Chapter V
Methods of surveillance

1 | Methodological recommendations of ONERBA for surveillance of bacterial resistance

To be actively involved in antimicrobial resistance surveillance at the local [1,2], national [3,4] or European level [5,6], microbiologists have to share common definitions and use a widely accepted methodology [1,3]. Therefore, the Scientific Board of ONERBA has issued in 2000 recommendations on methodological issues on surveillance of bacterial resistance to antimicrobials [7] aimed in helping microbiologists working in private practice, in hospitals, or in veterinary settings to participate to surveillance activities. These recommendations have been used for the preparation of the European recommendations for antimicrobial resistance surveillance [8].

ONERBA's recommendations relate especially to non-microbiological aspects of surveillance because precise recommendations on technical aspects of antimicrobial susceptibility testing (susceptibility tests, interpretation criteria…) have been established since many years in France (CA-SFM) [9]. The main topics developed in ONERBA's recommendations are:

- the different types of information, data collection, interpretation criteria, cross-resistance or co-resistance;
- definitions and thesaurus to be adopted in human or veterinary medicine with regards to the population under surveillance (identity and characteristics), dates, types of samples, bacteria, antimicrobials;
- duplicates: definitions and practical use;
- data stratification: indicators of medical activity, definition of hospital- or community-acquired infection in the hospital setting, specific indicators for multidrug-resistant bacteria, indicators for the veterinary medicine;
- external and internal quality controls, controls of likelihood.

The recommendations are available in French on ONERBA's website, http://www.onerba.org. The Scientific Board of ONERBA does not plan to update these recommendations because of the recent publication of European guidelines by the European Society for Chemotherapy, Microbiology and Infectious Diseases (ESCMID) in 2004 [8].

2 | Methodological issues for data analysed in this report

The results of the surveillance of bacterial resistance to antimicrobials are provided as percentages of susceptibility in the species, excepted for some particular cases accepted by convention, such as methicillin-resistant *S. aureus* (MRSA).

Full names of bacterial species are used in the titles of tables and figures, but can be abbreviated in columns of some tables. Common names are used when bacteria have not been characterised to the species level (e.g. coagulase-negative staphylococci…).

Common international denomination of antimicrobials is used throughout the text. In case of use, the abbreviations are listed in the appendix 1.

Data used to draw the figures presented in this report are systematically available in a table given in the report.

The breakpoints of reference used for the different antibiotics are given in the appendix 2.

Finally, the data presented in this report and discussed in this chapter are classified into four major information categories defined in ONERBA's methodological guidelines [7], and briefly reviewed below.

Subpopulations analysis of major bacterial species, according to their susceptibility level (type 1 information)

The objective is to identify and describe subpopulations of isolates according to their susceptibility level. This requires access to quantitative data (inhibition zone diameters or MICs). This type of data is useful for establishing the critical values that delimit clinical categories, and for detecting the emergence of strains with atypical susceptibility level that would remain undetected by qualitative S, I, or R classification; for example, strains with reduced susceptibility remaining within the susceptible category, or highly-resistant strains.

Global statistic of antibiotic resistance for the major bacterial species of medical interest (type 2 information)

The objective is to assess the percentage of strains with acquired resistance, i.e. to identify susceptible, intermediate and resistant strains within a species. Strains that are considered are those isolated from diagnostic samples, without considering the existence of a documented infection.

Global resistance statistics for the major bacterial species are extracted from databases of the laboratories of the networks.

This type of data is useful for defining the spectrum of activity of antimicrobial agents or their clinical indications.

Resistance of bacterial isolates from well-documented infections in specific epidemiological settings (type 3 information)

The objective is to determine, in specific epidemio-clinical settings, the probability of activity for the major antibiotics. This requires clinical data, except for close site samples (for example, cerebrospinal fluid) or blood cultures, whose interpretation is generally unambiguous aside from rare specific cases (for example, coagulase-negative staphylococci blood cultures).

This type of data is essential for defining indications for antibiotics as they appear in the summaries of product characteristics. It is invaluable for clinicians who are prescribers, as well as for Scientific Societies and Health Authorities who establish good practice recommendations for antibiotic use.

Surveillance of multidrug-resistant bacteria: prevalence, incidence, characteristics (type 4 information)

The objective is to assess the magnitude of the problem presented by multidrug-resistant bacteria (MDR): methicillin-resistant *S. aureus* (MRSA), extended-spectrum beta-lactamase producing enterobacteria (ESBL), carbapenem-resistant enterobacteria, glycopeptide-resistant enterococci (GRE), etc.

Because of their frequency or therapeutic consequences, MDR bacteria warrant specific surveillance in individuals, hospitals and the community, and even in animals and the environment.

Several National Reference Centres or veterinarian networks are responsible for the monitoring of some community-acquired species *(Streptococcus pneumoniae, Mycobacterium tuberculosis, salmonella Typhimurium)*. C-CLIN networks are in charge of the surveillance of MRSA and ESBL enterobacteria, and sometimes other MDR bacteria. Some indicators (incidence per 100 admissions and per 1000 patient-days, place of acquisition) have been standardised within the framework of the «Alert, Investigation and Surveillance of Nosocomial Infection Network» (RAISIN). The results generated by RAISIN are presented elsewhere [10]. Other indicators (percentage of MDR bacteria in the species, co-resistance to other antibiotics, etc.) are collected by some networks independently from RAISIN.

Références bibliographiques/References

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