

Evaluation of regional and local laboratories capacities for detection and characterisation of *Salmonella* and *Campylobacter*

1. Background

EU-survey



The survey was delivered to the 24 regional reference laboratories (RRL) participating to the Enter-Net Italia surveillance network:

20 laboratories replied.

We analysed the results automatically and with EXCEL program.

Enter-Net Italia, is a voluntary surveillance, made by 24 RRLs that collect isolates and epidemiological information for *Salmonella*, *Campylobacter*, *Yersinia* and *Shigella* from local laboratories distributed in the national territory, which generally identifies the isolates from biological sample.

Usually, one RRL covers one or two regions but for a large region (Lombardy) there are till 7 centers.

The national coverage of the Enter-Net Italia surveillance system is of 75,9 %.



- Regions where *Campylobacter* RRL is absent
- Regions where *Salmonella* RRL is absent



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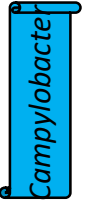
2. Diagnostics of *Salmonella* and *Campylobacter*

Only 20 RRLs replied to this survey

- ❖ Only 50% perform diagnostic test both for *Salmonella* and for *Campylobacter*.
- ❖ Globally while all the laboratories (20 RRLs) work on *Salmonella* only 15 out of 20, work on *Campylobacter* (65%) and this confirms that some regional centers are not diagnostic laboratories.



- 90% RRLs perform serotyping
- 45% RRLs perform susceptibility test



- 65% (15/20) of RRLs works on *Campylobacter*
- of these 86,6% *C. jejuni* and *C. coli* identification; 66-73% other species
- of these, 60% receive *Campylobacter* strains from other laboratories.
- 53,3% of the RRLs perform susceptibility test.



STRENGTHS



WEAKNESSES

- ➔ Lacking specific mandate to receive notification and *Campylobacter* strains
- ➔ Lacking personnel and funds to perform susceptibility test

3. Quality assurance and control

Salmonella

- Control materials (N respondent=18) 44% of RRLs for diagnosis; 38,9% for antibiotic susceptibility test
- 70% Salmonella serotyping EQAs
- 80% hold accreditation for some of the services provided

Campylobacter

- Control materials (N respondent=12) 60% of RRLs for diagnosis; 58% for species identification; 47% for antibiotic susceptibility test
- 40% diagnosis and species identification for *Campylobacter* EQAs
- 80% hold accreditation for some of the services provided

➔ EQAs are not performed at all by 15% and 33% (*Salmonella* and *Campylobacter*, respectively).

➔ This may impact diagnosis, testing results for human treatment and/or surveillance of AMR. Negative effect in referring isolates to NRL/AMR testing for national surveillance of AMR

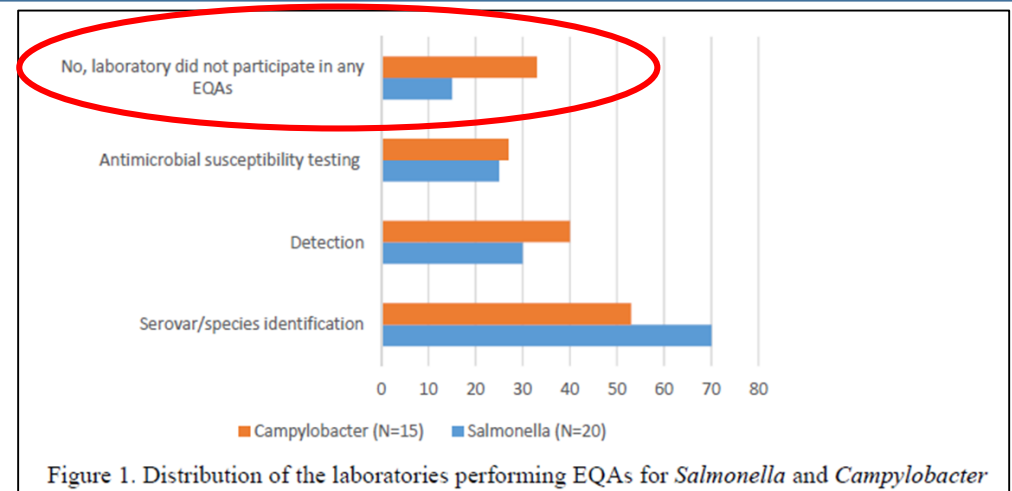


Figure 1. Distribution of the laboratories performing EQAs for *Salmonella* and *Campylobacter*

4. *Salmonella* and *Campylobacter* detection methods used in diagnostic laboratories

Salmonella
All (10) the RRLs perform culture based detection of *Salmonella* using selective enrichment and selective plating from clinical samples; half of the laboratories makes also direct plating.

Campylobacter
For *Campylobacter* N respondent=10 RRLs isolate from clinical samples, 20% of RRLs perform selective enrichment and selective plating, 50% only direct plating and 30% perform both.



→ Detection of *Campylobacter*, from clinical samples, could be improved using more frequently selective enrichment and selective plating. NRL will organize training to clinical laboratories on *Campylobacter* isolation.

5. *Salmonella* and *Campylobacter* characterisation methods used in local/regional laboratories

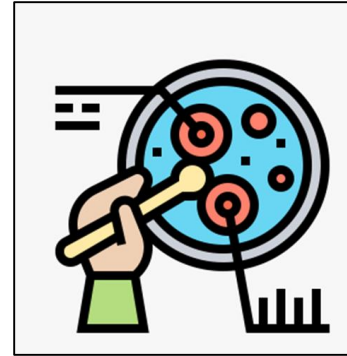
About 50% of the RRLs use MALDI-TOF for *Salmonella* and *Campylobacter* identification.

For *Salmonella* (N respondent=20)

- 85% of the RRLs use antisera
- 70% biochemical test
- 65% molecular methods
- 80% more than one method in place.

For *Campylobacter* (N respondent=15)

- 45% of the RRLs molecular methods
- 40% biochemical test
- 53,3% more than one method in place



In general, 75% of the RRLs perform susceptibility test following the ECDC protocol and 91,7% use EUCAST guidelines.

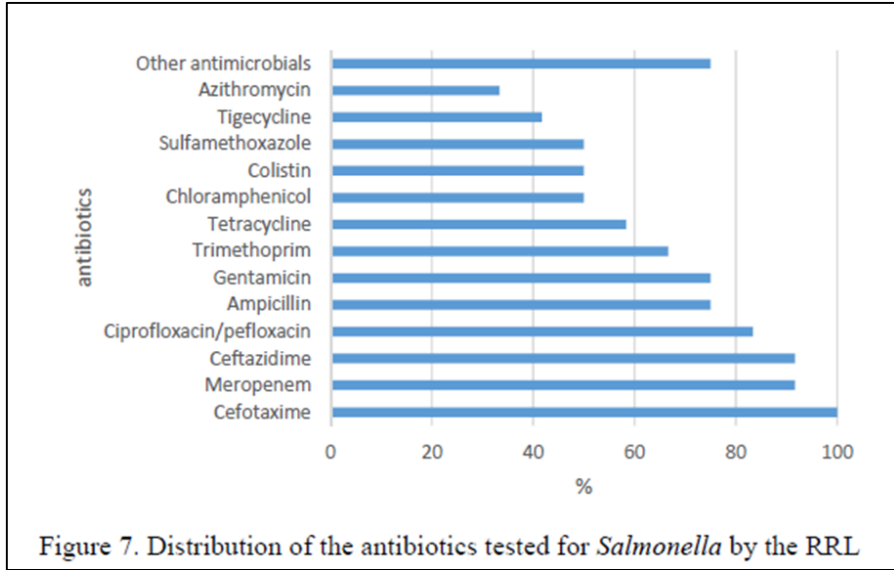


Figure 7. Distribution of the antibiotics tested for *Salmonella* by the RRL

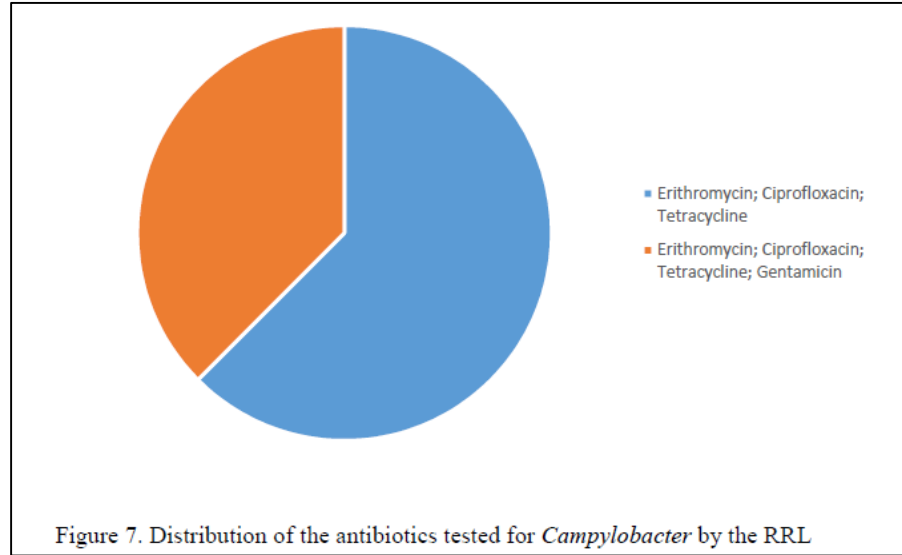


Figure 7. Distribution of the antibiotics tested for *Campylobacter* by the RRL

58,3% of RRLs tested at least 9 antibiotics of the priority list of the ECDC protocol.

Only 3 RRLs (37,5%) test the antibiotics of the priority list of ECDC protocol

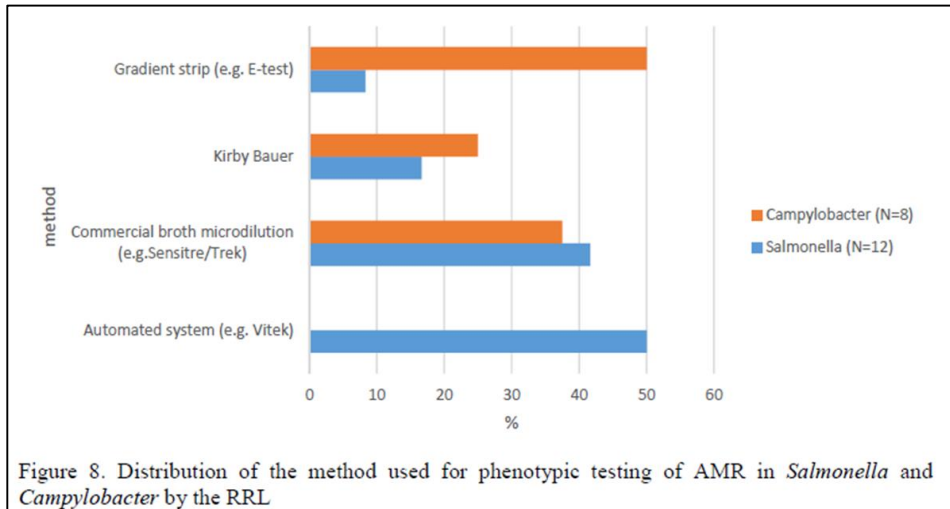
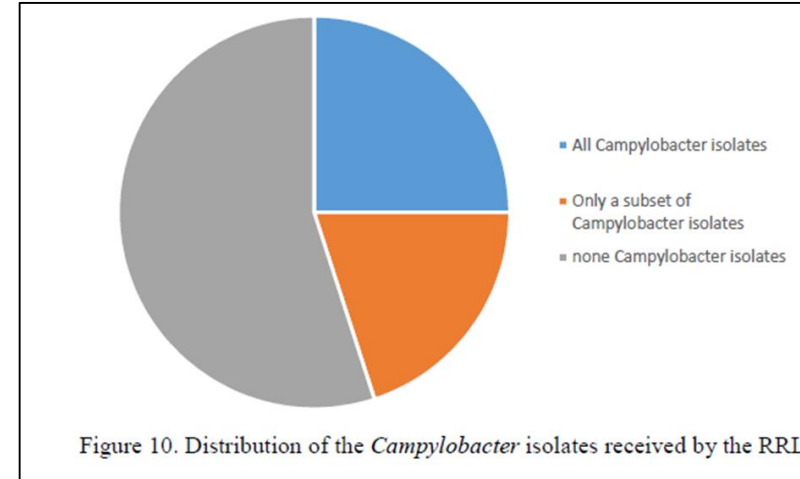
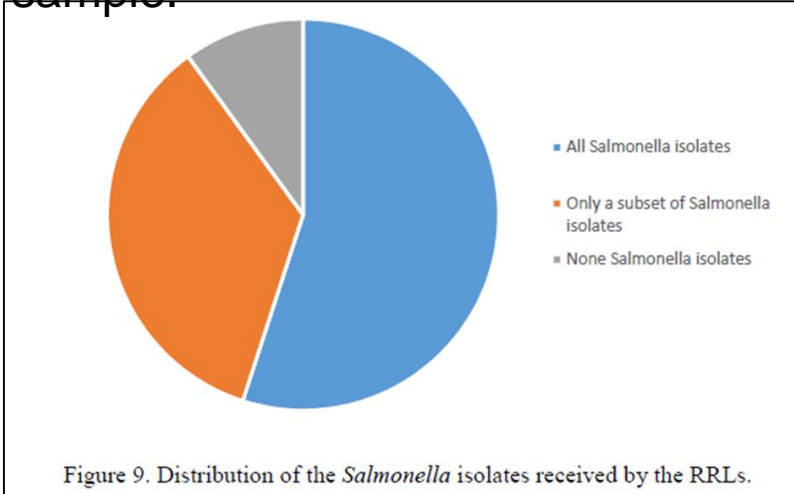


Figure 8. Distribution of the method used for phenotypic testing of AMR in *Salmonella* and *Campylobacter* by the RRL

- ➔ More than 40% and 60% of RRLs don't test the antibiotics of the priority list of the ECDC protocol, respectively for *Salmonella* and *Campylobacter*.
- ➔ More than 60% of the laboratories don't identify the molecular basis of the antibiotic resistance, either in *Salmonella* either in *Campylobacter*. Negative effect in monitoring of AMR referring isolates to NRL/AMR testing for national surveillance of AMR

6. *Salmonella* and *Campylobacter* isolate referral and linking to cases

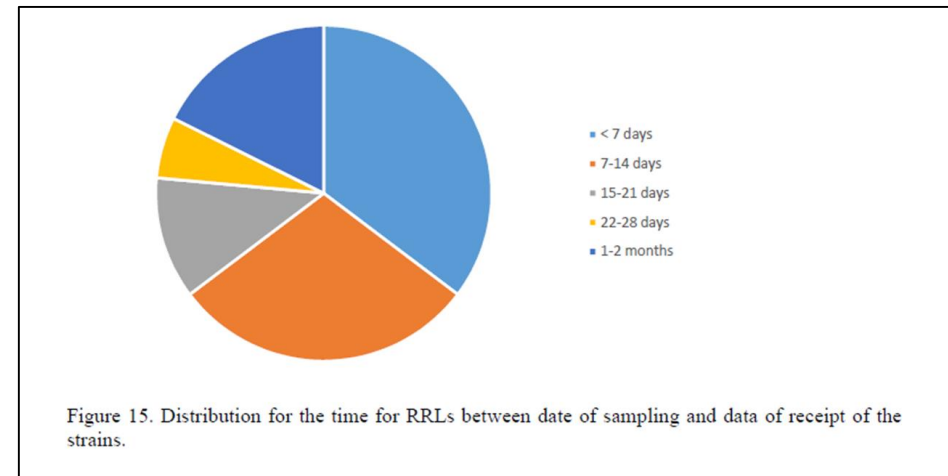
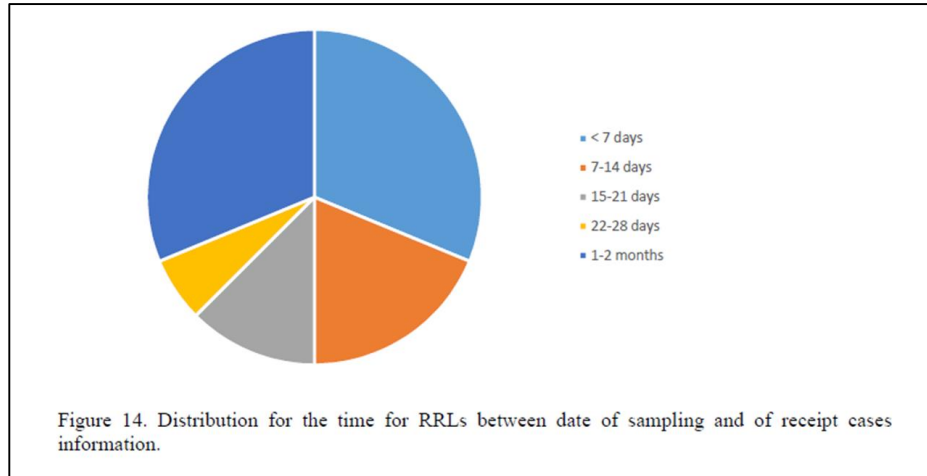
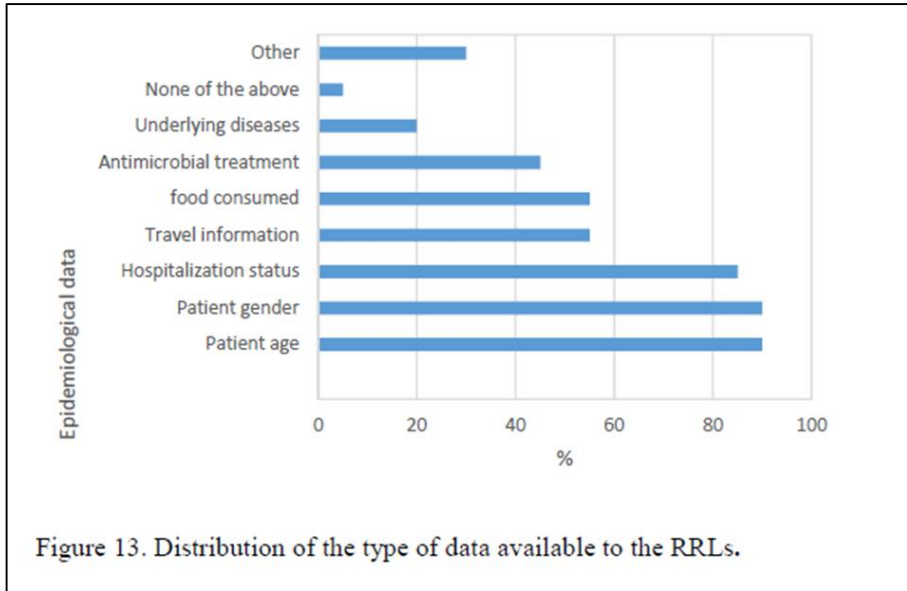
70% of the RRLs don't issue guidance on sampling practices in patients suspected to be infected with *Salmonella* and/or *Campylobacter* and 55% of the RRLs don't issue guidance on submission of clinical sample.



In 2022 the RRLs refer to NRL 4164 *Salmonella* and 1560 *Campylobacter* notifications: they send to NRL 959 *Salmonella* isolates and 150 *Campylobacter* isolates



- ➔ Lacking guidance for sampling practices in patients suspected to be infected with *Salmonella* and/or *Campylobacter* and on submission of clinical sample
- ➔ Only 45% of *Campylobacter* isolates are received by the RRL
- ➔ 20% of the RRL records information on paper



Availability of the epidemiological information of cases, 90% of the laboratories have access to patient age and gender, 85% hospitalization status, 55% travel information and food consumption



- ➔ Some important data are present in a low percentage (travel information and food consumption 55%)
- ➔ Timeliness of RRLs to receipt information and strains is by 14 days for 50% and 64,7%, respectively

WRAP-UP

- ❖ Globally our surveillance system is organized better for *Salmonella* than for *Campylobacter*: this is probably due by the fact that most of the RRLs have an official endorsement only for *Salmonella* since a long time. However, the national coverage is good (75,9 %).
- ❖ NRL should plan to organize EQAs and make a list of quality material.
- ❖ Results of the survey will be disseminated to national PH authorities to demonstrate the need of additional resources to RRL/local labs.
- ❖ Regarding susceptibility test more than 40% and 60% of RRLs for *Salmonella* and *Campylobacter* respectively don't test the antibiotics of the priority list of the ECDC protocol. More than 60% of the laboratories don't identify the molecular basis of the antibiotic resistance, either in *Salmonella* either in *Campylobacter*.
- ❖ Organize meetings with the RRLs and regions (?) to understand the difficulties encountered and how to solve them.

