



# **Surveillance of the antimicrobial resistance for emerging problem: experiences from Italy**

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# Surveillance of antimicrobial resistance

- Tracks changes in microbial populations
- Permits the early detection of resistant strains of public health importance
- supports the prompt notification and investigation of outbreaks
- Decision No 2119/98/EC of the European Parliament and of the Council of 24 September 1998 and European Commission.
- Directorate-General for Health & Consumers. Communication from the Commission to the European Parliament and the Council. Action plan against the rising threats from Antimicrobial Resistance. Brussels, 2011.

## Types of surveillance

- Appropriate strategies for surveillance of antimicrobial resistance should reflect identified scientific or public health objectives, resources and sustainability
- Three types of surveillance for AMR
  - Routine surveillance (selected pathogen, selected materials)
  - Alert surveillance tracking
  - Targeted surveys

## **Level of implementation of the surveillance in Italy**

- At local level (e.g. hospital) there is a micro-universe where surveillance and implementation of control actions are possible and easier.
- At national level it is more difficult due to the data collection from different systems, different kind of hospitals and situations, limited possibility of direct actions

# Italian surveillance systems for antimicrobial resistance

- National: ARISS
- Regional:
  - Lombardia
  - Emilia Romagna
  - Campania

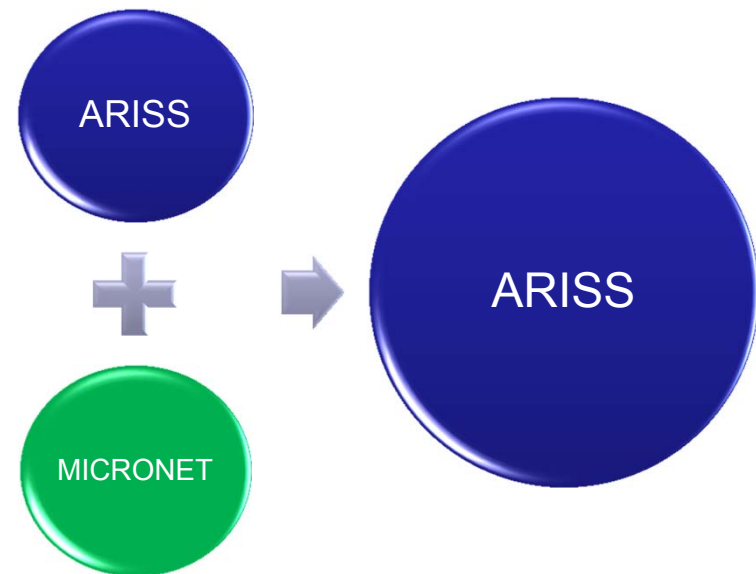


These systems have different characteristics, different potentialities, different objectives. This documents are supported by regional action plans. In Italy at national level the vision “integrated” of actions against AMR is still weak. In some regions is more concrete.

# Italian experience at national level

- Two surveillance systems
  - ARISS: data extracted by the antimicrobial test systems, sent every 3-6 months. Data regarding isolates of selected pathogens and materials.
  - Micronet : data extracted by 20 LIS every night regarding all materials and pathogens.

Since 2010 Micronet contributes together ARISS to send data to EARS-NET



## The advantage of a mixed system

- The basic surveillance is simple and cheap but “slow”.
- A subsample of data fully compatible with the protocol ARISS/EARS-Net is extracted by MICRONET.
- From 2010 15 laboratories are sending data to ARISS/EARS-Net through MICRONET.
- These data represent more stable, exhaustive and better quality data .
- The automatic system needs less human resources.

## **Some disadvantages/ challenges to have an enhanced surveillance system**

- The trend could be affected from this change (a block of new laboratories in 2010 and another in 2012) but the advantages are more than disadvantages.
- The automatic systems needs resources for maintenance at central level.
- There is not still a link with detailed clinical information.
- There are not results of enhanced microbiological characterizations



**Table 2: Annual percentage (%) of antimicrobial non-susceptible and resistant isolates, 2003–2013**

Microorganism by antimicrobial classes	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<i>Streptococcus pneumoniae</i>											
Penicillin R	5	5	5	<1	4	3	3	5	6	6	9
Penicillin RI	13	14	9	7	15	10	6	9	7	12	15
Macrolides RI	37	29	31	33	31	26	21	29	27	34	25
<i>Staphylococcus aureus</i>											
Oxacillin/meticillin R	39	40	37	38	34	34	37	37	38	35	36
<i>Escherichia coli</i>											
Aminopenicilins R	52	53	55	56	58	62	63	64	67	68	66
Aminoglycosides R	10	9	11	8	14	14	13	15	18	21	18
Fluoroquinolones R	25	28	28	27	32	38	36	39	41	42	42
Third-generation cephalosporins R	6	5	8	7	11	16	17	21	20	26	26
Carbapenems R	–	–	–	–	<1	<1	<1	<1	<1	<1	<1
<i>Enterococcus faecalis</i>											
Aminopenicilins RI	4	4	4	4	4	13	20	13	11	4	4
HL gentamicin R	39	36	38	38	39	47	49	50	50	51	46
Vancomycin R	2	2	3	3	2	2	3	2	3	1	1
<i>Enterococcus faecium</i>											
Aminopenicilins RI	80	78	77	86	73	64	60	70	83	87	82
HL gentamicin R	44	39	36	48	53	49	52	59	54	62	59
Vancomycin R	24	21	19	18	11	6	4	4	4	6	4
<i>Klebsiella pneumoniae</i>											
Aminoglycosides R	–	–	8	26	25	28	19	29	35	42	45
Fluoroquinolones R	–	–	11	23	27	28	20	39	46	50	54
Third-generation cephalosporins R	–	–	20	33	35	39	37	47	46	48	55
Carbapenems R	–	–	–	1	1	2	1	15	27	29	34
<i>Pseudomonas aeruginosa</i>											
Piperacillin R	–	–	–	23	20	20	24	21	22	30	31
Ceftazidime R	–	–	–	20	25	24	16	18	16	26	24
Carbapenems R	–	–	–	21	27	33	31	22	21	25	26
Aminoglycosides R	–	–	–	32	29	30	29	23	18	30	27
Fluoroquinolones R	–	–	–	36	35	36	42	31	26	31	29

## AR-ISS -> EARS-net : limits

- Participating laboratories vary across the time.
- Not always quantitative results (i.e. no MIC values)
- Few information on the clinical activities of the hospitals
- Difficult to investigate the large differences among hospitals.
- Isolation collection for a better characterization is limited
- The results is an average that is not fully representative
- Limited number of pathogens and material
- No direct link with activities different from surveillance

# What we need to be able to contrast better the emerging problems about AMR

- Surveillance systems able to catch differences among hospitals, settings, patients. (e.g. better understanding of the origin of the isolates) - > Regional systems (or collaboration with regional authorities) for a better knowledge of the territory
- Links with possible control actions
- Surveillance including more materials, more pathogens or availability of data when we need-> more flexible systems.
- **Capacity to monitor new “alert” situations**
- **A network able to amplify local alerts and to launch quickly investigations at national level**

# An example of use of surveillance beyond basic surveillance

Eurosurveillance, Volume 17, Issue 33, 16 August 2012

SURVEILLANCE AND OUTBREAK REPORTS

## Carbapenem non-susceptible *Klebsiella pneumoniae* from Micronet network hospitals, Italy, 2009 to 2012

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**TABLE 1**

*Klebsiella pneumoniae* isolates tested for susceptibility to imipenem and/or meropenem, by type of clinical specimen, 14 Micronet hospitals, Italy, 1 January 2009–30 April 2012 (n=11,353)

Clinical specimen	2009			2010			2011			2012 <sup>a</sup>		
	Total number of isolates	Number NS	% NS (95% CI)	Total number of isolates	Number NS	% NS (95% CI)	Total number of isolates	Number NS	% NS (95% CI)	Total number of isolates	Number NS	% NS (95% CI)
Respiratory sample <sup>b</sup>	226	12	5.3 (2.8–9.1)	331	89	26.9 (22.3–32.1)	396	159	40.2 (35.3–45.2)	91	35	38.5 (28.4–49.2)
Blood	166	9	5.4 (2.5–10.0)	283	64	22.6 (17.9–27.9)	344	112	32.6 (27.7–37.8)	89	26	29.2 (20.1–39.8)
Pus	164	5	3.0 (1.0–7.0)	253	33	13.0 (9.2–17.8)	307	90	29.3 (24.4–34.8)	75	27	36.0 (25.2–47.9)
Urine	2,282	37	1.6 (1.2–2.3)	2,774	153	5.5 (4.7–6.4)	2,794	279	10.0 (8.9–11.2)	766	110	14.4 (12.0–17.1)
Total <sup>c</sup>	2,840	63	2.2 (1.7–2.8)	3,646	341	9.4 (8.4–10.4)	3,846	642	16.7 (15.5–17.9)	1,021	198	19.4 (17.0–22.0)

NS: non-susceptible.

<sup>a</sup> 1 January–30 April.

<sup>b</sup> Bronchoalveolar lavages and tracheal aspirates.

<sup>c</sup> Includes 12 isolates from cerebrospinal fluid (2 in 2009, 5 in 2010, 5 in 2011, 0 in 2012).

# Advantages and disadvantages of an enhanced surveillance systems like Micronet

- Advantages

- Timeliness
- Flexibility
- Less human resources consuming at local level
- Higher comparability of the data

- Disadvantages

- Economical and human resources consuming at central level
- It needs to be used a lot in order to be sustainable
- Needs to be adapted to different settings

# When we cannot implement a surveillance... point prevalence surveys

Eurosurveillance, Volume 19, Issue 42, 23 October 2014

Rapid communications

## COLISTIN RESISTANCE SUPERIMPOSED TO ENDEMIC CARBAPENEM-RESISTANT KLEBSIELLA PNEUMONIAE: A RAPIDLY EVOLVING PROBLEM IN ITALY, NOVEMBER 2013 TO APRIL 2014

M. Monaco<sup>1,2</sup>, T Giani<sup>2,3</sup>, M Raffone<sup>1,4</sup>, F Arena<sup>3</sup>, A Garcia-Fernandez<sup>1</sup>, S Pollini<sup>3</sup>, Network EuSCAPE-Italy<sup>5</sup>, H Grundmann<sup>6</sup>, A Pantosti ([annalisa.pantosti@iss.it](mailto:annalisa.pantosti@iss.it))<sup>1</sup>, G M Rossolini<sup>3,7,8</sup>

ECDC SURVEILLANCE REPORT

## Point prevalence survey of healthcare-associated infections and antimicrobial use in European long-term care facilities

April–May 2013

## ANNALI DI IGIENE Medicina Preventiva

Volume 25 - Anno 2013 - Numero 2

### Infections and antimicrobial resistance in Long Term Care Facilities: a national prevalence study

doi:10.7416/ai.2013.1912

di M.L. Moro, E. Ricchizzi, F. Morsillo, M. Marchi, V. Puro, C.M. Zotti, R. Prato, G. Privitera, A. Poli, I. Mura, U. Fedeli

olisher

# or dedicated surveillance



*Ministero della Salute*

DIPARTIMENTO DELLA SANITÀ PUBBLICA E DELL'INNOVAZIONE

DIREZIONE GENERALE DELLA PREVENZIONE

Ufficio 05 Ex DGPREV

Viale Giorgio Ribotta, 5 - 00144 Roma

**Oggetto:** Circolare “Sorveglianza, e controllo delle infezioni da batteri produttori di carbapenemasi (CPE)”

- Involving other actors (e.g. public health authorities)
- Different flow of notification
- Attempt to increase the awareness of the same people that are in charge of other communicable diseases

# Conclusions

- Surveillance is only one of the components for contrasting AMR.
- In Italy works well at national level for routinary surveillance but it is not optimised for emerging problems. Some regions are better organised with integrated system and more tuned surveillance systems .
- Resources for enhanced surveillance system and a network of microbiological laboratories to investigate about the alerts and new need of information are needed.
- In Italy a stronger “integrated approach” at national level should be implemented.