

Symposium

“The Chennai Declaration” Recommendations of “A roadmap- to tackle the challenge of antimicrobial resistance” - A joint meeting of medical societies of India

Ghafur A¹, Mathai D², Muruganathan A³, Jayalal JA⁴, Kant R⁵, Chaudhary D⁶,
Prabhash K⁷, Abraham OC⁸, Gopalakrishnan R⁹, Ramasubramanian V¹⁰, Shah SN¹¹,
Pardeshi R¹², Huilgol A¹³, Kapil A¹⁴, Gill JPS¹⁵, Singh S¹⁶, Rissam HS¹⁷, Todi S¹⁸,
Hegde BM¹⁹, Parikh P²⁰

¹Coordinator, Road Map Meeting and Antibiotic Stewardship Committee Chairperson, Clinical infectious Diseases Society, ²President CIDS, ³President Elect API, ⁴Indian Medical Association, ⁵President, Association of Surgeons of India, ⁶Indian Society of Critical Care Medicine, ⁷Indian Society of Medical and Paediatric Oncology, ⁸Secretary CIDS, ⁹Organising Secretary CIDSCON, ¹⁰Organising Chairman, CIDSCON, ¹¹Editor, JAPI, ¹²Federation of Obstetric and Gynaecological Societies of India, ¹³President, Indian Society of Organ Transplantation, ¹⁴Indian Association of Medical Microbiologists, ¹⁵Director, School of Public Health and Zoonoses, GADVASU, ¹⁶Chairman, Research Committee, NABH, ¹⁷Member, Board of Governors, Medical Council of India, ¹⁸Panel member of Ministry of Health expert committee STG on Critical Care, ¹⁹Former Vice Chancellor, Manipal Academy of Higher Education, ²⁰Convenor, Indian Cooperative Oncology Network, India

Correspondence to: Dr. Abdul Ghafur, E-mail: drghafur@hotmail.com

Abstract

“A Roadmap to Tackle the Challenge of Antimicrobial Resistance - A Joint meeting of Medical Societies in India” was organized as a pre-conference symposium of the 2nd annual conference of the Clinical Infectious Disease Society (CIDSCON 2012) at Chennai on 24th August. This was the first ever meeting of medical societies in India on issue of tackling resistance, with a plan to formulate a road map to tackle the global challenge of antimicrobial resistance from the Indian perspective. We had representatives from most medical societies in India, eminent policy makers from both central and state governments, representatives of World Health Organization, National Accreditation Board of Hospitals, Medical Council of India, Drug Controller General of India, and Indian Council of Medical Research along with well-known dignitaries in the Indian medical field. The meeting was attended by a large gathering of health care professionals. The meeting consisted of plenary and interactive discussion sessions designed to seek experience and views from a large range of health care professionals and included six international experts who shared action plans in their respective regions. The intention was to gain a broad consensus and range of opinions to guide formation of the road map. The ethos of the meeting was very much not to look back but rather to look forward and make joint efforts to tackle the menace of antibiotic resistance. The Chennai Declaration will be submitted to all stake holders.

Key words: Antimicrobial resistance, antibiotic policy, Chennai declaration, CIDSCON, roadmap

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Background and Current Indian Scenario

Antimicrobial resistance is a serious global challenge. Every continent and country faces the menace of antibiotic resistant “super bugs,” though the extent and the severity of the problem varies. There could be a return to the pre-antibiotic era, where many people could suffer or die from untreatable bacterial infections.^[1,2]

There is a dramatic increase in the prevalence of superbugs, and there is an equal drop in the number of new antibiotics available. The pipeline of antibiotic research and development is nearly dry, especially when it comes to antibiotics active against Gram-negative bacteria. Research and development of any antibiotic is a huge investment for pharmaceutical industry.^[3] Lack of profitability has forced pharmaceutical industry to graze in fresh meadows, leaving the field of anti-infective research quite barren.

There is currently no functioning national antibiotic policy or a national policy to contain antimicrobial resistance in India. The policy published in 2011 has been put on hold due to non implementability of major recommendations.^[4,5] There is no restriction on Over The Counter (OTC) dispensing of antibiotics without prescription. Any antibiotic, including higher- end ones, can be purchased OTC without prescription.^[6,7]

Indian hospitals have reported very high Gram-negative resistance rates, with very high prevalence of ESBL (Extended Spectrum Beta Lactamases) producers and also high carbapenem resistance rates. Increasing carbapenem resistance will invariably result in increased usage of colistin, currently the last line of defence, with a potential for colistin-resistant and Pan Drug Resistant bacterial infections.^[8-10]

Indian hospitals have varying standards of infection control. Some centers report successful initiatives, while there is paucity of published data on the existence of an antibiotic policy in the majority of Indian hospitals or on their compliance with existing policies.^[11-14] As per data available from NABH assessors conclave most accredited hospitals, though having a well written antibiotic policy on paper, are not compliant in practice.^[15] India, with more than 20,000 hospitals, more than a billion population, wide cultural diversity, socio-economic disparity, and a large medical community of more than three-fourths of a million doctors, will find the resistance problem an issue very difficult to tackle unless we initiate whole hearted and joint efforts to tackle the menace on a war footing.^[16]

There are major international efforts to tackle the challenge of antimicrobial resistance.^[17-20] The Indian medical community is seriously concerned about the high resistance rate in our country and would like to partner with Indian authorities in tackling the issue and joining the global fight against antimicrobial resistance.

Development of Road Map

"A Roadmap to Tackle the Challenge of Antimicrobial Resistance - A Joint meeting of Medical Societies in India" was organized as a pre-conference symposium of the 2nd annual conference of the Clinical Infectious Disease Society (CIDSCON 2012) at Chennai on 24th August. This was the first ever meeting of medical societies in India on issue of tackling resistance, with a plan to formulate a road map to tackle the global challenge of antimicrobial resistance from the Indian perspective. We had representatives from most medical societies in India, eminent policy makers from both central and state governments, representatives of World Health Organization, National Accreditation Board of Hospitals, Medical Council of India, Drug Controller General of India, and Indian Council of Medical Research along with well-known dignitaries in the Indian medical field. The meeting was attended by a large gathering of health care professionals. The meeting consisted of plenary and interactive discussion sessions designed to seek experience and views from a large range of health care professionals and included six international experts who shared action plans in their respective regions. The intention was to gain a broad consensus and range of opinions to guide formation of the road map. The ethos of the meeting was very much not to look back but rather to look forward and make joint efforts to tackle the menace of antibiotic resistance. The Chennai Declaration will be submitted to all stake holders.

Aim of the "Road map meeting" and "Chennai Declaration"

Aim of the "Road map meeting" and "Chennai Declaration" was to initiate efforts to formulate a national policy to control the rising trend of antimicrobial resistance (AMR), after consultation with all relevant stake holders and to take all possible measures to implement the strategy.

Executive summary

1. Increasing antimicrobial resistance is a serious global and regional challenge. There is an urgent need to initiate measures to tackle the scenario and join international efforts to control this menace.
2. The Indian Ministry of Health (MOH) will need to take urgent initiatives to formulate a national policy to control the rising trend of antimicrobial resistance, after consultation with all relevant stake holders and then take all possible measures to implement the policy.
3. The Drugs Controller General of India (DCGI)

will need to formulate and implement a policy on rationalizing antibiotic usage in the country, both in hospitals and over the counters, after consultation with stake holders and experts in the field.

4. State Departments of Health will need to take initiatives to improve infection control standards and facilities in hospitals and encourage implementation of regional antibiotic policies, pending formulation and publication of a national policy. Once a national policy is formulated, whole hearted support for this policy by the state DOH is needed for implementation.
5. The Medical Council of India will need to make necessary curriculum changes so as to include a structured training on antibiotic usage and infection control at the undergraduate and post-graduate level.
6. An Infection Control Team (ICT) must be made mandatory in all hospitals. Regulatory authorities and accreditation agencies (NABH, ISO) must insist on a functioning ICT, during the licensing and accreditation process.
7. State Department of Health (DOH) should take initiatives in organizing regional and state infection control committees to supervise the functioning of hospital ICT.
8. A National Task Force should be set up to guide and supervise the regional and state infection control committees.
9. The National Accreditation Board of Hospitals (NABH) is required to insist on strict implementation of hospital antibiotic and infection control policy, during hospital accreditation and re-accreditation processes. Hospitals without compliance with the policy should not be given accreditation.
10. The Indian Council of Medical Research should broaden the antimicrobial resistance surveillance network, incorporating hospitals from both the government and private sector. ICMR will need to provide funds for research on antimicrobial resistance, drug development, and vaccines.
11. The Indian division of the World Health Organization should step up interaction with the government on issues related to drug resistance, antibiotic policy, and infection control.
12. There is an urgent need to standardize Microbiology laboratories in India. Hospitals must have good quality Microbiology laboratory or should be willing to outsource specimens, in the absence of a standardized laboratory.
13. Medical societies to take active interest in initiating infection control and antibiotic stewardship awareness activities among the society members,

utilizing the extensive network of local branches of all societies.

14. Medical journals should make deliberate attempts to educate readers on infection control and national antibiotic policy-related issues.
15. Electronic and print mass media should take initiatives on public awareness campaigns on the dangers of misuse of antibiotics.
16. Non-governmental organizations (NGOs) – national and international- have played a pivotal role in disseminating public information and funding research in diseases like cancer and cardiac diseases. They should come forward with similar enthusiasm to tackle antibiotic resistance issue, with the same vigor.
17. There is a need to evaluate the extent and to regulate the usage of antibiotics in veterinary practice.

India needs "An implementable antibiotic policy" and NOT "A perfect policy"

A strict and perfect antibiotic policy is always the ideal, just like having a perfect police and law and order system. However, asking for a complete and strict antibiotic policy in a country where there is currently no functioning antibiotic policy at all may not be an intelligent or immediately viable option without the political will to make such a drastic change. A multidisciplinary committee of eminent experts should explore the options available to us. For example, should we:

1. Adopt a strict antibiotic policy, with absolute and strict control on antibiotic use in the community and in hospitals, on a background of enforcement of good infection control standards in hospitals?

OR

2. Introduce step- by- step regulation of antibiotic usage, concentrating on higher end antibiotics first and then slowly extending the list to second and first line antibiotics?

Objectives

Regulate over the counter sale of antibiotics

It is obvious that ban of over the counter (OTC) sale of all antibiotics without prescription will be the ideal step. Currently, all antibiotics including injectables can be purchased over the counter without prescription. It is very easy to issue an order to ban OTC sales of all antibiotics without prescription, but whether such a strict policy could be implemented is questionable. It is debatable whether we have enough drug inspectors and infrastructure to monitor OTC dispensing of all antibiotics. This should be taken into consideration while making any recommendations. An over-enthusiastic approach without proper planning

will only lead to failure of the overall strategy and may further affect success of the overall antibiotic policy. A practical approach will be to formulate a list of antibiotics with strict monitoring on the dispensing of these drugs. Step- by- step introduction of other drugs to the restricted list could be tried once the success of the first stage is ensured. Another option would be banning OTC without prescription of all antibiotics in metros and big cities, where there will be no difficulty for patients to consult registered medical practitioners. A more liberal approach in smaller cities and villages, where immediate access to doctors is usually limited, can be utilized. This may not be an ideal approach, but a practical one in the current Indian context. An expert committee should look into these options and adopt the most viable one [Table 1].

Strategy 1: Complete ban on OTC sale of antibiotics without prescription throughout the country.

Strategy 2: Complete ban of OTC sale of antibiotics without prescription in metros and larger cities with a more liberal approach in smaller cities and villages.

Strategy 3: A liberal approach throughout the country to start with, with an initial list of antibiotics under restriction and addition of other drugs to the list in a phased manner.

In-hospital antibiotic usage monitoring

There is an urgent need to rationalize antibiotic usage

in Indian hospitals. Considering the large number of Indian hospitals and their heterogeneity, a nationwide attempt towards this aim will be a huge challenge, but high antibiotic resistance rates in Indian hospitals mandates us to make all efforts to rationalize antibiotic usage.

Surveillance on the usage of all antibiotics will be the ideal way to achieve the aim. This may be an impossible task in the current Indian context, considering the lack of resources in many hospitals. Monitoring higher-end antibiotics will be a more practical and implementable strategy. Monitoring should be more vigilant for third line antibiotics active against Gram-negative bacteria, as the antibiotic pipeline against Gram-negative bacteria is nearly empty unlike the situation for Gram-positive bacteria.

Strict monitoring on the usage of colistin, currently the most precious antibiotic in an era of increasing carbapenem resistance, must be implemented on an urgent basis. Colistin prescription should be in duplicate, with a copy to be sent to the pharmacy. The prescription must be countersigned by a consultant in 24 hours. In addition, a second opinion by an antibiotic steward within 48-72 hours must be made compulsory. This will allow any doctor to use this life-saving drug in emergencies and at the same time, misuse will be prevented by the compulsory rule of getting a second opinion. Carbapenem and tigecycline (the other higher-

Table 1: Rationalizing OTC sale of antibiotics- Step by Step Approach

Antibiotics those need a prescription (*duplicate) of a registered medical practitioner prior to dispensing	No need of Prescription	May or may not need prescription *needs consensus
<ul style="list-style-type: none">• All injectable Antibiotics• Oral antibiotics• Linezolid• Faropenem• Newer Quinolones-levofloxacin, moxifloxacin, sparfloxacin, pazufloxacin etc,• Chloramphenicol• 3rd generation cephalosporin- Cefdinir, cefpodoxime, cefixime <p>*Pharmacy to retain the duplicate prescription</p>	<ul style="list-style-type: none">• Ampicillin, Amoxicillin, co-amoxiclav• Erythromycin, clindamycin• Nitrofurantoin• Doxycycline• Ciprofloxacin	<ul style="list-style-type: none">• First & second generation cephalosporins cefadroxil, cephalexin,cefaclor• Cefuroxime• Cotrimoxazole• Azithromycin, clarithromycin

Table 2: In-hospital higher-end antibiotic usage monitoring

<ul style="list-style-type: none">• Colistin, carbapenem, and tigecycline needs strict monitoring.• Usage needs to be endorsed by another consultant within 72 hours.• Higher-end antibiotics with Gram-positive spectrum (teicoplanin, vancomycin, daptomycin, linezolid).<ul style="list-style-type: none">o Need monitoring (strict regulation may not be practical).o Need to complete an antibiotic monitoring sheet.o Prescription in duplicate. Copy to be sent to the pharmacy.o Pharmacist to maintain records on higher-end antibiotics usage.o Infection control committee will monitor the data at least every three months.
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end antibiotics with Gram-negative spectrum) usage should be subjected to similar stringent supervision [Table 2].

A similar approach would be ideal in the case of higher-end antibiotics with Gram-positive spectrum (teicoplanin, vancomycin, daptomycin, and linezolid) as well, but may be difficult to implement. A compulsory second opinion may not be a practical and viable option in case of these drugs. However, these antibiotics must be prescribed in duplicate and a copy to be sent to the pharmacy. Infection control committee should monitor these prescriptions at regular intervals and give feed back to the clinicians. The hospital infection control committee should monitor compliance to the surgical prophylaxis policy.

Audit and feedback

Pharmacy should keep track on the usage of higher-end antibiotics and should provide a daily list to the infection control team. The infection control team should follow-up the cases on a daily basis, discuss with the antibiotic steward, and give feedback to the primary consultant.

Initiate measures to step up microbiology laboratory facilities

Availability of standardized Microbiology laboratories is limited to bigger hospitals and major cities. Measures should be initiated to expand the network of accredited laboratories. In order to overcome the problem of financial constraints in a resource-limited setting, low-cost diagnostic methods and rapid bedside diagnostics should be explored.

National antimicrobial resistance surveillance system

Department of Health and Indian council of Medical Research (ICMR) should establish a national antibiotic resistance surveillance system with representation from all regions in the country. Government and private hospitals, hospitals of varying bed strengths and facilities should all be included. Such data will be useful to initiate targeted efforts to tackle resistance, formulate and modify national and regional antibiotic policies. Periodic publication of collated data in a key national journal will serve as a benchmark for antibiotic usage and resistance load in hospitals.

Roles and Responsibilities

Role of ministry of health

Ministry of Health should take urgent initiative to formulate a national policy in order to control the rising trend of antimicrobial resistance, after

consultation with all relevant stake holders and take all possible measures to implement the strategy.

National antibiotic policy must have generic domains of agreement but should be subject to local adaptation depending on resistance patterns and resources.

Department of Health (DOH) to make regulations to reinforce infection control measures in all hospitals.

DOH to support, through the development of a national network, surveillance of AMR (Antimicrobial Resistance) and consumption and quality of prescribing. As resource constraints may be a major obstacle in a developing country like India, we can start with a few key pathogens and antibiotics and later expand to include a broader list of pathogens and antibiotics.

DOH to conduct public awareness campaigns through media and encourage private organizations to conduct similar campaigns.

Encourage research to develop new antibiotics and vaccines.

Accreditation of hospitals must be made mandatory.

DOH working in close collaboration with the insurance industry, represented by Federation of Indian Chamber of Commerce and Industry (FICCI), to lay down standard treatment guidelines for diseases after consulting with national experts (including proper antibiotic use), which will be linked to third party payment for the hospitalized patients.

Role of Drugs Controller General of India (DCGI)

Urgent measures are needed to regulate over the counter sale of antibiotics (OTC) and rationalize in-hospital antibiotic usage, especially higher-end antibiotics. DCGI has a significant role to play in the initiation of the OTC regulation. Though this is a major challenge, there should not be any delay in initiation of serious efforts.

Hospital Infection Control Committee (HICC)

All hospitals must have an infection control committee and an antibiotic policy and should initiate or augment efforts towards implementation.

Those hospitals with an existing ICC and an antibiotic policy should augment efforts to increase compliance to the policy. Hospitals without a policy must initiate efforts to formulate an ICC and an antibiotic policy. ICC should define an annual target for achievement. Hospital accreditation agencies can assess the compliance to the policy.

All hospitals must have an infection control team, under the leadership of an infection control consultant, who can be an infectious diseases specialist, a microbiologist with training in infection control or a physician of any specialty with training in infection control. The committee should include all major stake holders including medical superintendent, general manager, housekeeping supervisor, operation theater in-charge, chief executive officer, medical director, and representatives of major departments. Wholehearted support of the hospital management is essential for the effective functioning of ICT. The committee should meet at least once in three months and discuss important infection control issues like the level of

compliance to antibiotic policy, antibiotic resistance pattern (antibiogram), and the compliance to infection control guidelines [Figure 1].

Antibiotic steward

An antibiotic steward is a physician who is trained in infectious diseases and infection control or a microbiologist with training in infection control and antibiotic stewardship. In hospitals without an ID physician or microbiologist, any clinician with special interest in infection control and antibiotic stewardship can function as an antibiotic steward. Antibiotic steward should be responsible for giving a second opinion on higher-end antibiotic usage. Availability of more than

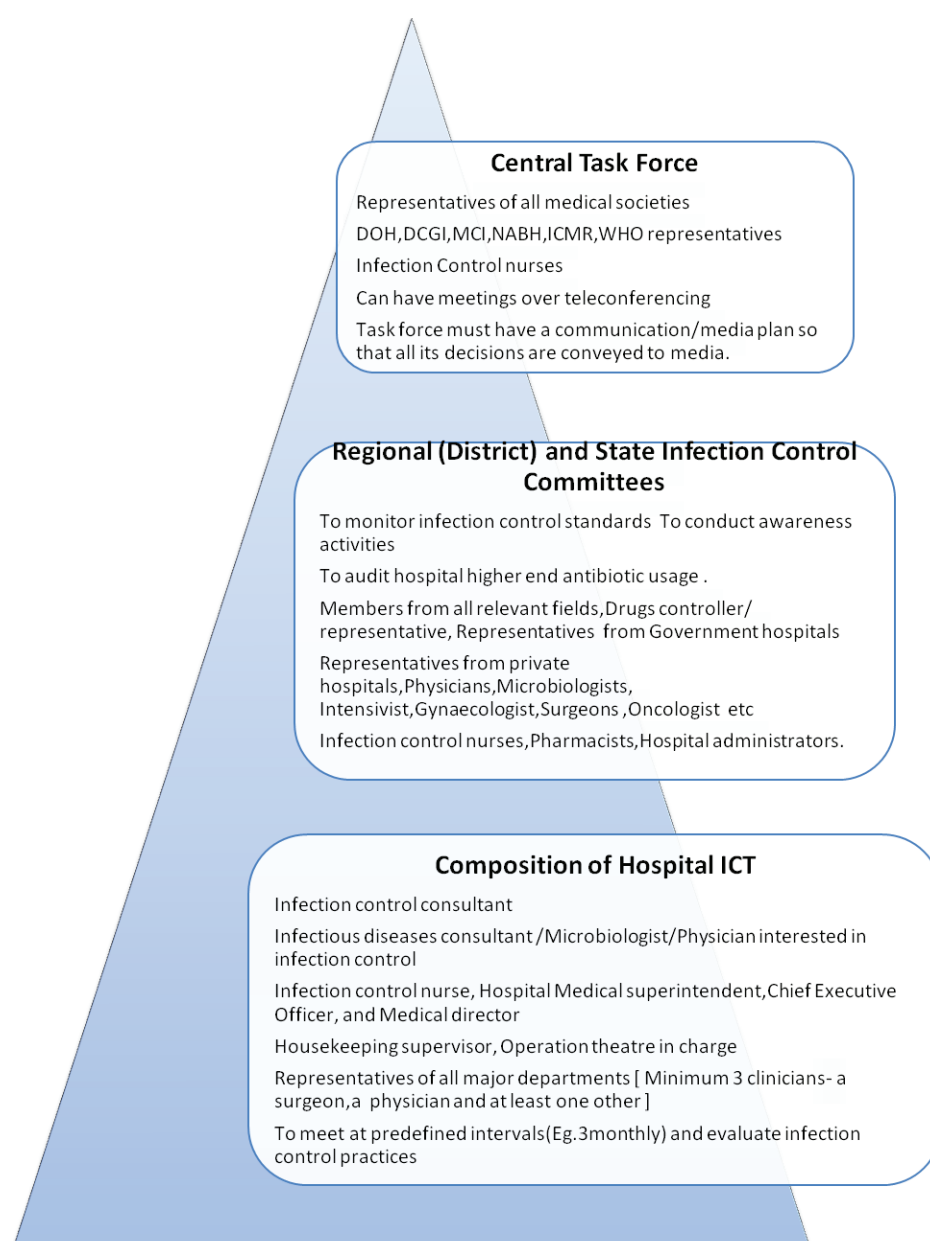


Figure 1: Hierarchy of infection control committee

one antibiotic steward in any one hospital will provide flexibility and choice.

Regional (District) Infection Control and Antibiotic Stewardship Committees

Regional infection control committees could be established to assist and supervise the infection control activities in the region. All hospitals in the region, both government and private, should be under the guidance of the regional committee. Regional committee can look into the infection control quality monitors, higher-end antibiotic usage, and other infection control and patient safety-related issues. The committee can meet once in 3-6 months.

Central Task Force

A central task force should be formed to supervise the infection control and antibiotic stewardship activities at a national level. Task force should include representatives of all major stake holders. Regional and state infection control committees can report to the central task force. Presence of state task forces can bridge the activities of the regional committees with the central task force.

Role of Microbiology Laboratories

Microbiology laboratories and Microbiologists have to play a very crucial and integral role in the implementation of the Roadmap and the national policy. Lack of standardization of Microbiology laboratories is a serious issue, which needs urgent attention of the policy makers. Microbiology labs should issue hospital antibiogram at pre-defined intervals. Those hospitals without good laboratory support should be willing to outsource samples to better laboratories. The system of notification of communicable diseases is a popular, established, though not strictly followed system in the country. Multidrug-resistant bacteria, especially pan-drug-resistant bacteria, must be considered as a notifiable entity. Such a reporting system should complement national antimicrobial resistance surveillance studies.

Indian Microbiologists should expand their role from the conventional Microbiologist working in a laboratory to an active player in directing interventions in the prevention of HAIs, deciding antibiotic policy and authorizing use of reserve antibiotics, planning and strengthening of diagnostic facility, choosing rapid, sensitive, and specific diagnostic tests, and monitoring antimicrobial resistance [Table 3].

Hospital Microbiology laboratories should follow

standard protocols for susceptibility testing.

Must generate and distribute antibiogram at regular intervals (Quarterly).

Hospitals to send antimicrobial susceptibility testing (AST) to standardized labs to avoid erroneous reporting of organisms and their susceptibility pattern.

Pan-drug-resistant Gram-negatives, carbapenem-resistant Gram-Negatives, Vancomycin-resistant Enterococcus and MRSA should be made notifiable.

Evaluate the role of bedside / rapid diagnostics

Role of National Accreditation Board of Hospitals (NABH)

National accreditation board of hospitals can play a very significant role in implementing infection control and antibiotic stewardship policy in Indian hospitals. There is no published data on the level of compliance of NABH accredited hospitals to the antibiotic policy and infection control guidelines. NABH should formulate more efficient ways of assessing the compliance to the guidelines. NABH to insist on strict implementation of hospital antibiotic and infection control policy, during hospital accreditation and re-accreditation processes.

Authors do realize that during NABH accreditation process, assessment on the compliance to infection control policy and infection control practices is only one of the 636 elements to be covered. Additional importance must be given to the infection control part.

NABH should consider issuing an advisory towards the seriousness of the antibiotic policy and following it up with all sincerity. Additional time should be allocated for the infection control and antibiotic policy surveillance.

Role of medical council of India

One of the main reasons for the inappropriate antibiotic usage by Indian doctors is the lack of adequate training on the subject during undergraduate and post-graduate courses. This deficit in the basic training can only be overcome if there is a change in the curriculum.

Curriculum change

Structured training in antibiotic usage and infection control should be introduced in both UG and PG curriculum.

Post-MD/DNB (Internal Medicine) sub-specialization in Infectious Diseases, (leading to DM/DNB) should be introduced in all post-graduate centers that offer sub-specialty training.

MD microbiology: Compulsory training in infection control and antibiotic stewardship.

Infectious Diseases training in UG and PG curriculum in all specialties.

Antibiotic stewardship and infection control one week rotation-3rd, 4th, and final year MBBS.

Post Graduates-all specialties -two week rotation/three yr

Medical / pediatric / pulmonology / microbiology post graduates -one month rotation/three yr

Role of medical teachers

Teachers should be role models to their students in wise and appropriate antibiotic usage. All efforts should be made to educate and stimulate students and young doctors to follow infection control practices.

Teachers as role models of rational prescribers.

Undergraduate examinations- questions on principles of good antibiotic practice in theory, viva, and practical examinations (in all specialties).

Rational prescribing practices should be introduced early in the curriculum.

Problem-based learning and case studies on antibiotic prescription and infection control.

Concepts to be reinforced during CRRI (Compulsory Rotational Residential Internship) and PG courses.

Teaching of common prescribing errors (inappropriate empiric choices, failure to de-escalate, inappropriate dose, route and duration of antibiotics, inappropriate prophylaxis) and consequences of inappropriate prescriptions. ("learning from our mistakes")

Emphasis on making accurate diagnosis (clinical, microbiological) and then prescribing antibiotics, thereby limiting empiric therapy.

Role of an individual physician – In the end, in spite of all the regulations in place, given the immense size and heterogeneity in the health care delivery, antibiotic control will depend on the wisdom of a physician or a surgeon at the patient's bedside, in the clinic or at home.

Role of director of medical education (DME)

State Department of Health and the Directorate of Medical education should take very active initiatives

in implementing the national antibiotic policy and the curriculum change recommended by the MCI.

Support establishment of infection control committee in all medical college hospitals.

Regular CMEs on proper antibiotic usage.

Antibiotic policy for all medical college hospitals.

Implement the curriculum changes recommended by MCI.

Encourage research (thesis) and publication on infection control and antibiotic stewardship related issues.

Antibiotic usage auditing (monthly) in all teaching hospitals.

Role of directorate of public health (DPH) / directorate of medical services (DMS)

DPH and DMS will have pivotal role in implementing infection control and antibiotic stewardship policies in government hospitals

Help establish a district infection control committee.

Educating medical officers.

Organize fund for antibiotic stewardship training.

Induction training and periodic training courses on antibiotic usage for health care staff.

Stress on infection control in government hospitals.

Encourage usage of alcohol hand rub between patient contacts.

Role of World Health Organization (WHO)

World Health Organization should play an active role in tackling antibiotic resistance. WHO should co-ordinate initiatives in various countries, provide technical support, and organize awareness activities. Microbes are global citizens; their spread across the earth not being restricted by the national boundaries or national flags. If we intend to challenge microbes and tackle the situation, we have to pursue the behaviour and tactics of bugs, by becoming global citizens and thinking beyond national boundaries. High quality infection control set-ups in developed countries may not be fruitful unless countries with high resistance rates and less stringent infection control facilities take serious measures to control resistance. WHO can play significant role in helping countries who

lack resources to upgrade the laboratory facilities and infection control standards. Indian division of the World Health Organization should be proactive in tackling resistance initiatives and interact with the government on issues related to drug resistance, antibiotic policy, and infection control.

WHO to take initiatives in establishing an international fund to tackle resistance to help resource-limited countries in setting up infection control facilities.

Provide technical and monetary help in tackling AMR initiatives.

Augment WHO led educational activities for medical community and the public.

Role of medical societies in implementing antibiotic stewardship

'Road map meeting' and the 'Chennai Declaration' are the typical examples of the willingness of medical societies to work together for a common cause. Medical societies in India always took active interest in public health issues and have made significant contributions in all initiatives. Even though the issue of antibiotic resistance existed for long time, serious discussion on the subject started only in recent years. Medical societies were quick to respond to a call for a joint initiative and communicate with authorities offering co-operation and support to a national antibiotic policy.

Medical societies should disseminate policy decisions to all society members through society journals, conferences, Continuing Medical Education (CME) activities, newsletters, and website.

Action plan of all societies for the coming year – Spreading message on rational usage of antibiotics and infection control.

Encourage members of the society to attend short courses to qualify to be an antibiotic steward.

Dedicated sessions on infection control and antibiotic stewardship in society conferences.

Society conferences will have dedicated sessions on tackling resistance.

Engage with media in a positive manner.

Role of medical journals

Journals must make deliberate attempt to educate readers on infection control and national antibiotic policy-related issues and publish more articles on the subject of antibiotic stewardship and infection control. A joint meeting of journal editors to implement this agenda should be explored.

Role of mass media

International media have played a significant role in the success of public awareness activities on the danger of overuse of antibiotics. Indian media should follow similar examples and help authorities and medical societies to make tackling resistance efforts a big success.

Media should take initiatives in public awareness campaigns.

Newspapers can publish articles to educate public on the danger of overuse of antibiotics.

Table 3: Role of microbiologists and microbiology laboratories

1.	Constantly changing spectrum of Multi Drug Resistant (MDR) pathogens and the availability of newer technologies calls for the need of regular communication between the microbiologists and clinicians.
2.	Microbiology labs need to be strengthened and be proactive with rapid & molecular diagnostics, early identification of emerging pathogens and detecting resistance accurately.
3.	Generating cumulative antibiograms for emerging patterns of resistance.
4.	Determining molecular epidemiology of resistant strains.
5.	Dissemination of data at frequent and regular intervals.
6.	Develop networking of institutes, Govt. and private hospitals/labs.
7.	Develop standardized laboratory methods & Quality control protocols, for reliable data.
8.	Rapid, sensitive, specific and point of care tests – bacterial infections/ resistance
9.	Taking technology to the field – microarray based, Real time PCR based.
10.	Mandatory NABL accreditation of the clinical laboratories.
11.	Restrictive reporting of antibiotics. Microbiologists should release the sensitivity report on higher -end antibiotics, only if the bacteria are Multi Drug Resistant.
12.	Government support for capacity building.
13.	Identify Institutions in different regions as referral labs which will be responsible for making a repository of bacterial strains of interest/rare resistant markers, undertake genotyping of the resistant isolates and study emergence of new mechanism of resistance.

Media should disseminate information on the "Bad bugs, no drugs" concept.

Visual media should broadcast programmes and news on the danger of overuse of antibiotics.

Media should avoid sensationalism and increase awareness.

Veterinary antibiotic usage

Veterinary antibiotic usage as a growth promoter or for prophylactic and therapeutic indications is a major contribution to the resistance scenario, as majority of these antibiotics are also used for disease control in humans. There are clinical and epidemiological evidences that resistant bacteria or resistance determinants might be passed from animals to humans directly or indirectly via food, environment, or during animal husbandry practices. Some countries report that more than 50% of their total output of antimicrobial compounds is used in agriculture, and most are applied to food animals in sub-therapeutic doses as growth promoters.^[21] The magnitude of veterinary antibiotic usage is not well-studied in India. Therefore, there is need to emphasize on the following aspects.

Need to evaluate the extent of antibiotic usage in the veterinary practice and the indications of use (Prophylaxis, treatment, or growth promoter).

Need to regulate antibiotic usage in the veterinary practice.

Need to ascertain and monitor the prevalence of resistant bacteria, especially important zoonotic food-borne bacteria in animals and food of animal origin to quantify the rate of transfer of medically-relevant resistance genes and resistant bacteria from animals to humans.

Regular monitoring of residues of antibiotics in food of animal origin and study the role of antibiotic residues in food towards development of resistance.

Formulation/implementation of proper regulations for observance of withholding or withdrawal periods between the use of antibiotics and animal slaughter or milking to avoid residues of antibiotics in milk and meat.

National antibiotic awareness day

A designated "National Antibiotic Awareness Day" will help in propagating the importance of tackling antibiotic resistance among health care workers and the public, giving opportunity to all stake holders to appraise their

previous work and plan future activities.

Where does the road map head?

"Road map meeting" decisions - The "Chennai declaration" will be submitted to all sectors of the relevant governmental and non-governmental bodies, medical societies, and all major stake holders.

The road map should form the template for regional and local framework for combating AMR. Progress with the implementation of the Road map will be assessed annually by a joint committee during the annual conference of one of the participating medical societies. Road map committee of medical societies will communicate with all stake holders to collect data on the progress.

The central task force can categorise the recommendations into major and minor on priority basis, assess the progress of implementation and the compliance by all stake holders.

The road map will be a dynamic process, subject to further adaptation with time, experience, and maturity.

Measurable goals of the road map

First year

1. Formulation of a national policy to combat antimicrobial resistance.
2. Initiation of efforts to implement major components of the policy.
3. Sixty percent compliance rate to major recommendations by all stake holders.

Second year

1. Compliance rate to reach 70%.
2. Initiation of efforts to implement minor components of the policy.
3. India achieving the status of a country with a functioning antibiotic policy despite limitations.

Next five years

1. More than 90% compliance rate to major and minor components of the policy.
2. India achieving the status of a country with a functioning antibiotic policy comparable to those countries with high quality infection control and antibiotic policy compliance rates.

Conclusion

Serious concern about the rising trend of antimicrobial resistance in the country has prompted medical societies to hold the joint "Road map meeting" in order to seek practical, implementable solutions to the problem. We

have considered the Indian scenario on the ground before making the recommendations. We believe that if we have the will and resolve, the "Chennai Declaration" targets can very easily be achieved.

Disclaimer

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References

1. Dr. Margaret Chan, Director General-World Health Organisation. Available from: <http://www.who.int/world-health-day/2011> [Last accessed on 2012 Nov 15].
2. Appelbaum PC. 2012 and beyond: Potential for the start of a second pre-antibiotic era? *J Antimicrob Chemother* 2012;67:2062-8.
3. Boucher HW, Talbot GH, Bradley JS, Edwards JE, Gilbert D, Rice LB, *et al.* Bad Bugs, No Drugs: No ESKAPE! An Update from the Infectious Diseases Society of America -IDSA Report on Development Pipeline. *Clin Infect Dis* 2009;48:1-12.
4. Available from: <http://ibnlive.in.com/news/antibiotic-policy-put-on-hold-indefinitely/192878-17.html>. [Last accessed on 2012 Nov 15].
5. Available from: <http://www.dailypioneer.com/nation/10933-lack-of-foresight-antibiotic-policy-bites-dust.html> [Last accessed on 2012 Nov 15].
6. Rathnakar UP, Sharma NK, Garg R, Unnikrishnan B, Gopalakrishna HN. A study on the sale of antimicrobial agents without prescriptions in pharmacies in an urban area in South India. *J Clin Diagn Res* 2012;6:951-4.
7. SaradammaRD, Higginbotham N, Nichter M. Social factors influencing the acquisition of antibiotics without prescription in Kerala State, South India. *Soc Sci Med* 2000;50:891-903.
8. Taneja N, Singh G, Singh M, Sharma M. Emergence of tigecycline and colistin resistant *Acinetobacter baumannii* in patients with complicated urinary tract infections in north India. *Indian J Med Res* 2011;133:681-4.
9. Mohamudha PR, Harish BN, Parija SC. Emerging carbapenem resistance among nosocomial isolates of *klebsiella pneumoniae* in South India. *Int J Pharm Biol Sci* 2010;51:1-11.
10. Tayade A, Ghafur AK, Gopalakrishnan R, Priyadarshini K, Thirunarayan MA, Ramasubramanian V, *et al.* ABS 121/12-Clinical profile of patients with colistin resistant Gram negative infections, CIDSCON. 2012.
11. Sarma JB, Ahmed GU. Infection control with limited resources: Why and how to make it possible? *Indian J Med Microbiol* 2010;28:11-6.
12. Wattal C. Prescription auditing of Antimicrobials. Microbiology news letter, Sir Gangaram Hospital. 2012;18:37.
13. Jaggi N, Sissodia P, Sharma L. Control of multidrug resistant bacteria in a tertiary care hospital in India. *Antimicrob Resist Infect Control* 2012;1:23.
14. Ghafur A, Nagvekar V, Thilakavathy S, Chandra K, Gopalakrishnan R, Vidyakshmi PR. Save antibiotics, save lives: An Indian success story of infection control through persuasive diplomacy. *Antimicrob Resist Infect Control* 2012;1:29.
15. Second NABH Assessors Conclave at New Delhi and Bangalore in Dec 2010 and Feb 2011 and data presented by the NABH representative to the 'Road map meeting'.
16. Ghafur A. Can India be the wing commander in the global fight against antimicrobial resistance? *J Assoc Physicians India* 2012;60:42-3.
17. Available from: <http://ecdc.europa.eu/en/EAAD/Pages/Home.aspx/> [Last accessed on 2012 Nov 15].
18. Available from: http://www.e-bug.eu/eng_home.aspx?cc=engandss=1andt=Welcometo%20e-Bug [Last accessed on 2012 Nov 15].
19. Available from: <http://www.parliament.uk/edm/2010-12/2418> [Last accessed on 2012 Nov 15].
20. Carlet J, Rambaud C, Pulcini C. WAAR (World Alliance against Antibiotic Resistance): Safeguarding antibiotics. *Antimicrob Resist Infect Control* 2012;1:25.
21. The Medical Impact of Antimicrobial Use in Food Animals. Report of a WHO Meeting. Berlin, Germany, 13-17 October 1997.

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