical drains
- Nasogastric tube Tracheostomy
- Urinary catheter

Related to treatment

- Blood transfusion
- Recent antimicrobial therapy
- Immunosuppressive treatments
- Stress-ulcer prophylaxis
- Recumbent position
- Parenteral nutrition
- Length of stay

There are four infection control indicators

- VAP (Ventilator associated pneumonia)
- CA-UTI (Catheter urinary tract infection)
- BSI (Blood stream infection)
- SSI (Surgical site infection)

Hospital acquired infection control in Soni Manipal Hospital

During my summer training, I studied the infection control department of the hospital,

which works for prevention of hospital-acquired infection among patients and staff of the hospital who are prone to get an infection. The department fulfills the following role and responsibilities:

- Produce guideline on prevention and management of infection
- Conduct audit and surveillance to report on compliance of infection control measures
- Provide advise to healthcare staff on prevention of infection

There is a hospital infection control committee that overheads the department and is responsible for smooth functioning of infection control policies and also monitor the same to maintain quality.

The committee comprises of Infectious disease consultant doctor, Infectious disease nurses, Unit head, Medical Superintendent, Head Clinical Services Quality Manager and other medical representative consultants from different departments.

The department wanted to introduce an antimicrobial stewardship program in the facility to ensure optimal use of antimicrobials, especially antibiotics to enhance the quality of care and patient safety primarily and reduce the costs of care secondarily

ANTIMICROBIAL STEWARDSHIP

Large worldwide surveillance studies report that resistance to nearly all-antimicrobial classes is increasing, as is the emergence of what have been termed pan- drug resistant pathogens. In addition, drug development has become more complex than it was decades ago.

As antimicrobial resistance increases and antimicrobial development declines, we must use our current cadre of antimicrobials more wisely. Administering antimicrobials judiciously to extend their useful lifetime are but one of the things we can offer immediately to address this public health crisis. This means optimizing antimicrobial use in humans via the development of a prospective, formalized, strategy to ensure that antimicrobials are used appropriately. Programs developed from this strategy are called antimicrobial stewardship programs (ASPs). Good antimicrobial stewardship is a practice that ensures the optimal selection, dose, and duration of an antimicrobial therapy that leads to the best clinical outcome for the treatment or prevention of infection while producing the fewest toxic effects and the lowest risk for subsequent resistance. It should be noted that the unregulated use of these drugs does not only induce resistance, but also directly harm patients by increasing their risk of developing side effects such as life-threatening infections as well as lead to excessive-drug– related expenditures. Appropriate use of antibiotics is important. Up to 30% of ventilator associated pneumonias are treated inadequately. There is increasing evidence to suggest that the use of appropriate and early antibiotics improves morbidity and mortality.

It should be stressed that antimicrobial stewardship is only one strategy for minimizing the development of resistance. To be successful, there must be collaboration between ASPs and both infection control programs (ICPs) and environmental service departments. The most important areas contributing to the development of resistance that can be controlled by healthcare systems are infection control, the hospital environment, and antimicrobial use. Although this report focuses on the use of antimicrobials, a balanced perspective is important in understanding and addressing this crisis.

PROJECT REPORT

Knowledge attitudes and practice survey about antimicrobial prescribing among consultants at Soni Manipal Hospital, Jaipur

Abstract

Background Antimicrobial resistance (AMR) is a global concern. This study evaluated knowledge, attitudes and practices about antimicrobial prescribing among consultants in hospital setting.

Aim To assess the knowledge, attitude and practices regarding antimicrobial prescription among the consultants in order to help formulate a strategic antimicrobial stewardship intervention for Manipal Hospital Jaipur.

Methods A self-administered questionnaire based survey was conducted among consultants of Manipal Hospital Jaipur.

Result Gaps were found at levels of knowledge (irregular teaching program departmentally as well as personal seeking of knowledge, perception regarding the usefulness of sources of information, sources of information) and practice (Succumbing to patient demand to over prescribe, not consulting the infectious disease consultant frequently for a review, inadequate frequency of referring to antibiogram and self-documentation of prescriptions).

Conclusion Addressing these gaps and the reasons (as stated in the comments by consultants and reasons for the choice in some questions) will help in devising a tailor made antimicrobial stewardship plan/intervention for Soni Manipal Hospital, Jaipur.

Introduction

Antimicrobials have transformed the practice of medicine, making once lethal infections readily treatable and making other medical advances, like cancer chemotherapy and organ transplants, possible. The prompt initiation of antibiotics to treat infections has been proven to reduce morbidity and save lives. Patients who are unnecessarily exposed to antibiotics are placed at risk for serious adverse events with no clinical benefit. The misuse of antibiotics has also contributed to the growing problem of antibiotic resistance, which has become one of the most serious and growing threats to public health. Unlike other medications, the potential for spread of

resistant organisms means that the misuse of antibiotics can adversely impact the health of patients who are not even exposed to them.¹

A growing body of evidence demonstrates that hospital based programs dedicated to improving antibiotic use, commonly referred to as “Antimicrobial Stewardship Programs (ASPs)”, can both optimize the treatment of infections and reduce adverse events associated with antimicrobial use and help clinicians improve the quality of patient care.¹

Review of literature

Antimicrobial resistance is an increasing problem world- wide that has been identified as a major threat by the World Health Organisation due to the lack of new antibiotics in the development pipeline and infections caused by multi-drug resistant pathogens becoming untreatable. A strategic global response is required to preserve current antibiotics and to reduce development of resistance. Antimicrobial stewardship programs aim to optimize antimicrobial use and are now required as part of accreditation of many hospitals worldwide.² Antimicrobial stewardship refers to coordinated interventions designed to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy, and route of administration. Antimicrobial stewards seek to achieve optimal clinical outcomes related to antimicrobial use, minimize toxicity and other adverse events, reduce the costs of health care for infections, and limit the selection for antimicrobial resistant strains.⁴

Effective antimicrobial stewardship interventions include audit and feedback, education, academic detailing, antimicrobial restriction and approval and computerized decision support. However, the optimal model of antimicrobial stewardship is likely to differ depending on the context, and a challenge for all institutions is to find an antimicrobial stewardship model that fits the prescribing culture of that particular institution to best facilitate sustainable change. Interventions that are tailored to address specifically identified barriers are more likely to change behavior and to improve professional practice. A barrier is defined as process or situation that would potentially impede or obstruct optimal antimicrobial prescribing.²

Aim

To gather knowledge about the gaps and barriers behind antimicrobial prescription among the healthcare staff to help formulate a strategic antimicrobial stewardship intervention for Soni Manipal Hospital Jaipur.

Objectives

To assess the knowledge and explore the attitudes of physicians at Manipal Hospital, Jaipur to antimicrobial use in order to identify barriers to appropriate antimicrobial prescribing and stewardship formulation.

Methods

Study Design: Descriptive cross sectional study

The study consisted of a cross sectional survey in the form a self-administered questionnaire to assess the knowledge, attitudes and practice (KAP) regarding antimicrobial prescription and stewardship practices. Based on the observations and analysis of the survey, an antimicrobial stewardship intervention will be formulated and tested.

Sample Design: 20 consultants at Soni Manipal Hospital Jaipur were taken as the sample under study.

Purposive sampling.

Observations and Results

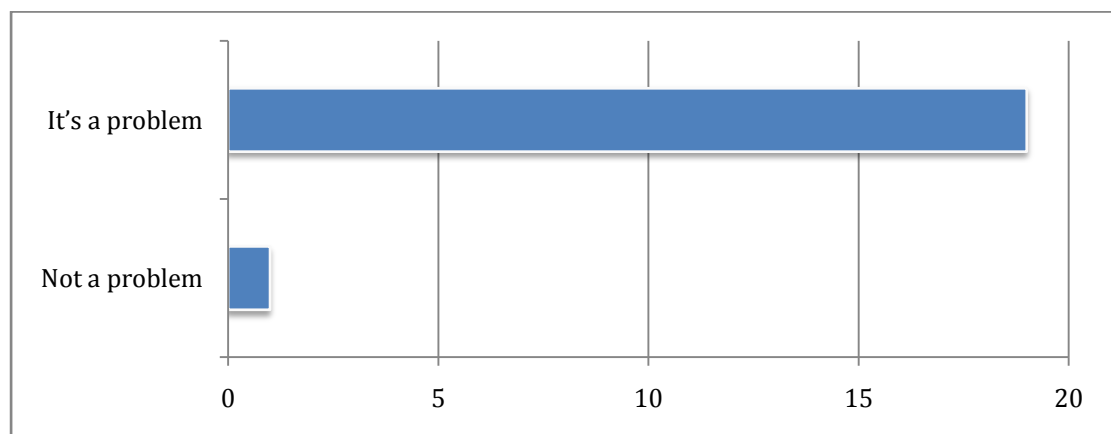


Fig.1 Knowledge regarding antimicrobial resistance as an issue

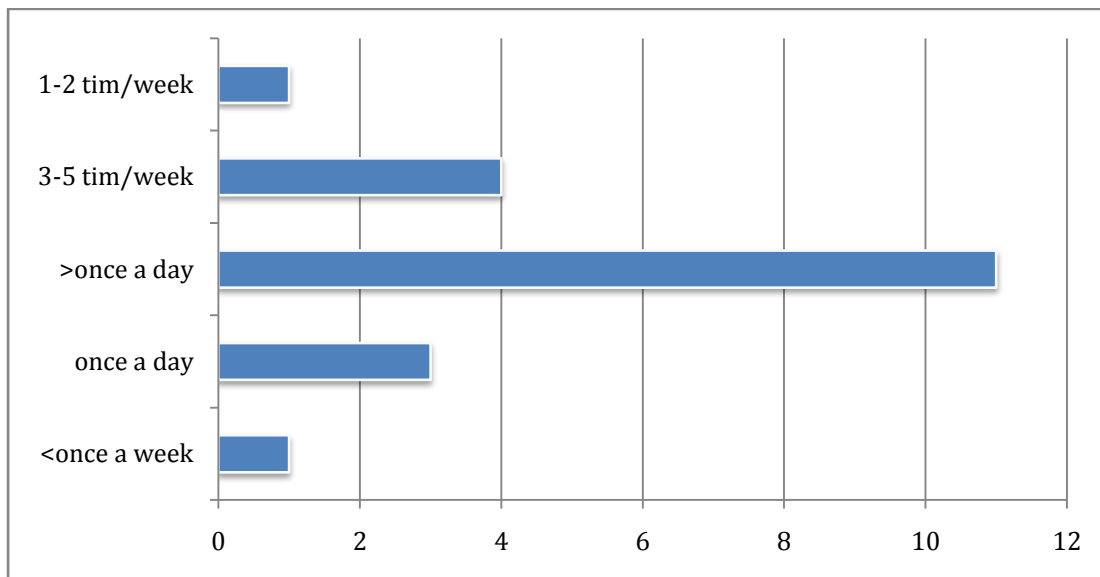


Fig. 2 Frequency of antibiotic prescribing in practice

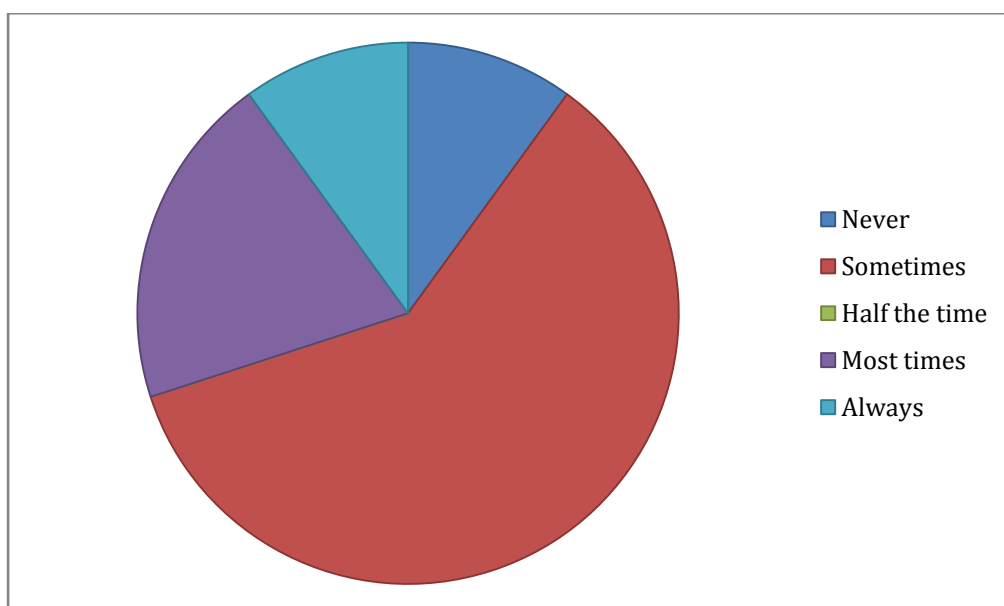


Fig. 3 Practice (frequency) of reviewing antibiotic prescription with infectious disease consultant

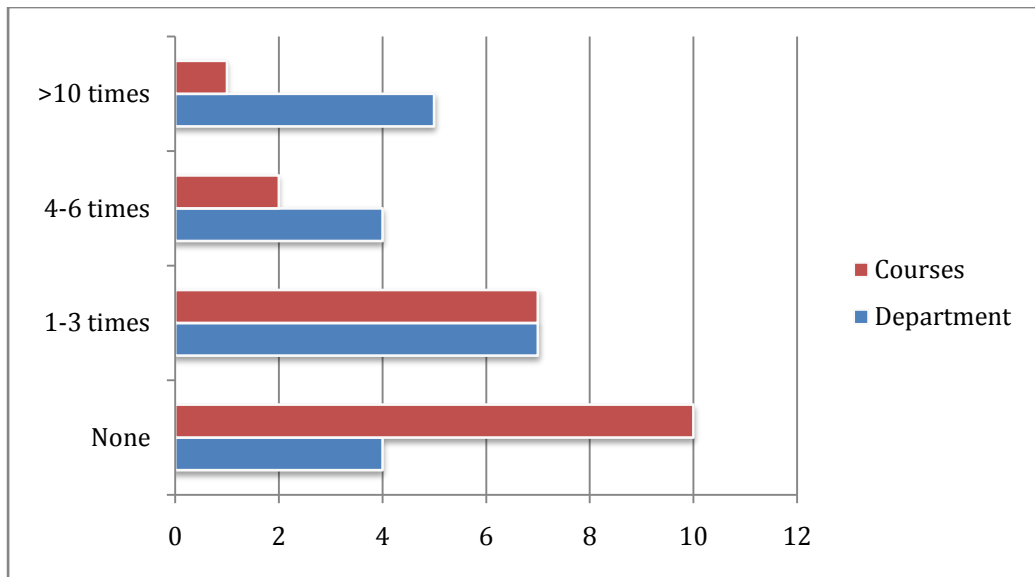


Fig. 4 Frequency of teaching regarding antibiotics (Knowledge)

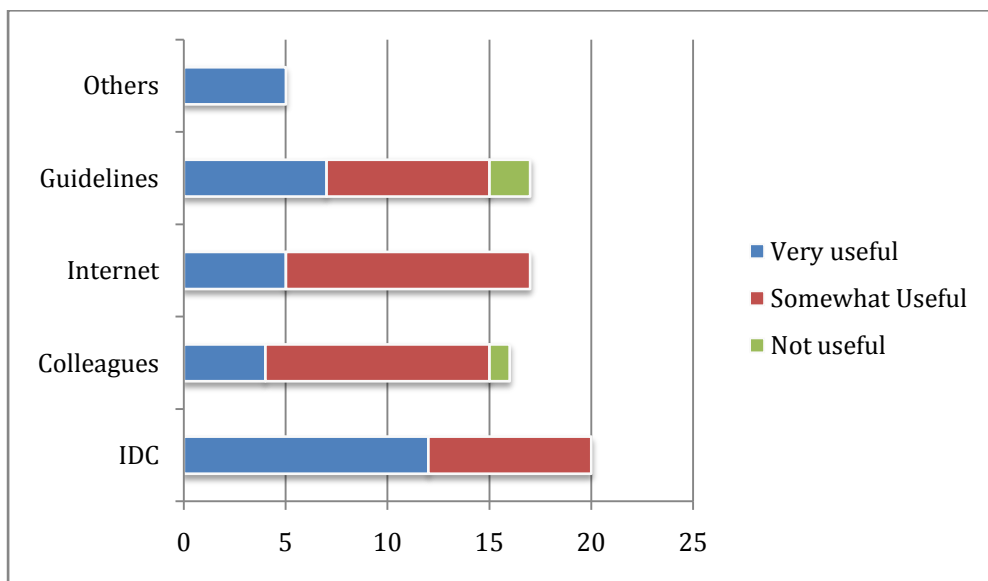


Fig. 5 Sources of information regarding antibiotics used and their perceived usefulness

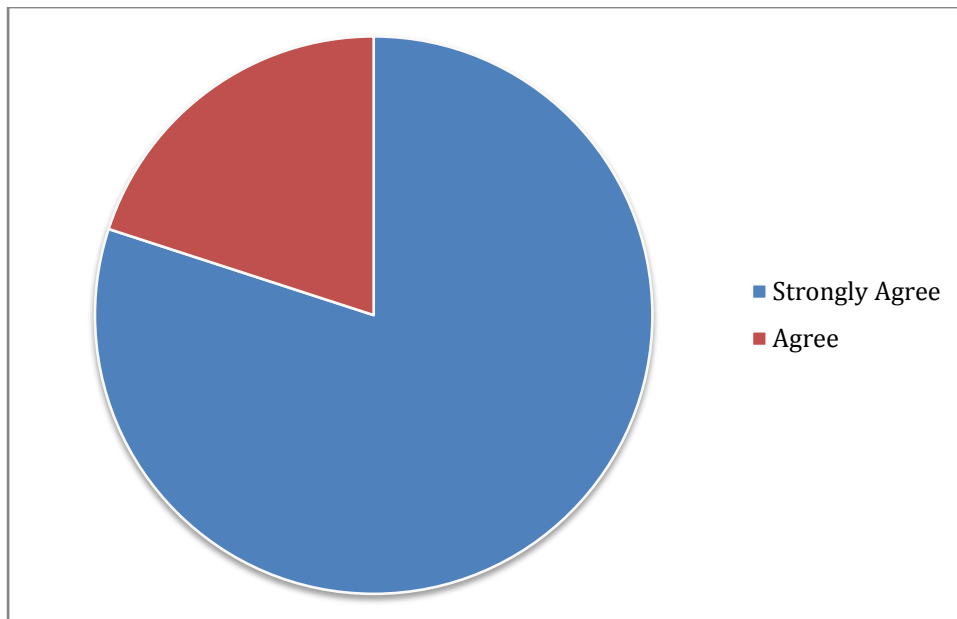


Fig. 6 Injudicious and indiscriminate use of antibiotics can lead to additional burden of medical cost to patient (Knowledge)

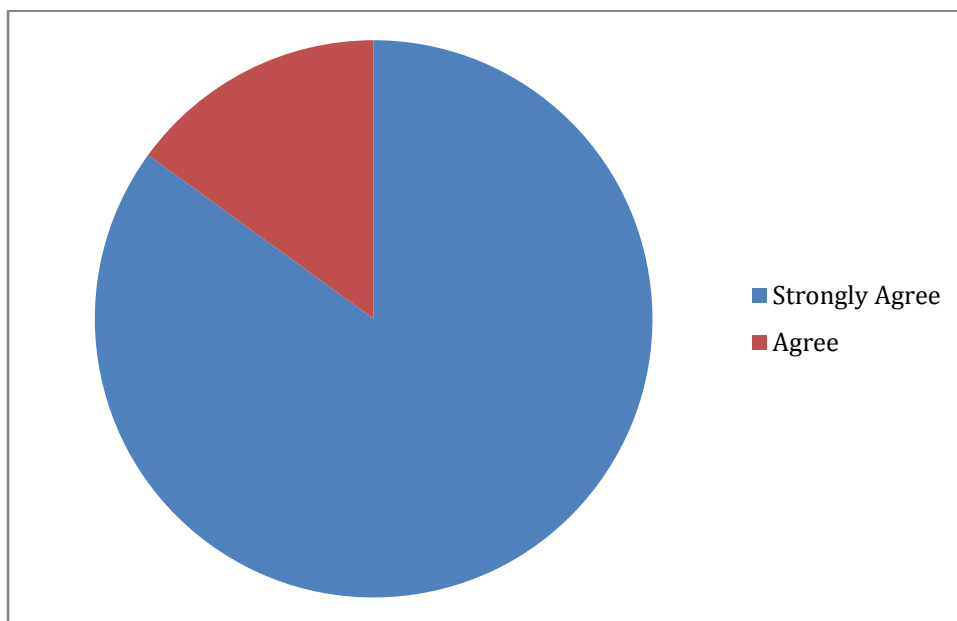


Fig 7 Hospital acquired antibiotic resistance is a challenge (Knowledge)

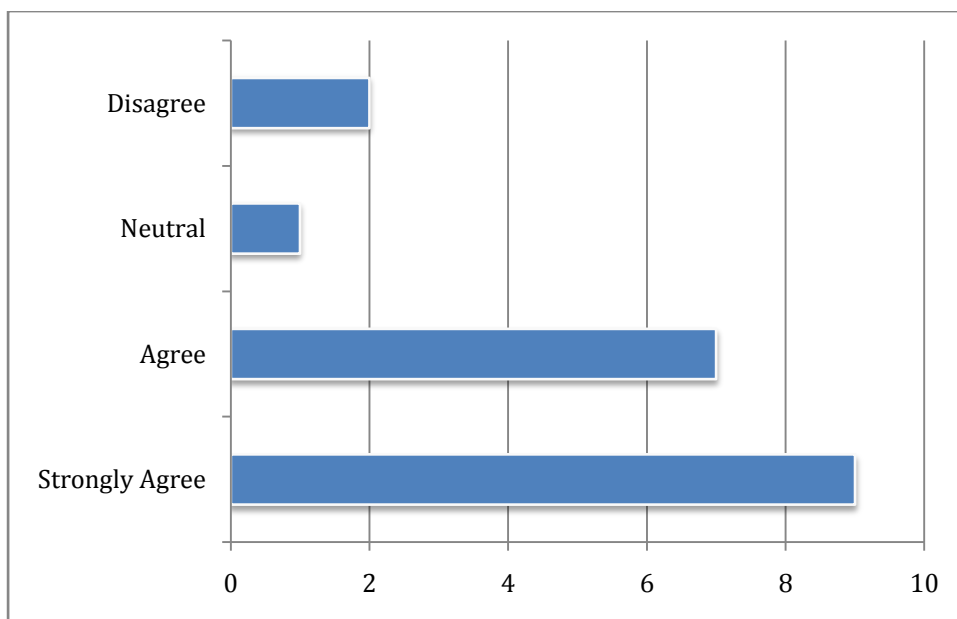


Fig 8 Perception regarding antibiotic overuse in hospital and others in country (Knowledge)

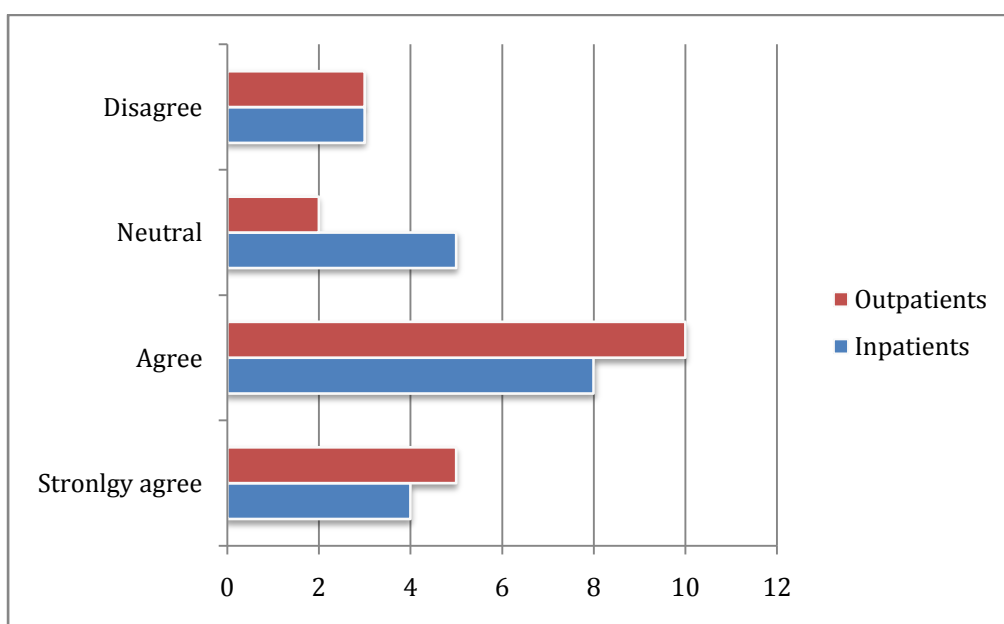


Fig. 9 Patients demands for antibiotics contribute to overuse (Practice)

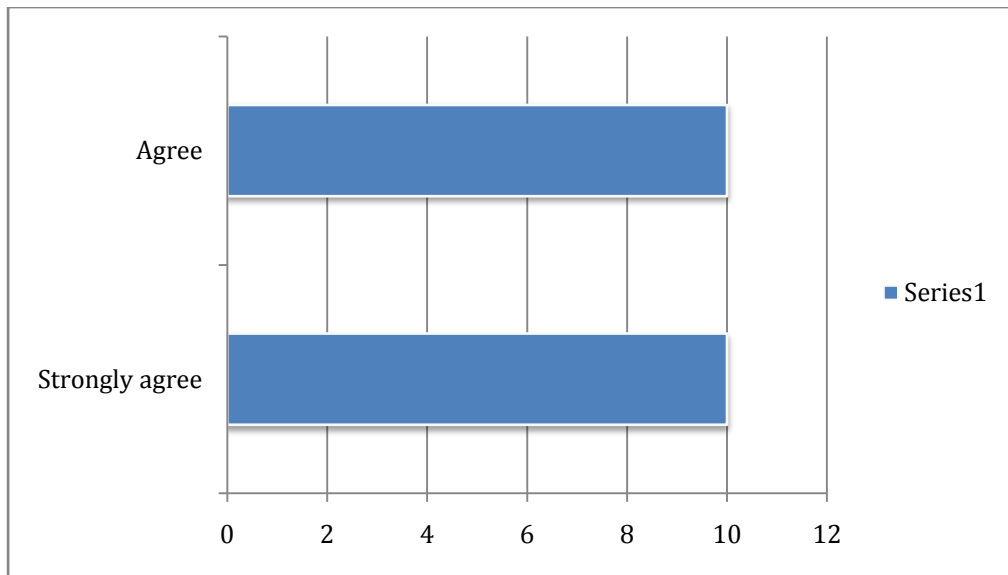


Fig. 10 Attitude towards introduction of an antimicrobial stewardship program

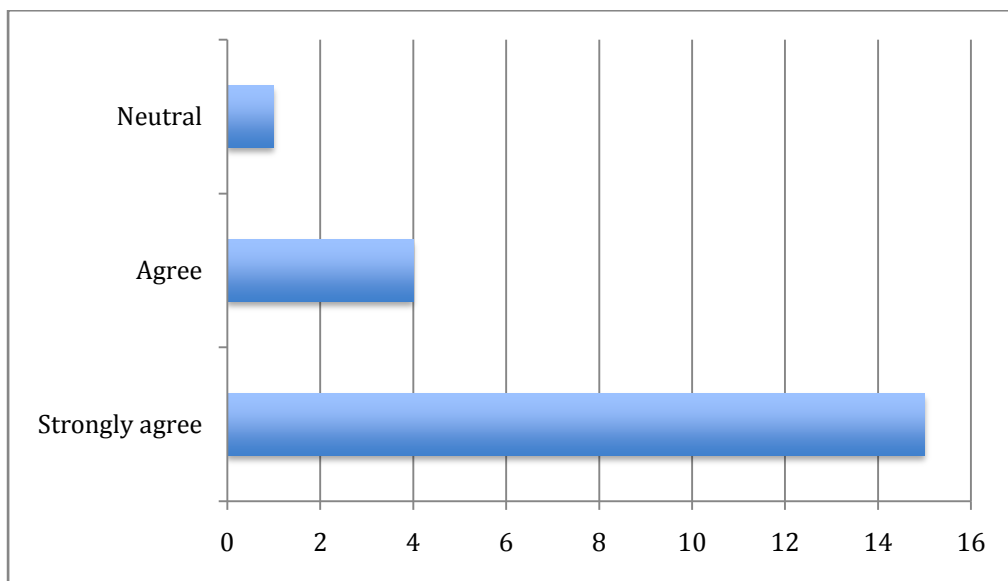


Fig. 11 Attitude towards organization of educational programs on antibiotics

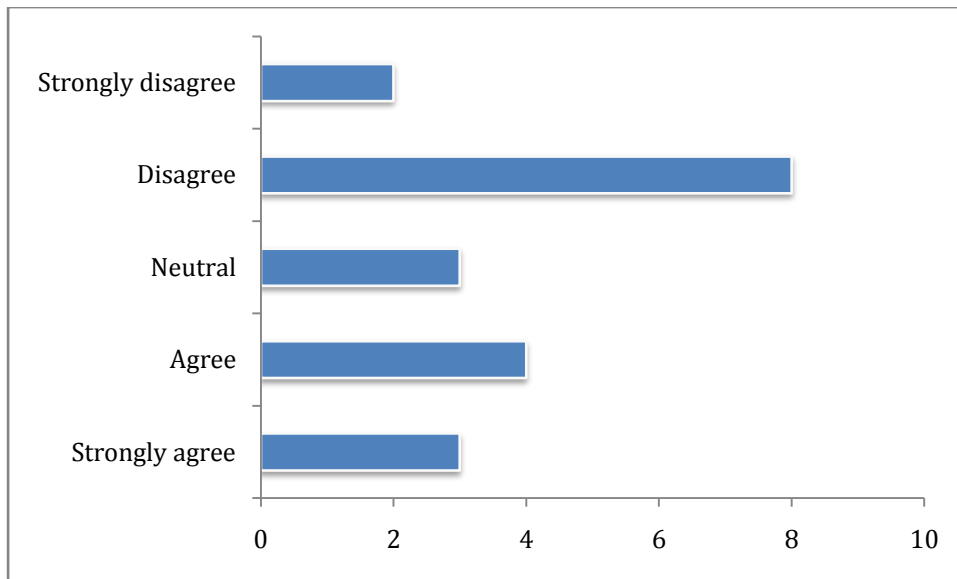


Fig. 12 I am not aware and notified about new antibiotics in my hospital
(Awareness regarding antibiotics available in hospital)

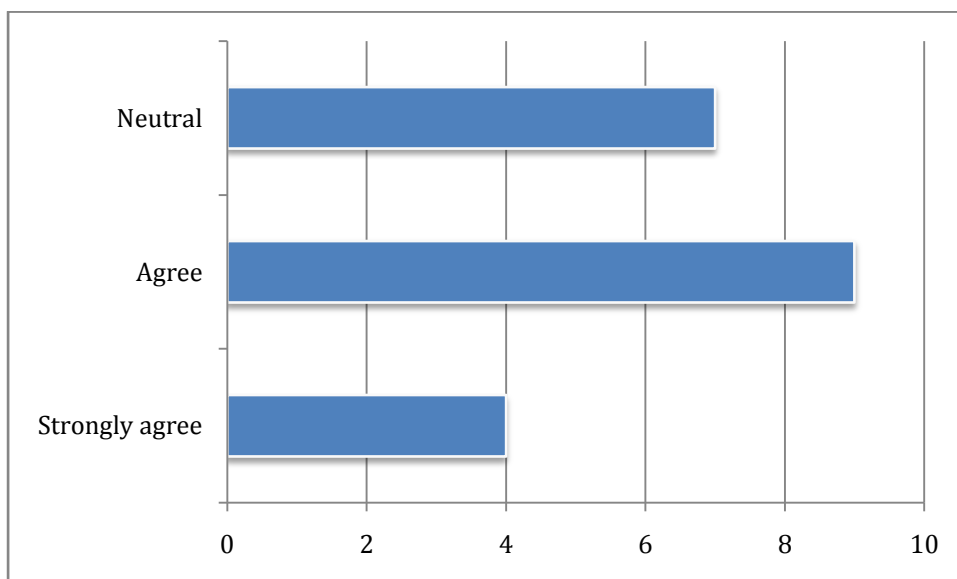


Fig. 13 Practice of using an antibiogram before prescribing
Reasons for choice:

- Agree/Strongly agree
 1. This is the way prescribing is done
 2. I mostly deal with chronic wounds for which antibiotics have been used already
 3. Cost, availability and efficacy
 4. NABH protocol

- Neutral

1. Never used

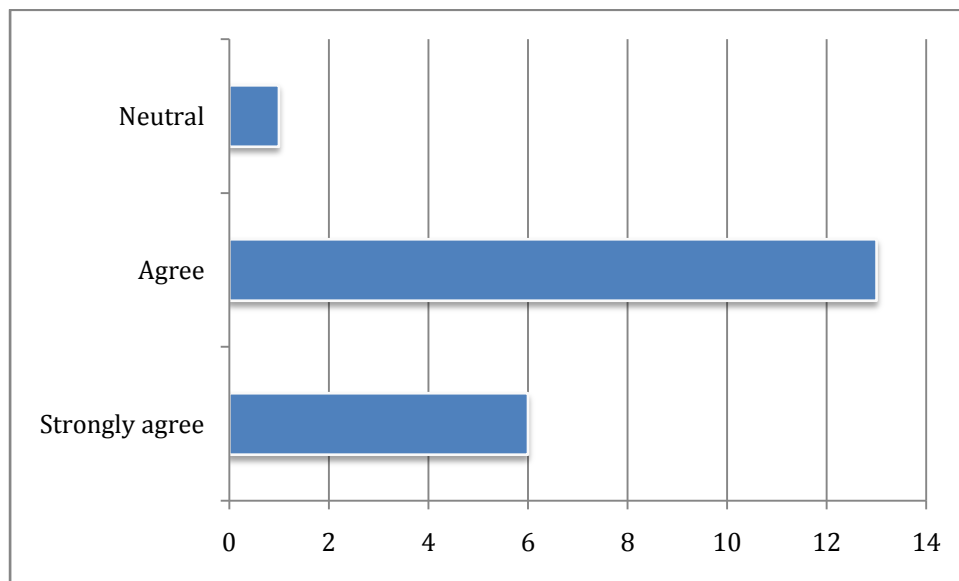


Fig. 14 Practice of self-documentation of all prescriptions

Reasons for choice:

- Agree /Strongly agree
 1. To reduce medication errors
 2. The kind of infections seen in my patients are usually similar
 3. In case of resistance I would like to consult infectious disease consultant.
 4. NABH protocol, also critical to my practice.

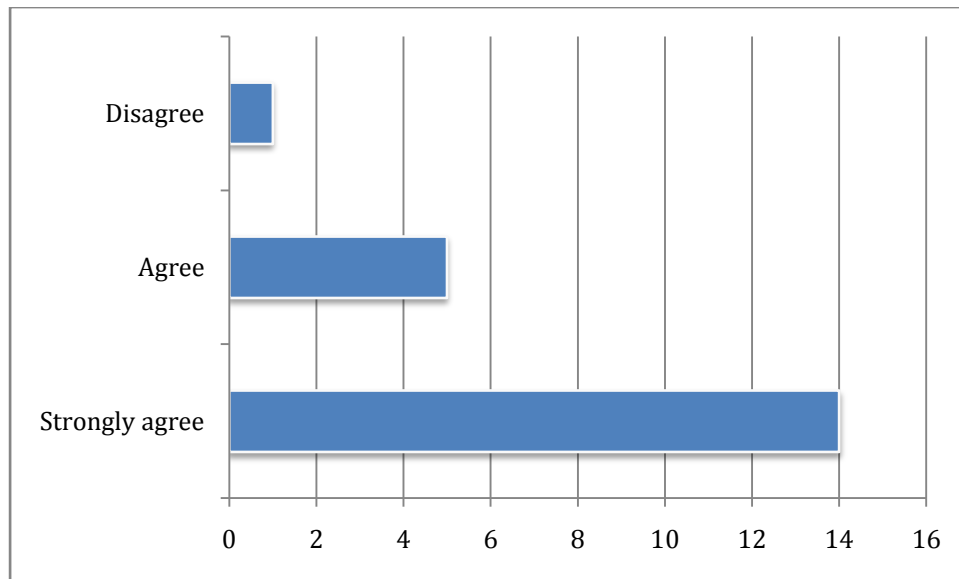


Fig. 15 Attitude towards verbal prescriptions leading to medical errors

Comments by consultants

- I advise to check use of higher antibiotics in periphery by quacks and health workers
- Medical prescription should be in standard universal format & there should be few pharmacists who can check on these prescriptions
- No cut strip method should be used by pharmacist
- Strongly enforce the list of restricted antibiotics (from pharmacy)
- I feel the Infectious disease consultant should arrange specialty wise teaching program on basic management and prevention of infections, judicious use of antibiotics (at least 1st line)
- Rule of strict asepsis is not actually followed, that's why surgeons are forced to use antibiotics

Summary and discussion

Knowledge

- 95% of the consultants know and concede that antimicrobial resistance is a problem.
- 20% consultants did not receive any teaching on antibiotics from their department in the last year while 35%, 20% and 25% consultants received departmental teachings 1-3 times, 4-6 times and >10 times respectively from their departments in last one year.
- 50% consultants did not participate in any courses to in last one year to receive knowledge on antibiotics, while 35%, 10% and 5 % of the rest of them participated in courses 1-3 times, 4-6 times and >10 times respectively.
- 100% consultants agree (80% strong agreement) that injudicious and indiscriminate use of antibiotics can lead to increased medical cost burden to patients
- Regarding knowledge and perception of antibiotic overuse in their hospital and other hospitals of the country, 45% of consultants strongly agreed to overuse, 35% agreed, 10% disagreed and 5% were neutral.
- 100% consultants agree (85% strong agreement) that hospital acquired antibiotic resistance is a challenge for us.

Attitude

- 100% consultants agree (50% strong agreement) that an antimicrobial stewardship program will help in optimizing clinical care
- 95% consultants have a positive attitude and would like to have organization of educational programs on antibiotics (75% strongly agreeing, 20% agreed and 5% neutral)
- 95% (70% strong agreement) consultants agree that verbal prescriptions can lead to medical errors while 5% disagree

Practice

- 55% consultants prescribe antibiotics more than once a day, while 15% prescribe once a day, 20% prescribe 3-5 times/week, 5% prescribe 1-2 times/week and 5% prescribe less than once a week.
- 60% consultants review their decision to prescribe antibiotics with the infectious disease consultant 'sometimes' while 20 % do it most of the times. 10% of them do it always while 10% never do it.
- Patients demand for antibiotics leads to overuse; among inpatients 60% consultants agree (20% strong agreement), 25% are neutral and 15 % disagree, while among outpatients 75% consultants agree (25% strong agreement), 10 % are neutral and 15 % disagree to any pressure from patient demand causing overuse.
- Source of information used most times for consulting when in doubt over antibiotics is the infectious disease consultant, which is perceived as very useful by 50% of the consultants only and somewhat useful by 40%. The other sources mostly used are information from colleagues, Internet and formal guidelines, which were perceived as somewhat useful only. In the other category, consultants mentioned standard textbooks. This was the least used source but considered 100% as very useful.
- Regarding practice of referring to current antibiogram before deciding on prescription, 45% of consultants agree that they do it, 20% strongly agree on doing it and 35% were neutral.
- Regarding the practice of self-documentation of prescriptions, 65% agreed on practicing it, 30% strongly agreed and 5 % were neutral.

Conclusion

The consultants at Soni Manipal Hospital, Jaipur unanimously concur over the gravity of problem of antimicrobial resistance and display a positive attitude and intention toward introduction of an antimicrobial stewardship program at their facility however there are certain gaps in at levels of knowledge (irregular teaching program departmentally as well as personal seeking of knowledge, perception regarding the usefulness of sources of information, sources of information) and practice (Succumbing to patient demand to over prescribe, not consulting the infectious disease consultant frequently for a review, inadequate frequency of referring to antibiogram and self documentation of prescriptions). Addressing these gaps and the reasons behind them, as stated in the comments by consultants and reasons for the choice in some questions will help in devising a tailor made antimicrobial stewardship plan/intervention for Soni Manipal Hospital, Jaipur.

Recommendations

Gap	Intervention	Evaluation
Irregular teaching program in department	• Education (active) Clinical case discussions, rounds, educational outreach • Specialty specific modules of teaching	Competency assessment tests
Perception of sources of information regarding antibiotics as not very useful	Engagement on rotary basis with the antimicrobial stewardship program team (ASP)	Post intervention survey
Overprescribing due to patients' demand	Primary: prescriber education Secondary: patient education	Post intervention survey
Not consulting the infectious disease	• Educational outreach • Prospective audit and	Post intervention audit

(ID)specialist frequently	feedback by the ID specialist and the ASP team	
Inadequate self documentation	Computerized physician order entry (CPOE)	Self evaluating intervention
Inadequate referral to antibiogram	Formulation of local guidelines and antimicrobial policy subject to audit and review by the ASP team and incorporating them into • CPOE • Pocketbooks (education)	Post intervention survey/audit of CPOE data

Table 1: Recommendations KAP survey

Recommended Program Design/ Project Implementation Plan

Goals of the program

- Reduce inappropriate antimicrobial use
- Improve patient outcomes
- Reduce antimicrobial resistance, toxicity and unnecessary costs

Step 1: Engage

To ensure a successful Antimicrobial Stewardship Program:

- The senior hospital management, who are accountable for the outcomes, should support the program.
- The head of the organization to implement and evaluate the program should allocate a team of people and resources.
- A key component of a stewardship program is leadership and culture of antibiotic use.
- Promote a culture of optimal antibiotic use within the facility.
- Engage administrative and clinical leadership to champion stewardship effort

Specific Change ideas

- Identify clinical providers as champions to be thought leaders about antibiotic stewardship.
- Work with administrators to ensure that they understand the rationale and goals for stewardship programs and interventions and provide support (financial and non-financial).
- Engage a physician champion and core team to enhance the focus of antimicrobial stewardship into the current process of care.
- Bring disciplines together to improve communication and collaboration about improving antibiotic use, including, as appropriate:
- Consider having the multidisciplinary group perform a gap analysis of antimicrobial use at the facility to identify priority areas for improvement.

Step 2: Convene an Antimicrobial stewardship program (ASP) team

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.

Experts + Management Representatives (Permanent)

Senior Consultant + Resident (Rotary)

Role/ Responsibilities:

- Formulation of local guidelines and antibiotic policy of the hospital. Ensure regular review and update of the same.
- Ensure regular auditing of guidelines, stewardship practice and quality assurance indicators.
- Human decision support (24*7)
- Education and training

Step 3: Educate

Education is a key component of any Antimicrobial Stewardship Program. It should include healthcare professionals from all care settings, as well as patients and the public. By increasing people's knowledge and understanding of how antimicrobials should be used to treat common infections and why inappropriate use may lead to resistance and loss of effective treatments, this valuable resource can be protected for future generations.

Education in hospitals (Primary)

Prescribers and other healthcare staff with modules adapted to their background including

- Professional training for new staff
- Continuing medical education and professional development for all prescribers

The content of education should be adapted to each level and include:

- Basic knowledge of infection management
- Basic microbiology
- Importance of prudent prescribing in tackling antimicrobial resistance.
- Best practices for prescribing to support safe and effective prescribing, administration and monitoring of antimicrobial therapy.

The training should be delivered by the ASP team and may include competency assessment.

Mode of Education:

Passive: Handbook/ Pocketbook/ Mobile App

Active: Clinical case discussions, rounds, educational outreach and academic detailing, prospective audits and feedback.

Education of patients (Secondary)

Educating patients and the general public about hygiene and antibiotic use is also important, and may indirectly support hospital education efforts. National and regional public health campaigns, including education aimed at parents and children, have had a variable level of success.

Step 4: Execute

Phase I

Pre-authorization (front end): where antimicrobials are made available through an approval process (formulary restrictions and preauthorization).

- **Antimicrobial prescribing policy**

Antimicrobial Prescribing Policy containing a list of available antimicrobials and regimen for treatment of common infections; that is regularly reviewed and updated

- **Formulary restriction**

This involves determining the list of restricted antimicrobial agents (broad spectrum and later generation antimicrobials) and criteria for their use combined with an approval system, which is subject to regular audit and feedback to the prescribers. It is essential that all aspects of prescribing be supported by expert advice 24 hours a day.

Grouping of antimicrobials “traffic light approach”

- Red (Highly restricted)
- Yellow (Restricted)
- Green (Unrestricted)

Prospective audit and feedback (back end): where antimicrobials are reviewed after antimicrobial therapy has been initiated (prospective audit with intervention and feedback)

Antimicrobial review methods are employed post-prescription and outlined in as following:

- Review of indication for antibiotic and compliance with policy/guideline/formulary; note any recording of exception

- Review of appropriateness of antibiotic choice, dose, route and planned duration
- Review of directed therapy based on culture and susceptibility test results
Potential for conversion from IV to oral route
- Review requirement for therapeutic drug monitoring
- Review any antibiotic related adverse events

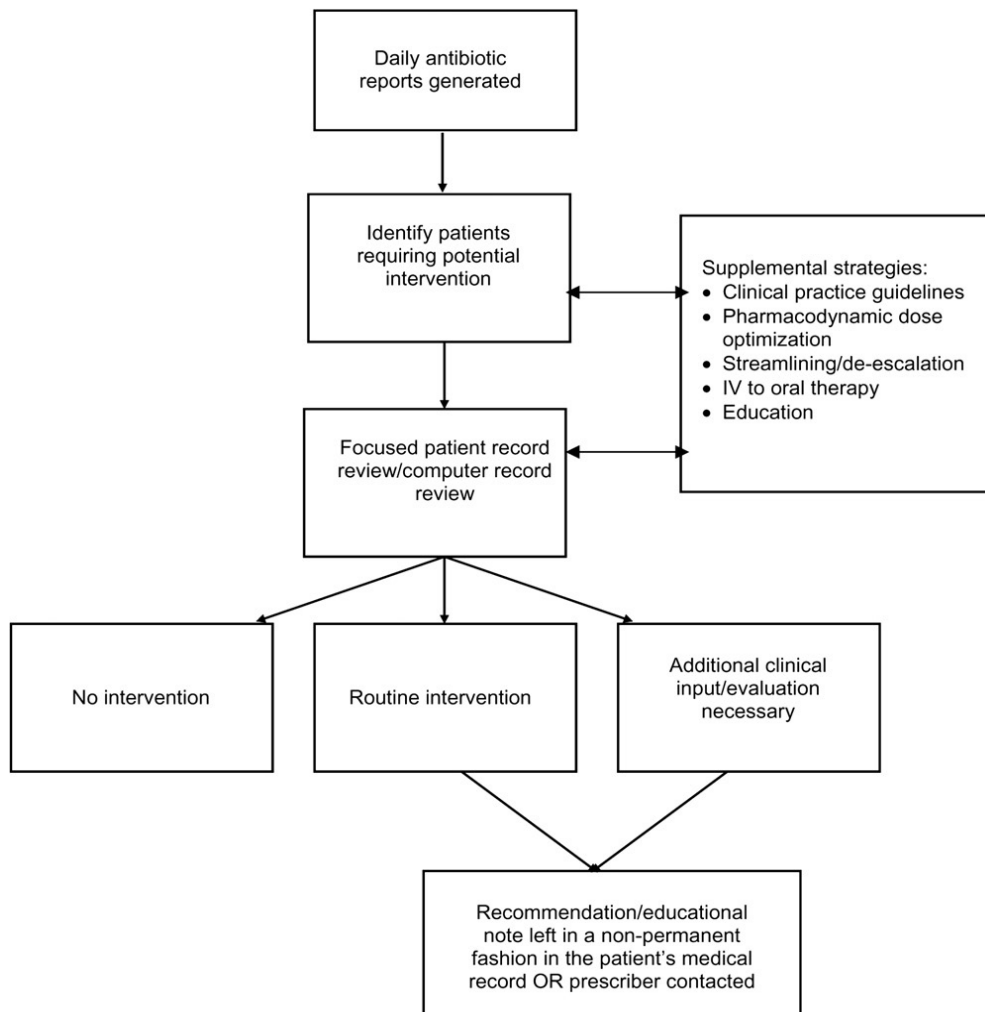


Fig. 16 An example of concurrent review with feedback strategy workflow diagram.

During clinical review, a range of point-of-care stewardship interventions can be useful to provide direct and timely feedback to the prescriber at the time of prescription or laboratory diagnosis, and provide an opportunity to educate clinical staff on appropriate prescribing.

Point of care interventions (Start SMART then Focus)

Start SMART

- Do not start antimicrobial therapy unless there is clear evidence of infection
- Take a thorough drug allergy history
- Initiate prompt effective antibiotic treatment within one hour of diagnosis (or as soon as possible) in patients with severe sepsis or life-threatening infections. Avoid inappropriate use of broad-spectrum antibiotics
- Comply with local antimicrobial prescribing guidance
- Document clinical indication (and disease severity if appropriate), drug name, dose and route on drug chart and in clinical notes
- Include review/stop date or duration
- Obtain cultures prior to commencing therapy where possible (but do not delay therapy)

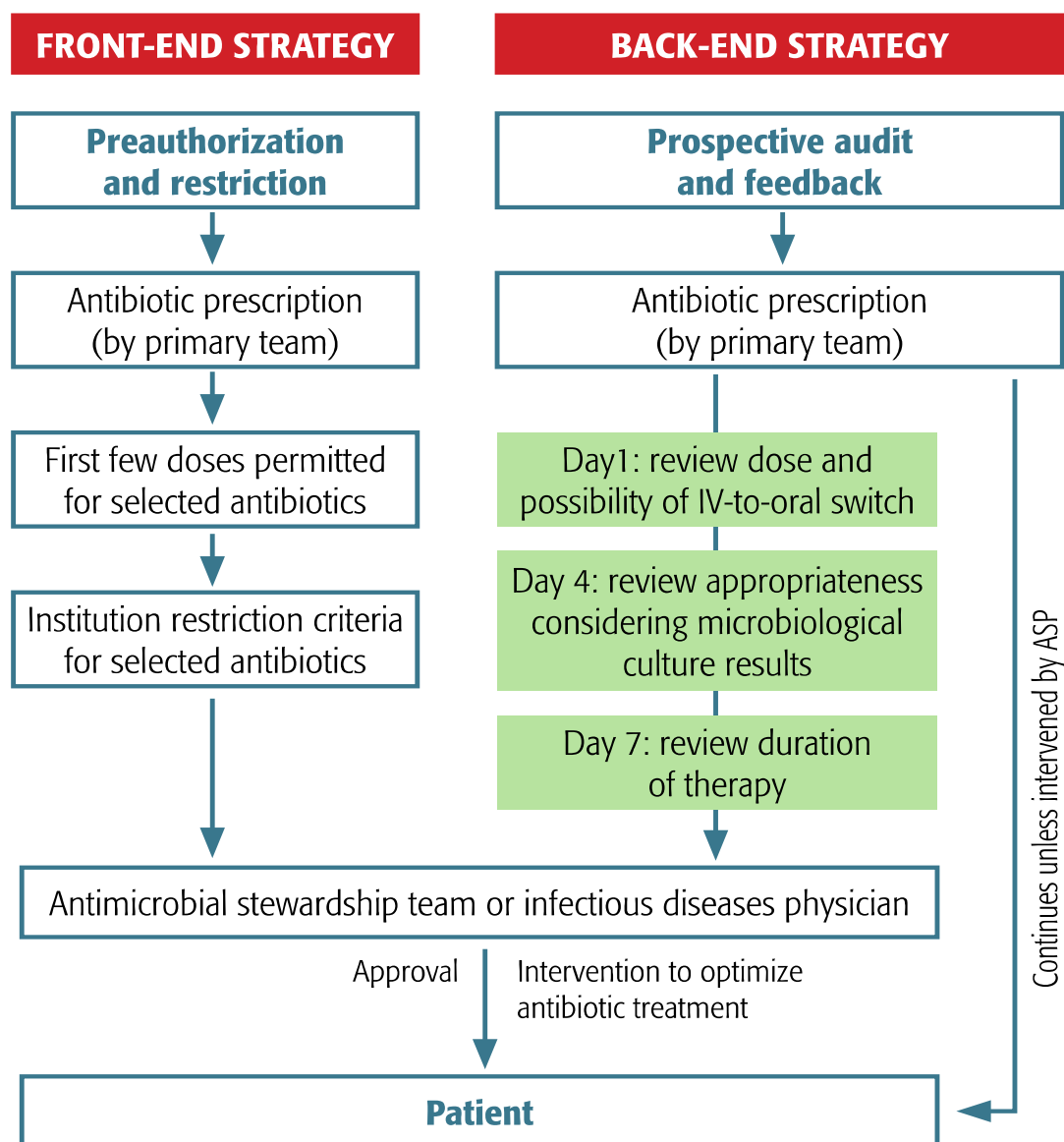
Then Focus

- Review the clinical diagnosis and the continuing need for antibiotics by 48-72 hours and make a clear plan of action - the ‘antimicrobial prescribing decision’
- The five ‘antimicrobial prescribing decision’ options are Stop, Switch, Change, Continue and OPAT:
 - **Stop** antibiotics if there is no evidence of infection
 - **Switch** antibiotics from IV to oral
 - **Change** antibiotics – ideally to a narrower spectrum – or broader if required. Prescribers should seek expert advice when necessary
 - **Continue** and document next review date or stop date for IV and oral antibiotics
 - Outpatient Parenteral Antibiotic Therapy (**OPAT**)

Review and subsequent decision be clearly documented in the clinical notes. The decision should also be documented clearly on the drug chart.

**Consent form of responsibility:* for cases when the consultant decides to prescribe an antimicrobial despite the intervention/or has a disagreement with the recommendations made by the ASP team.

Figure 9. Front- and Back-end Antimicrobial Stewardship Strategy.



Adapted from Chung GW et al. Virulence 2013; 4:1-7.

Fig. 17 Front and back end strategies for antimicrobial stewardship (an example)

Phase II

Direct computer physician order entry / Clinical decision support system

Pneumonia - Inpatient - TEST, PATIENT B

Pneumonia Antibiotics - Inpatient [1 orders of 15 are selected]

Admit via: *
Admit to: Admit from Home, Admit from LTC, Transfer from Acute Care Facility
MRSA Risk? *
P. Aeruginosa Risk? *
Beta Lactam Allergy? *
Has pt. received STAT dose(s) of abx? *

Example, "Admit From:" Drop Down Menus

Antimicrobial choice boxes become "checked" based on answers to the questions

STAT Orders

Order	Dose	Calc Dose	Dose Form	Route	Frequency
STAT DOSES - 6 item(s)					
☐ Azithromycin Inj		500	mg	IV INFUSION	stat
☒ Aztreonam Inj			mg	IV INFUSION	stat
☒ Cefepime Inj			mg	IV INFUSION	stat
☒ Ceftriaxone Inj			mg	IV INFUSION	stat
☒ Moxifloxacin Inj in 250 ml 0.8% NaCl	400		mg	IV INFUSION	stat
☒ Vancomycin Inj			mg	IV INFUSION	stat

Stat orders

Scheduled antimicrobial orders (note, full screen and all antimicrobial orders are not shown due to space limits on slide)

Refer to Guidelines message:

Order	Calc Dose	Dose Form	Route	Frequency	Duration	Start Date	Enter Start Time
Option 1 - SELECT BOTH ITEMS - 2 item(s)							
☒ Ceftriaxone Inj		mg	IV INFUSION	q24h	7 Days	T	Start At: hh:mm
☒ Azithromycin Inj	500	mg	IV INFUSION	q24h	7 Days	T	Start At: hh:mm
Option 2 - 1 item(s)							
☒ Moxifloxacin Inj in 250 ml 0.8% NaCl	400	mg	IV INFUSION	q24h	7 Days	T	Start At: hh:mm

OK Cancel

Fig. 18 An example of computerized decision support designed to facilitate guidelines for the treatment of pneumonia.

Computer-assisted decision support programs have been designed to provide real-time integrated patient and institutional data, including culture and susceptibility results, laboratory measures of organ function, allergy history, drug interactions and cost information.

They provide therapeutic choices for clinicians and allow for the incorporation of clinical judgment by overriding suggestions. Autonomy is preserved while ensuring that important variables in the choice of antimicrobial therapy are considered.

E.g. TREAT systems' antimicrobial software is an advanced decision support system currently in use.

Step 5: Evaluation and Monitoring

Surveillance Point Prevalence survey,daily monitoring (CPOE)

Process Indicators

- The prescribed daily dose (PDD) is defined as the average dose prescribed according to a representative sample of prescriptions. The PDD can be determined from studies of prescriptions or medical or pharmacy records. It is important to relate the PDD to the diagnosis on which the dosage is based. The PDD will give the average daily amount of a drug that is actually prescribed
- Defined daily dose(DDD)/100 bed days

DDD/100 bed days =

$$\frac{\text{no. of units administered in a time period} \times 100}{\text{WHO DDD} \times \text{no. of days in study} \times \text{no of beds} \times \text{bed occupancy}}$$

- DDD/1000 patient days =

$$\frac{\text{No. of units administered in a time period} \times 1000}{\text{WHO DDD} \times \text{no. of patient days}}$$

E.g. AMC Tool is a programme by ESCMID (Europe's Society of Clinical Microbiology and Infectious Diseases) to calculate antimicrobial consumption. It computes antimicrobial consumption data provided as numbers of packages into numbers of Defined Daily Doses (DDD).

Outcome measures

- Length of hospital stay
- Reduced bacterial resistance

Quality Indicator:

Antimicrobial Bundle

- *Filling of relevant information by clinical areas*
- *Optimal microbiological representative samples*
- *Possible upfront A/b Used?*
- *How many attempts to de-escalate happened?*

An audit to ascertain the compliance of filling up inpatient medical records with respect to provisional diagnosis at Soni Manipal Hospital, Jaipur

Background

Antimicrobial stewardship program focuses on optimizing the use of antimicrobials and ensure point of care interventions to do so. In order to carry out these interventions and suggestions by an ASP team, provisional diagnosis as made by the doctors within 24-48 hours of admission of a patient is crucial as it forms the basis of all further medication and investigatory test decisions. A low compliance would indicate the need for a robust system/program to check that and aid in enhancing the quality of treatment meted out to the patient.

Aim

To gather and assess data in order to substantiate the establishment of an antimicrobial stewardship program at the hospital.

Objectives

To assess the compliance of completion of inpatient medical records under the head 'provisional diagnosis'.

Methods

Study Design: Descriptive study

Sample size: A sample of 200 inpatients was taken under study.

Duration of study: 10 days

Data was collected by observing and recording from the medical records of inpatients everyday within 24 hours of admission and reviewed after 48 hours with respect to completion of 'provisional diagnosis' head in the files.

Observation and results

Department	Yes	No	No (after 48 hrs)
Cardiology	30	0	0
Internal Medicine	20	1	1
Med. Gastro	19	0	0
Med. Onco	21	0	0
Nephrology	6	4	4
Neurology	11	5	5
Neurosurgery	8	0	0
Gynaecology&Obstetrics	4	0	0
Paed Med Onc	1	12	12
Paed	13	0	0
Plastic Surg	4	0	0
Radiation Onc	4	1	1
Resp Med	11	1	1
Surg Gastro	2	0	0
Urology	5	4	4
Orthopaedics	8	5	5
TOTAL	167	33	33

Table 2: Compliance of provisional diagnosis (department wise)

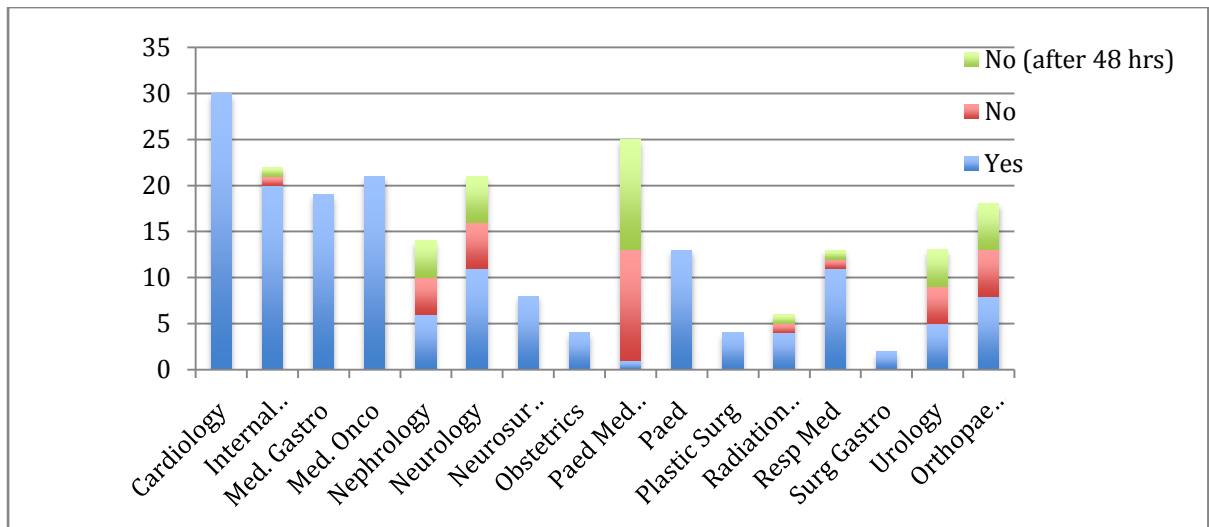


Fig .19 Compliance of provisional diagnosis (department wise)

Summary

- Cardiology, medical gastroenterology, surgical gastroenterology, medical oncology, neurosurgery, gynecology and obstetrics, pediatrics and plastic surgery departments show a 100% compliance rate.
- Internal medicine (96%) radiation oncology (76%) and respiratory medicine (92%) compliance rate.
- Nephrology (60%) urology (55.5%) neurology (68.7%) orthopedics (61.5%) pediatric medical oncology (7.6%) compliance rate.

Discussion

- This was a primary study to understand the compliance rate and correlate that to the need for antimicrobial stewardship.
- However, upon analysis it was found that each department varies not only in terms of number of patients admitted per specialty/ward but also antibiotic usage (assessed from number of prescriptions); rendering the results subject to further study and analysis.

Recommendations

- Hospital consumption of antibiotics per department/specialty and ward must be worked out to ascertain the areas of maximum consumption.
- Representative samples with the largest from departments and ward with maximum consumption must be taken to study the compliance of provisional diagnosis completion within 24-48 hours.
- Another parameter in the medical record 'investigations' must be observed for compliance in conjunction with provisional diagnosis to provide a more comprehensive correlation of compliance, as ordering the culture sensitivity tests is an important factor in deciding to de-escalate, stop or continue the antimicrobial therapy.

References:

1. Centers for Disease Control and Prevention. *Core elements of Hospital Antibiotic Stewardship Programs* (cdc.gov.in)
2. Chaves et al *Analysis of knowledge and attitude surveys to identify barriers and enablers of appropriate antimicrobial prescribing in three Australian tertiary hospitals* , IMJ, June 2014
3. García et al. *Knowledge, attitudes and practice survey about antimicrobial resistance and prescribing among physicians in a hospital setting in Lima, Peru* BMC Clinical Pharmacology 2011, 11:18
4. http://www.idsociety.org/Stewardship_Policy/#sthash.hT5SPN1S.dpuf
5. Australian Hospital Stewardship Guidance produced by the Australian Commission on Safety And Quality in Healthcare [*Duguid et al., 2010*],
6. National Stewardship Guidance from Scotland [*Nathwani et al., 2006*], the UK [*DOH-ARHAI, Start smart then Focus, 2011*]

Questionnaire

SURVEY ABOUT ANTIMICROBIAL PRESCRIBING

Department _____

Position _____

Years of Experience ☐ 1 year ☐ 2-4 years ☐ 5-7 years ☐ 7+ years

	Question	Answer
1.	What do you think about antimicrobial resistance?	☐ It is a problem ☐ It is not a problem ☐ I do not know
2.	How frequently do you prescribe antibiotics in the emergency room, outpatient clinic or in the wards?	☐ More than once a day ☐ Once a day ☐ 3-5 times per week ☐ 1-2 times per week ☐ Less than once a week
3.	Do you review your decision to prescribe antibiotics with Infectious disease consultant?	☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

4.	During the last year, how many times have you received some teaching on antibiotics...?	
	- As part of the academic activities of your department	☐ 0 ☐ 1-3 times ☐ 4-6 times ☐ 6-10 times ☐ >10 times

	- Participation in courses	☐ 0 ☐ 1-3 times ☐ 4-6 times ☐ 6-10 times ☐ >10 times
5.	Which of the following sources of information do you use when you have a specific question on antibiotics? Please tick the source used and rate its usefulness on a scale of 1-5 (1=very useful, 2-4=somewhat useful 5=useless)	
	A) Information from infectious disease consultant	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	B) Information from colleagues of the same rank	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	C) Internet sources	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	D) National/International Guidelines	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
	E) Others : please write it out -----	
6.	Indiscriminate and injudicious use of antibiotics can lead to additional burden of medical cost to patient	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree
7.	Hospital acquired antibiotic resistance is a challenge/problem for us	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

Tell us how strongly you agree or disagree with the following statements on antibiotics

8.	Antibiotics are overused in my hospital and in other hospitals of my country	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree
9.	Patients' demands for antibiotics contribute to overuse...	
	a- in inpatients	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree
	b- in outpatients	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree
10.	General knowledge on antimicrobial resistance should be considered when antibiotics are prescribed to an individual patient	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree
11.	An antimicrobial stewardship/ prescription control program will help in optimizing clinical care	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

12.	I would like the organization of educational programs on antibiotics	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree
13.	I never know which antibiotics are available in my hospital because I am not notified	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree
14.	I always refer to current antibiogram (cumulative antibiotic susceptibility report?) before deciding on prescriptions? State the reason for your choice	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree
15.	I ensure to self-document the dose, duration, and indication for all prescriptions? State the reason for your choice	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree
16.	Verbal prescriptions can lead to medical errors	☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

CARDIOLOGY

Date of admission	Department	Ward	Consultant	PD	After 48 hrs
30/04/16	Cardiology	Pre-cath	Niraj Gupta	Yes	
30/04/16	Cardiology	CCU	Niraj Gupta	Yes	
30/04/16	Cardiology	Pre-cath	Niraj Gupta	Yes	
02/05/16	Cardiology	CCU	Niraj Gupta	Yes	
02/05/16	Cardiology	CCU	Devendra Shrimal	Yes	
04/05/16	Cardiology	CCU	Niraj Gupta	Yes	
04/05/16	Cardiology	CCU	Niraj Gupta	Yes	
04/05/16	Cardiology	CCU	Devendra Shrimal	Yes	
05/05/16	Cardiology	CCU	Niraj Gupta	Yes	
05/05/16	Cardiology	Pre-cath	Devendra Shrimal	Yes	
05/05/16	Cardiology	CCU	Devendra Shrimal	Yes	
06/05/16	Cardiology	Semi Deluxe	Devendra Shrimal	Yes	
06/05/16	Cardiology	Pre-cath	Niraj Gupta	Yes	
06/05/16	Cardiology	Pre-cath	Devendra Shrimal	Yes	
06/05/16	Cardiology	CCU	Niraj Gupta	Yes	
06/05/16	Cardiology	CCU	Niraj Gupta	Yes	
07/05/16	Cardiology	MICU	Niraj Gupta	Yes	
07/05/16	Cardiology	CCU	Niraj Gupta	Yes	
07/05/16	Cardiology	Pre-cath	Niraj Gupta	Yes	
07/05/16	Cardiology	Pre-cath	Devendra Shrimal	Yes	
07/05/16	Cardiology	AC Gen	Devendra Shrimal	Yes	
07/05/16	Cardiology	Pre-cath	Niraj Gupta	Yes	
09/05/16	Cardiology	Pre-cath	Devendra Shrimal	Yes	
09/05/16	Cardiology	CCU	Niraj Gupta	Yes	
09/05/16	Cardiology	CCU	Niraj Gupta	Yes	
09/05/16	Cardiology	Pre-cath	Devendra Shrimal	Yes	
09/05/16	Cardiology	CCU	Devendra Shrimal	Yes	
09/05/16	Cardiology	Pre-cath	Devendra Shrimal	Yes	
10/05/16	Cardiology	Pre-cath	Niraj Gupta	Yes	
10/05/16	Cardiology	Pre-cath	Niraj Gupta	Yes	
	INTERNAL MEDICINE				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
01/05/16	Internal Medicine	Semi Deluxe	Ravikant Porwal	Yes	
01/05/16	Internal Medicine	MICU	Ravikant Porwal	Yes	
02/05/16	Internal Medicine	Super Deluxe	Ravikant Porwal	Yes	
02/05/16	Internal Medicine	ICU	Ravikant Porwal	Yes	
02/05/16	Internal Medicine	MICU	Vipin Kumar Jain	Yes	
02/05/16	Internal Medicine	GW- I	Ravikant Porwal	Yes	
03/05/16	Internal Medicine	MICU	Vipin Kumar Jain	Yes	

03/05/16	Internal Medicine	Neuro ICU	Ravikant Porwal	Yes	
03/05/16	Internal Medicine	GW- I	Ravikant Porwal	Yes	
03/05/16	Internal Medicine	GW- I	Vipin Kumar Jain	Yes	
03/05/16	Internal Medicine	GW- I	Vipin Kumar Jain	Yes	
03/05/16	Internal Medicine	GW- II	Vipin Kumar Jain	Yes	
05/05/16	Internal Medicine	Semi Deluxe	Ravikant Porwal	Yes	
05/05/16	Internal Medicine	AC Gen	Vipin Kumar Jain	Yes	
05/05/16	Internal Medicine	GW- I	Vipin Kumar Jain	No	No
05/05/16	Internal Medicine	AC Gen	Vipin Kumar Jain	Yes	
07/05/16	Internal Medicine	AC Gen	Vipin Kumar Jain	Yes	
09/05/16	Internal Medicine	ICU	Ravikant Porwal	Yes	
09/05/16	Internal Medicine	MICU	Vipin Kumar Jain	Yes	
10/05/16	Internal Medicine	MICU	Vipin Kumar Jain	Yes	
10/05/16	Internal Medicine	HDU	Vipin Kumar Jain	Yes	
	MEDICAL GASTROENTEROLOGY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
30/04/16	Medical Gastroenterology	Semi Deluxe	Vijay Sharma	Yes	
01/05/16	Medical Gastroenterology	GW- II	Vijay Sharma	Yes	
02/05/16	Medical Gastroenterology	Semi Deluxe	Vijay Sharma	Yes	
02/05/16	Medical Gastroenterology	GW- I	Vijay Sharma	Yes	
03/05/16	Medical Gastroenterology	MICU	Vijay Sharma	Yes	
03/05/16	Medical Gastroenterology	GW- I	Vijay Sharma	Yes	
04/05/16	Medical Gastroenterology	GW- II	Vijay Sharma	Yes	
04/05/16	Medical Gastroenterology	GW- II	Vijay Sharma	Yes	
05/05/16	Medical Gastroenterology	AC Gen	Vijay Sharma	Yes	
05/05/16	Medical Gastroenterology	GW- II	Vijay Sharma	Yes	
06/05/16	Medical Gastroenterology	GW- II	Vijay Sharma	Yes	
07/05/16	Medical Gastroenterology	GW- II	Vijay Sharma	Yes	
09/05/16	Medical Gastroenterology	GW- I	Vijay Sharma	Yes	
09/05/16	Medical Gastroenterology	GW- II	Vijay Sharma	Yes	
09/05/16	Medical Gastroenterology	GW- I	Vijay Sharma	Yes	
10/05/16	Medical Gastroenterology	GW- II	Vijay Sharma	Yes	
10/05/16	Medical Gastroenterology	GW- I	Vijay Sharma	Yes	
10/05/16	Medical Gastroenterology	GW- I	Vijay Sharma	Yes	
11/05/16	Medical Gastroenterology	GW- II	Vijay Sharma	Yes	
	MEDICAL ONCOLOGY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
30/04/16	Medical Oncology	Deluxe	Deepak Gupta	Yes	
02/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
02/05/16	Medical Oncology	AC Gen	Deepak Gupta	Yes	

03/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
04/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
05/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
05/05/16	Medical Oncology	AC Gen	Deepak Gupta	Yes	
05/05/16	Medical Oncology	AC Gen	Deepak Gupta	Yes	
06/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
06/05/16	Medical Oncology	Semi Deluxe	Deepak Gupta	Yes	
07/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
09/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
09/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
09/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
09/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
09/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
09/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
09/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
10/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
10/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
10/05/16	Medical Oncology	OMW	Deepak Gupta	Yes	
	NEPHROLOGY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
03/05/16	Nephrology	GW- II	Jitendra Goswami	Yes	
03/05/16	Nephrology	Semi Deluxe	Jitendra Goswami	No	No
03/05/16	Nephrology	GW- II	Jitendra Goswami	Yes	
04/05/16	Nephrology	GW- II	Jitendra Goswami	Yes	
04/05/16	Nephrology	GW- II	Jitendra Goswami	Yes	
05/05/16	Nephrology	Deluxe	Jitendra Goswami	Yes	
06/05/16	Nephrology	GW- I	Jitendra Goswami	No	No
06/05/16	Nephrology	GW- I	Jitendra Goswami	No	No
10/05/16	Nephrology	GW- I	Jitendra Goswami	No	No
11/05/16	Nephrology	GW- II	Jitendra Goswami	Yes	
	NEUROLOGY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
30/04/16	Neurology	MICU	Raja Ram Agarwal	Yes	
30/04/16	Neurology	MICU	Raja Ram Agarwal	Yes	
30/04/16	Neurology	MICU	Raja Ram Agarwal	Yes	
02/05/16	Neurology	MICU	Raja Ram Agarwal	Yes	
02/05/16	Neurology	HDU	Raja Ram	Yes	

			Agarwal		
02/05/16	Neurology	ICU	Raja Ram Agarwal	Yes	
02/05/16	Neurology	GW- I	Raja Ram Agarwal	No	No
03/05/16	Neurology	MICU	Raja Ram Agarwal	Yes	
03/05/16	Neurology	Neuro ICU	Raja Ram Agarwal	Yes	
04/05/16	Neurology	Semi Deluxe	Raja Ram Agarwal	No	No
04/05/16	Neurology	Semi Deluxe	Raja Ram Agarwal	No	No
04/05/16	Neurology	GW- I	Raja Ram Agarwal	No	No
04/05/16	Neurology	ICU	Raja Ram Agarwal	No	No
05/05/16	Neurology	Neuro ICU	Raja Ram Agarwal	Yes	
07/05/16	Neurology	MICU	Raja Ram Agarwal	Yes	
10/05/16	Neurology	HCU	Raja Ram Agarwal	Yes	
	NEUROSURGERY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
30/04/16	Neurosurgery	GW- II	Neurosurgery Team	Yes	
02/05/16	Neurosurgery	GW- II	Neurosurgery Team	Yes	
05/05/16	Neurosurgery	Deluxe	Neurosurgery Team	Yes	
06/05/16	Neurosurgery	MICU	Neurosurgery Team	Yes	
06/05/16	Neurosurgery	MICU	Neurosurgery Team	Yes	
09/05/16	Neurosurgery	AC Gen	Neurosurgery Team	Yes	
09/05/16	Neurosurgery	GW- I	Neurosurgery Team	Yes	
10/05/16	Neurosurgery	Semi Deluxe	Neurosurgery Team	Yes	
	OBSTETRICS & GYNAECOLOGY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
02/05/16	Obstetrics & Gynaecology	GW- I	Savita Bansal	Yes	

04/05/16	Obstetrics & Gynaecology	GW- I	Savita Bansal	Yes	
07/05/16	Obstetrics & Gynaecology	GW- II	Hema Agarwal	Yes	
09/05/16	Obstetrics & Gynaecology	Semi Deluxe	Savita Bansal	Yes	
	PAEDIATRIC MEDICAL ONCOLOGY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
30/04/16	Paediatric Medical Oncology	BMT	Satyendra Katewa	No	No
01/05/16	Paediatric Medical Oncology	Semi Deluxe	Satyendra Katewa	No	No
01/05/16	Paediatric Medical Oncology	Semi Deluxe	Satyendra Katewa	No	No
02/05/16	Paediatric Medical Oncology	Deluxe	Satyendra Katewa	No	No
02/05/16	Paediatric Medical Oncology	Semi Deluxe	Satyendra Katewa	No	No
04/05/16	Paediatric Medical Oncology	Deluxe	Satyendra Katewa	No	No
04/05/16	Paediatric Medical Oncology	Deluxe	Satyendra Katewa	No	No
06/05/16	Paediatric Medical Oncology	Super Deluxe	Satyendra Katewa	No	Discharged
06/05/16	Paediatric Medical Oncology	Deluxe	Satyendra Katewa	No	Discharged
09/05/16	Paediatric Medical Oncology	Deluxe	Satyendra Katewa	No	No
09/05/16	Paediatric Medical Oncology	Deluxe	Satyendra Katewa	No	No
10/05/16	Paediatric Medical Oncology	BMT	Satyendra Katewa	No	No
11/05/16	Paediatric Medical Oncology	Super Deluxe	Satyendra Katewa	Yes	
	PAEDIATRICS				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
30/04/16	Paediatrics	GW- II	Sunil Dutt Sharma	Yes	
30/04/16	Paediatrics	NICU	Sunil Dutt Sharma	Yes	
30/04/16	Paediatrics	GW- I	Sunil Dutt Sharma	Yes	
01/05/16	Paediatrics	NICU	Sunil Dutt Sharma	Yes	
02/05/16	Paediatrics	GW- I	Sunil Dutt	Yes	

			Sharma		
03/05/16	Paediatrics	GW- I	Mohit Vohra	Yes	
04/05/16	Paediatrics	NICU	Sunil Dutt Sharma	Yes	
05/05/16	Paediatrics	AC Gen	Mohit Vohra	Yes	
06/05/16	Paediatrics	NICU	Sunil Dutt Sharma	Yes	
06/05/16	Paediatrics	AC Gen	Mohit Vohra	Yes	
07/05/16	Paediatrics	NICU	Mohit Vohra	Yes	
07/05/16	Paediatrics	NICU	Sunil Dutt Sharma	Yes	
09/05/16	Paediatrics	Semi Deluxe	Sunil Dutt Sharma	Yes	
	PLASTIC SURGERY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
02/05/16	Plastic Surgery	HDU	Triveni Dhaka	Yes	
07/05/16	Plastic Surgery	GW- I	Triveni Dhaka	Yes	
10/05/16	Plastic Surgery	AC Gen	Triveni Dhaka	Yes	
10/05/16	Plastic Surgery	GW- II	Triveni Dhaka	Yes	
	RADIATION ONCOLOGY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
02/05/16	Radiation Oncology	OMW	Dinesh Mangal	Yes	
02/05/16	Radiation Oncology	OMW	Dinesh Mangal	Yes	
02/05/16	Radiation Oncology	OMW	Ruchir Bhandari	No	Discharged
09/05/16	Radiation Oncology	OMW	Dinesh Mangal	Yes	
09/05/16	Radiation Oncology	OMW	Dinesh Mangal	Yes	
	RESPIRATORY MEDICINE				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
02/05/16	Respiratory Medicine	GW- I	Nirmal Kumar Jain	Yes	
03/05/16	Respiratory Medicine	GW- II	Mahesh Goyal	Yes	
04/05/16	Respiratory Medicine	Semi Deluxe	Deepak Yaduvanshi	Yes	
05/05/16	Respiratory Medicine	GW- II	Deepak Yaduvanshi	No	No
05/05/16	Respiratory Medicine	Semi Deluxe	Nirmal Kumar Jain	Yes	
05/05/16	Respiratory Medicine	GW- II	Deepak Yaduvanshi	Yes	

06/05/16	Respiratory Medicine	MICU	Deepak Yaduvanshi	Yes	
06/05/16	Respiratory Medicine	GW- II	Nirmal Kumar Jain	Yes	
07/05/16	Respiratory Medicine	ICU	Deepak Yaduvanshi	Yes	
09/05/16	Respiratory Medicine	GW- II	Nirmal Kumar Jain	Yes	
11/05/16	Respiratory Medicine	Semi Deluxe	Nirmal Kumar Jain	Yes	
11/05/16	Respiratory Medicine	Deluxe	Nirmal Kumar Jain	Yes	
	SURGICAL GASTROENTEROLOGY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
02/05/16	Surgical Gastroenterolgy	AC Gen	Monika Gupta	No	Yes
02/05/16	Surgical Gastroenterolgy	GW- I	Monika Gupta	Yes	
	UROLOGY				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
03/05/16	Urology	GW- II	Manish Gupta	Yes	
03/05/16	Urology	Semi Deluxe	Divya Ratan Dhawan	No	Discharged
03/05/16	Urology	GW- II	Divya Ratan Dhawan	No	No
04/05/16	Urology	GW- II	Divya Ratan Dhawan	No	No
05/05/16	Urology	OMW	Divya Ratan Dhawan	Yes	
06/05/16	Urology	GW- I	Manish Gupta	No	Yes
06/05/16	Urology	GW- I	Manish Gupta	No	No
06/05/16	Urology	GW- II	Manish Gupta	Yes	
11/05/16	Urology	GW- I	Manish Gupta	Yes	
	ORTHOPAEDICS				
Date of admission	Department	Ward	Consultant	PD	After 48 hrs
01/05/16	Orthopaedics	GW- II	Asif Iqbal	No	No
01/05/16	Orthopaedics	GW- I	B R Bagaria	Yes	
01/05/16	Orthopaedics	OT Ward	B R Bagaria	Yes	
02/05/16	Orthopaedics	GW- I	B R Bagaria	No	No
02/05/16	Orthopaedics	Semi Deluxe	B R Bagaria	Yes	

03/05/16	Orthopaedics	HDU	B R Bagaria	Yes	
03/05/16	Orthopaedics	GW- I	Asif Iqbal	No	No
04/05/16	Orthopaedics	GW- I	B R Bagaria	Yes	
05/05/16	Orthopaedics	AC Gen	B R Bagaria	No	No
05/05/16	Orthopaedics	AC Gen	B R Bagaria	Yes	
07/05/16	Orthopaedics	GW- II	B R Bagaria	No	No
09/05/16	Orthopaedics	AC Gen	B R Bagaria	Yes	
11/05/16	Orthopaedics	AC Gen	B R Bagaria	Yes	