

IMPACT OF CULTURE-INDEPENDENT DIAGNOSTIC TESTS ON THE SURVEILLANCE OF GASTROINTESTINAL BACTERIA IN BELGIUM

Results of a survey carried out among Belgian laboratories in April 2024

1. Context

The National Institute of Insurance for Disease and Disability (RIZIV/INAMI) is planning a change in the reimbursement of diagnostic tests for gastrointestinal bacteria, the specific reference to “culture” will be removed and replaced with “detection”. This change is driven by the development of culture-independent diagnostic techniques (CIDT), mainly molecular techniques. Although the added value of molecular techniques is not debated, the absence of culture, could affect data availability for patient management, public health and surveillance.

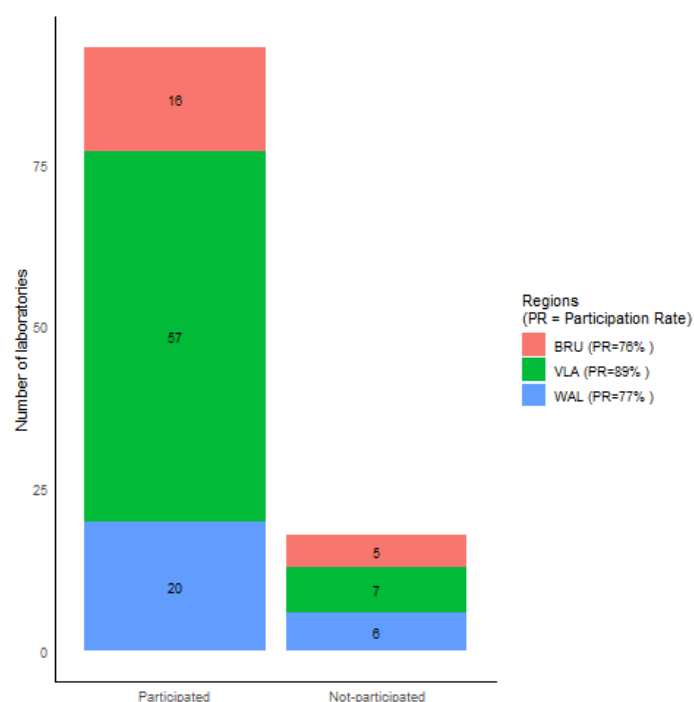
A survey among Belgian laboratories was therefore carried out in April 2024. The aim of the survey was to (i) identify current diagnostic practices, (ii) assess future diagnostic practices in light of the upcoming reimbursement change, and (iii) identify how the laboratories estimate the importance of certain public health questions for *Campylobacter*, *Salmonella*, *Shigella*, *Yersinia* and *STEC*.

2. Results

2.1. PARTICIPATION

All 111 Belgian recognized bacteriological laboratories were contacted, 93 (84%) participated to the survey. The participation rate was 76% in Brussels, 89% in Flanders and 77% in Wallonia (Figure 1).

Figure 1 Participation of the laboratories to the survey by region

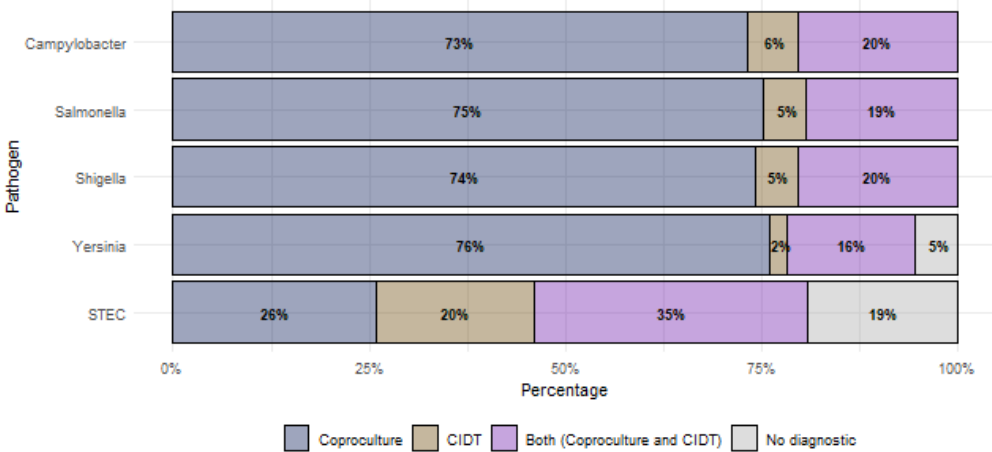


2.2. DIAGNOSTIC OF CAMPYLOBACTER, SALMONELLA, SHIGELLA AND YERSINIA

2.2.1. Current practice

For the diagnosis of *Campylobacter*, *Salmonella*, *Shigella* and *Yersinia*, 73-76% of laboratories responding to the survey currently perform coproculture; 2-6% use CIDT, and 16-20% use both types of method (Figure 2).

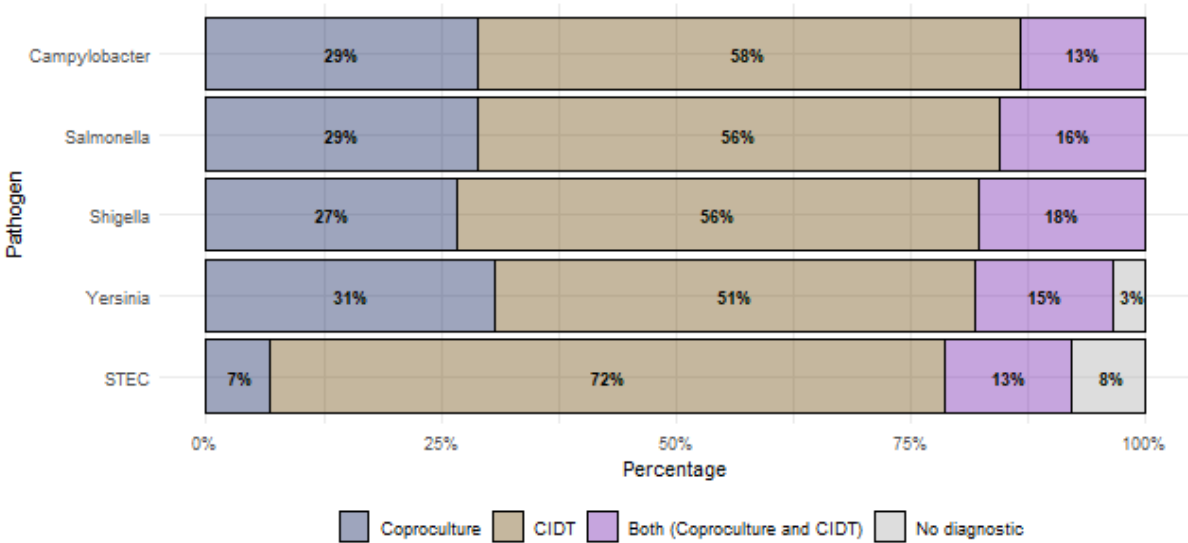
Figure 2 Current diagnostic practices by pathogen



2.2.2. Future practice linked to test reimbursement change

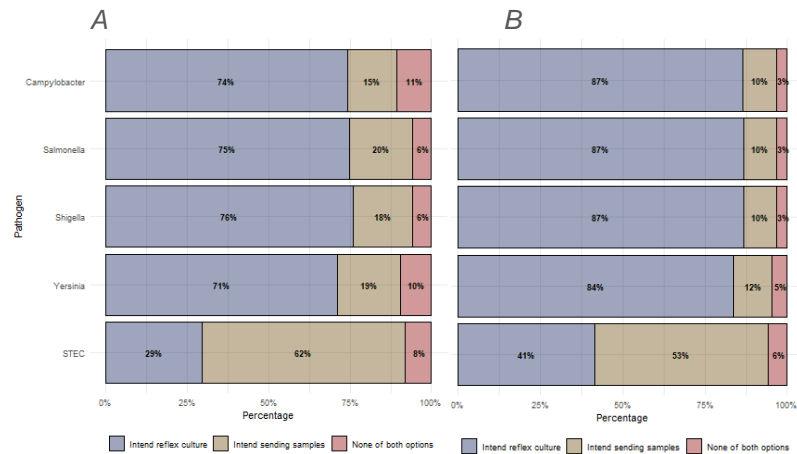
A change in test reimbursement will lead to a change in laboratory diagnostic practices for *Campylobacter*, *Salmonella*, *Shigella* and *Yersinia*, since 51-58% of laboratories estimate that they will perform CIDT for these pathogens when these tests will be reimbursed (Figure 3), 27-31% will perform coproculture and 13-18% both.

Figure 3 Estimated diagnostic practices by pathogen following the reimbursement change



The majority of laboratories nevertheless intend to perform a reflex culture on positive samples (71-76%), or to send samples to the NRC (15-20%). The small share of laboratories that did not intend to do so, decreased considerably if financial compensation is provided (Figure 4).

Figure 4 Intention of laboratories to perform reflex culture or send samples to the NRC, without financial compensation (A) or with financial compensation (B)



Note:

For *Campylobacter* it is worth mentioning that CIDT could detect species that are not easily cultivated (other than *jejuni-coli*).

2.3. DIAGNOSTIC OF SHIGA-TOXIN PRODUCING *E. COLI* (STEC)

The situation is different for STEC, given the complexity of culture for these bacteria. Currently, only 26% of the laboratories responding to the survey perform coproculture for STEC diagnosis; 20% use CIDT and 35% use both methods (Figure 2). The proportion of laboratories using CIDT for STEC diagnosis will increase to 72% when the reimbursement conditions change (Figure 3). For STEC, laboratories also intend to send positive samples to the NRC (62%) and, to a lesser extent, to perform a reflex cultures (29%) (Figure 4).

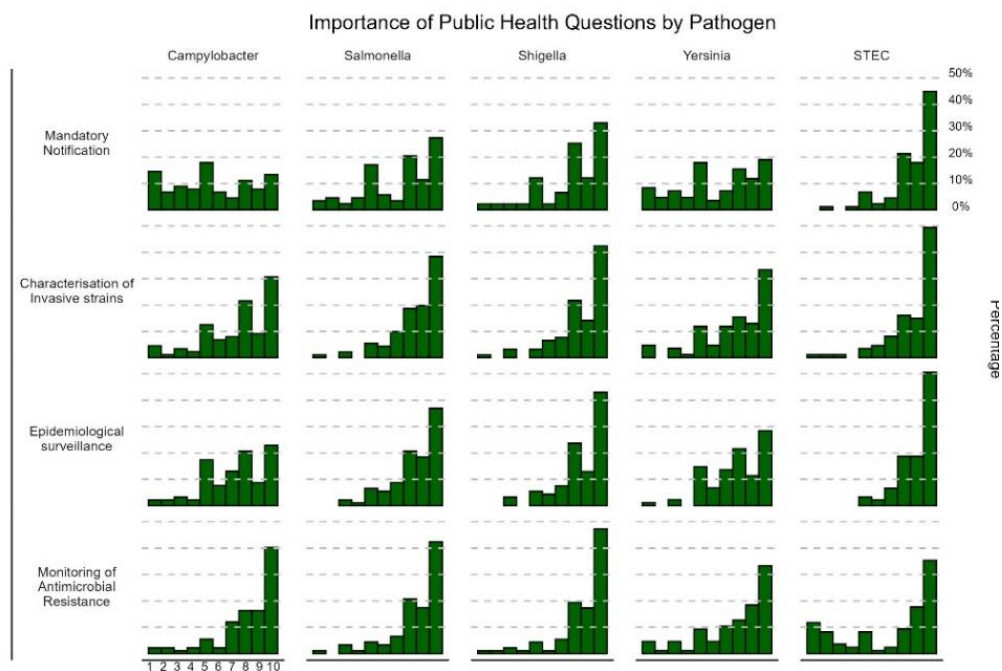
Note:

As it was beyond the scope of this study, no details were asked about STEC culture technique. However, it should be underlined that only individual colonies of O157 STEC are easily detected on specific sorbitol-containing media. For other serotypes, straightforward and expensive antigenic or molecular detection of Stx-toxins has to be applied on individual colonies. It should be advisable to ask laboratories to send all CIDT positive samples with negative reflex culture to the NRC.

2.4. IMPORTANCE OF PATHOGEN CHARACTERISATION FOR PUBLIC HEALTH

Lastly, the importance (on a scale of 1 to 10) laboratories assigned to (i) mandatory notification, (ii) characterisation of invasive strains, (iii) epidemiological surveillance, (iv) monitoring of antimicrobial resistance of *Campylobacter*, *Salmonella*, *Shigella*, *Yersinia* and STEC is illustrated in Figure 5. These results are in line with the expected, e.g. a higher score for mandatory notification for *Shigella* (notifiable in Flanders) and STEC (notifiable in Belgium), the importance of invasive strains for STEC (hemolytic uremic syndrome) or the higher scores regarding antimicrobial resistance for *Shigella* and *Salmonella*.

Figure 5 Estimation of the importance of mandatory notification, characterisation of invasive strains, epidemiological surveillance and monitoring of antimicrobial resistance for *Campylobacter*, *Salmonella*, *Shigella*, *Yersinia* and STEC (1 = not important, 10 = very important)



3. Discussion

- For *Campylobacter*, *Salmonella*, *Shigella* and *Yersinia*, culture-independent diagnostic techniques are not widely used yet in Belgium. The numbers observed in the present survey are in line with previously published results for *Salmonella*¹ and *Campylobacter*².
- For STEC, the use of CIDT is more widespread, given the fact that culture of this bacterium is less straightforward.
- The results of the survey indicate that the planned reimbursement change is expected to lead to an important change in diagnostic practices and a broader use of CIDT for gastrointestinal bacteria.
- The importance of bacterial isolation and characterisation for public health purposes is well perceived by laboratories.
- The majority of laboratories intend to perform reflex cultures on positive samples, or to send positive samples to the NRC, especially if financial support is foreseen.
- In general, the NRC advises to perform reflex culture rather than send stool samples, except for STEC for which sending clinical samples is preferred.
- The impact of the change in reimbursement conditions on surveillance of gastrointestinal bacteria will nevertheless need to be closely monitored. A follow-up questionnaire will be developed in the coming years, to assess the diagnostic practices once the change in nomenclature is in place.

¹ Van Goethem et al, PLoS One 2021

² Survey carried out among laboratories in 2022 (Sciensano)

- The change from “culture” to “detection” for the current reimbursement condition of diagnostic tests for gastrointestinal bacteria was presented to the Commissie voor Klinische Biologie/Commission de Biologie Clinique in June 2024.

4. Acknowledgements

We thank all Belgian laboratories for their participation to this survey.

The following persons wrote this report:

Pieter-Jan Ceysens, Wesley Mattheus (NRC Salmonella-Shigella, Sciensano)

Florence Crombé, Denis Pierard (NRC STEC, UZ Brussel)

Delphine Martiny, Olivier Vandenberg (NRC Campylobacter, LHUB-ULB)

Anne-Marie Van Den Abeele (AZ Sint Lucas, Microbiology Working Group)

Kris Vernelen, Bernard China (Quality of Laboratories, Sciensano)

Géraldine De Muylder, Wouter Van Dyck, Dieter Van Cauteren (Epidemiology of Infectious Diseases, Sciensano)

Contact: fwd@sciensano.be