

*Editorial*

# Role of regional antibiograms: Acting before the blast

Charu Singh<sup>1</sup>, Naveen Bansal<sup>2</sup>, Ashish Gulia<sup>3</sup>Departments of <sup>1</sup>Microbiology, <sup>2</sup>Transfusion Medicine, <sup>3</sup>Surgical Oncology, Homi Bhabha Cancer Hospital and Research Centre, New Chandigarh, Punjab, India.

A local antibiogram of a hospital is a helpful tool for clinicians to decide on empirical therapy for their patients. The role of microbiology laboratories in generating these antibiograms is praiseworthy. The antibiogram is prepared by a microbiologist as per the trends, maybe 3 monthly, 6 monthly, and in some centers, even once a year.

Most of the centres circulate the antibiogram in the hospital amongst clinicians but practical application of the same must be done by and antimicrobial stewardship team and decide upon the empirical therapy for their patients in collaboration with treating team of doctors.

However, the role of a local antibiogram in deciding an empirical therapy in a tertiary care hospital seems doubtful as a majority of the patients are referred from adjoining areas, such as subcenters catering to a population of 3,000–5,000. Primary health centers cater to a population of 20,000–30,000, followed by community health centers catering to over 1 lakh population in rural areas. Tertiary care centers in the form of medical colleges and other post-graduate colleges cater to majority of the population in the state, even those that are referred to by rural healthcare facilities. Majority number of patients in a region present to the government hospitals followed by private hospitals and clinics.

The idea of discussing the healthcare system is important because we have to recognize the pool of patients that a tertiary care hospital is going to receive. The patients are referred by lower centers and private clinics to the tertiary care centers for better management because of the availability of better health services and state of art laboratories to have better patient outcomes.

The role of a tertiary care center microbiology laboratory is very important as the antibiogram that they will prepare is not only representative of their residents but also the patients who are referred from far-off places adjacent to the city and state.

We all know that antimicrobial resistance is a global threat and to reduce this, various steps have been taken. Antibiotic

policy is prepared by looking after the hospital antibiogram. Besides, National agencies also actively analyze data received from major centers all over the country to frame policies and recommendations. National antibiograms are of little use in deciding whether the antimicrobial use in communities is more appropriate.<sup>[1]</sup> These are useful for microbiologists or infectious disease specialists to recognize changing resistance trends and track antibiotic trends to modify their laboratory policies. Moreover, national antibiograms focuses mainly on the hospital-acquired pathogens which are comparatively more resistant, and community-acquired pathogens are often neglected or even if included in common antibiogram, their parameters are diluted due to abundance of hospital-acquired isolates as compared to the community-acquired one. The antibiograms should be prepared for both community and hospital acquired strains separately. This approach is impossible on a national level as compilation of so much data is practically impossible. However, if some state-level agency is involved in compiling antibiograms of a state within a particular radius then at base level, we can have a better segregation of antibiograms. For example, the primary care physicians who cater to community-acquired strains can be of great help to connect with fully equipped microbiology laboratories of their region where the laboratories can generate antibiograms of community-acquired isolates. The higher centers can compile their antibiograms of their hospital. A common agency at state level is required who will compile data from every center at state level. Subsequently, they can generate regional antibiograms which will help every healthcare setup catering to patients of a region.

The need for regional antibiograms serves a lot of purposes. Majority of tertiary care centers have fully equipped microbiology laboratory and hospital information systems which enables them to prepare an antibiogram of their hospital and frame policies. However, many centers within a radius of that hospital may not be equipped with the state of art facility and primary care physicians can also be prescribed

\*Corresponding author: Charu Singh, Assistant Professor, Department of Microbiology, Homi Bhabha Cancer Hospital and Research Centre, New Chandigarh, Punjab, India. [singhcharu98@gmail.com](mailto:singhcharu98@gmail.com)

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antibiotics without considering their pattern. Besides, private facilities may prescribe antibiotics based on the reports generated by pharmaceutical companies whose results may be biased. Studies have already been conducted in some countries comparing antibiograms between different regions of a country which has shown a significant difference. Hostler *et al.* studied that across the pathogen-antibiotic combinations, 69% of hospital-specific susceptibilities fell within 1 standard deviation (SD) of the regional mean susceptibility rate and 97% fell within 2 SD. No individual participating hospital had >1 pathogen-antibiotic combination susceptibility >2 SD from regional mean susceptibility rate.<sup>[2]</sup> They concluded in their study that, small community hospitals cannot develop their antibiogram because of data paucity where regional antibiograms can come to rescue.<sup>[2]</sup> This implies even for unusual pathogens as many unusual pathogens are not isolated in some hospitals due to variation in local antibiograms.<sup>[2]</sup>

Var *et al.* in their study collected antibiograms from 16 microbiology laboratories of hospitals referring their patients to tertiary care centers in SouthEastern Virginia.<sup>[1]</sup> The tertiary care hospital served patients within seventy mile radius. They designated tertiary care centers as central facility and other hospitals were labeled region-wise (northwest, northeast, southwest, and southeast).

Price *et al.* studied that the Delmarva region of the US harbors Gentamicin-resistant *Escherichia coli* due to the poultry industry as compared to the Chesapeake Bay region, hence emphasizing the role of regional antibiograms.<sup>[3]</sup>

Another study was conducted by Link-Gelles *et al.*, who studied geographical and temporal trends in the antimicrobial susceptibility of *Streptococcus pneumoniae* in the United States. They concluded that differential non-susceptibility within serotypes was responsible for geographic variations due to selective antibiotic pressure rather than serotype distribution.<sup>[4]</sup>

### Recommendations

1. Every state should mandate all hospitals to submit their antibiograms so that the same can be compiled at the state antimicrobial resistance laboratory. The same can be achieved by starting a program at the state level

2. In states spread over a very large area, they may be divided zone-wise by locating tertiary care hospitals in every zone
3. The state has to set up microbiology laboratories where samples from those clinics, hospitals, and nursing homes can be tested where microbiology facility is not available
4. These microbiology laboratories will be reporting to a common regional microbiology laboratory/zonal microbiology laboratory
5. The data will be analyzed at the zonal microbiology laboratory and submitted to the state health laboratory. Tertiary care centers can directly submit their antibiograms to state laboratory
6. Submission of antibiograms to state agencies should be mandatory for all microbiology laboratories
7. The regional antibiogram should be freely made available at the site and every physician and consultant should be able to retrieve it and frame the antibiotic policy by reading the report
8. The centers where isolates are not enough to prepare the antibiogram shall also be enrolled in the program and they should submit raw data and proper guidance by the state health authorities should be communicated to them.

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