Micronet
an Italian automatized laboratory based surveillance and early warning system for infectious diseases

F. D'Ancona, C. Rizzo^, V. Alfonsi*, M.L. Ciofi degli Atti* on behalf of the Micronet Group°*

* National Centre for Epidemiology, Surveillance and Health Promotion - Istituto Superiore di Sanità, Roma
^ Department of Pharmaco-Biology- Hygiene Unit- University di Bari
° Antonio Goglio (BG), Carlo Di Pietrantonj (AL), Annalisa Pantosti (RM), Isa Moro (BO), Roberto Raso (AL), Roberto Serra (TV), Paolo Spolaore (TV)

17th European Congress
Munich/Germany, 31 March - 3 April 2007

Abstract

In 2004, the Istituto Superiore di Sanità (ISS) the National Public Health Institute, supported by Ministry of Health, started up an automatized surveillance system based on microbiology laboratories. It consists of epidemiological surveillance of infectious diseases based on computerized and early collection and transmission of data on infectious diseases, pathogens and antimicrobial resistance from microbiology LIS (Laboratory Information System). It is the first Italian computerised laboratory based surveillance. Micronet represents an important starting point for regional networks that could be merged into a national one. It aimed to be an important tool for the rapid detection of epidemics and trends of infections, providing complete and up-to-date data more timely.

Micronet's concept and overall architecture

- Micronet database was drawn to be a source of data for epidemiological purposes (Figure 1). However the record contain information for data linkage
- We structured 11 standardized tables in order to manage data exchange, regularly updated and available on line.
- All the efforts are done to make possible describe in each record "what was looked for", starting from an association between the material and all possible pathogens/infections that could be diagnosed using that specific test.
- Personal data as age, gender, date of admission, unique identifier are collected to describe better the results.
- A flexible XML format was also defined as being a format to exchange data from laboratories (all test results, positive and negatives) to the central server.
- All participant laboratories were asked to develop an exporting procedure complying with the provided specifications.
- Data are stored into the Micronet central database, and a web site was set up to provide feedback through the analysis on aggregated data.
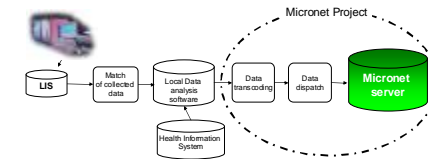

Figure 1 - Process to feed MicroNet

RESULTS

Micronet is operative from January 2007 but it is still a pilot project. The tables and specifications were implemented in 9 laboratories. Data collected during 9 months corresponding to more than 60,000 records (removing duplicates). These data are only a not representative sample for each laboratory as the routinary collection will start in May 2007.

Micronet database could be analysed by web site using query in real time. In the first step, data range, laboratories and materials could be selected with a multiple choice. Then several kind of output are possible (an example in Figure 2): number of positive test, number of tests, frequency of isolated microorganisms, antibiotic resistance profile. Different level of data consultation were taken into account including a special access for epidemiologist in charge of control actions for some diseases (e.g. tuberculosis, meningitis legionellosis): in this case it is possible the identification of the patient that normally is not accessible neither at the central level.

For specific requirements, data could be exported on statistical packages. The web site of the project (http://www.micronet.iss.it) is available in Italian only.

Figure 2: Example of output from Micronet web site.
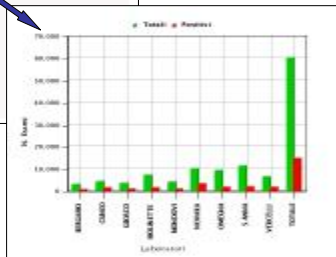
Laboratory	Number of records	%
Lab1	3160	5.2
Lab 2	4340	7.2
Lab 3	3733	6.2
Lab 4	7167	11.9
Lab 5	4211	7.0
Lab 6	10239	16.9
Lab 7	9452	15.6
Lab 8	11530	19.1
Lab 9	6580	10.9
Total	**60412**	**100.0**

Table 1: Distribution of records for each laboratory after removing the duplicates.

Test type	Number of records	%
Culture	48346	80.0
Antimicrobial resistance	7276	12.0
Microscopy test	1840	3.0
Antigen test	1821	3.0
Nucleic acid test	989	1.6
Antibody test	134	0.2
Metabolic activity/cellular components test	5	0.0
Typing	1	0.0
Total	**60412**	**100.0**

Table 2: Distribution of records by test type.

Conclusion

Micronet represents an important a national network providing instruments for rapid detection of outbreaks and assessment of microbiological trends. It is planned to recruit other 10 laboratories during 2007 in order to improve the representativeness of the system.

The potential users of this unique Italian data source are regional authorities (integrating existing clinical and laboratories surveillance system), national authorities (trend analysis, alert and support of the infectious diseases notification system) and participant laboratories (comparing local data with regional/national average).

The project is now facing some problematic such as the representativeness, comparability of data, methods for duplicates clearing, management of the standardised tables at local level, but the results obtained in the pilot phase show its potentialities.

If you want more information you could write to the authors: dancona@iss.it

Micronet is supported by Italian Ministry of Health/CCM (capitolo 4393/2904-CCM)