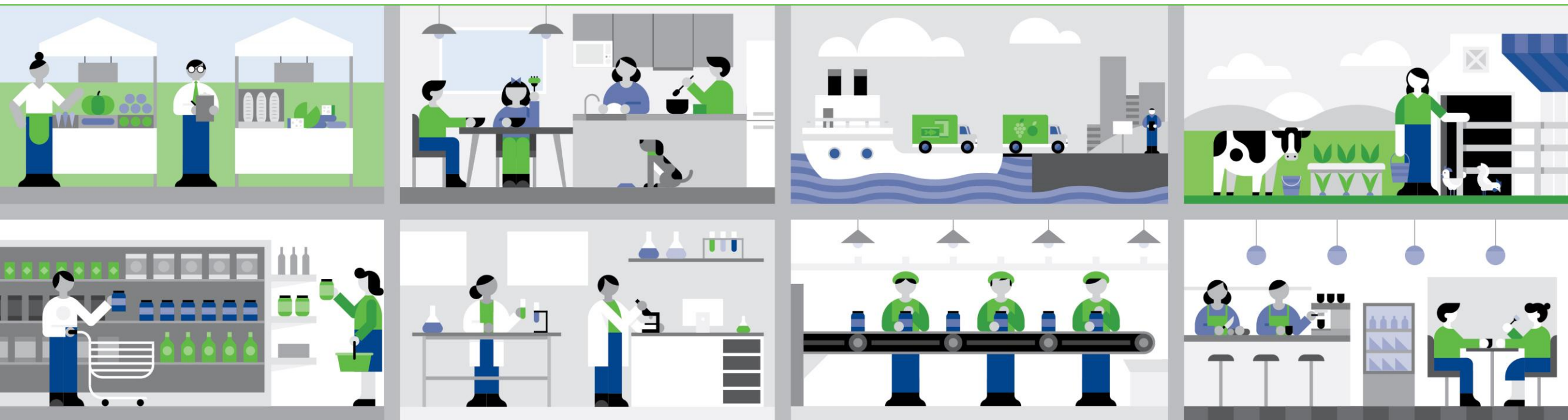


WGS – The Irish Experience

Presented by Lisa O'Connor **based on input from colleagues in the NRLs,** Brian Byrne, William Byrne and Montserrat Gutierrez, **and FSAI,** Shaun Smith and Michelle Minihan

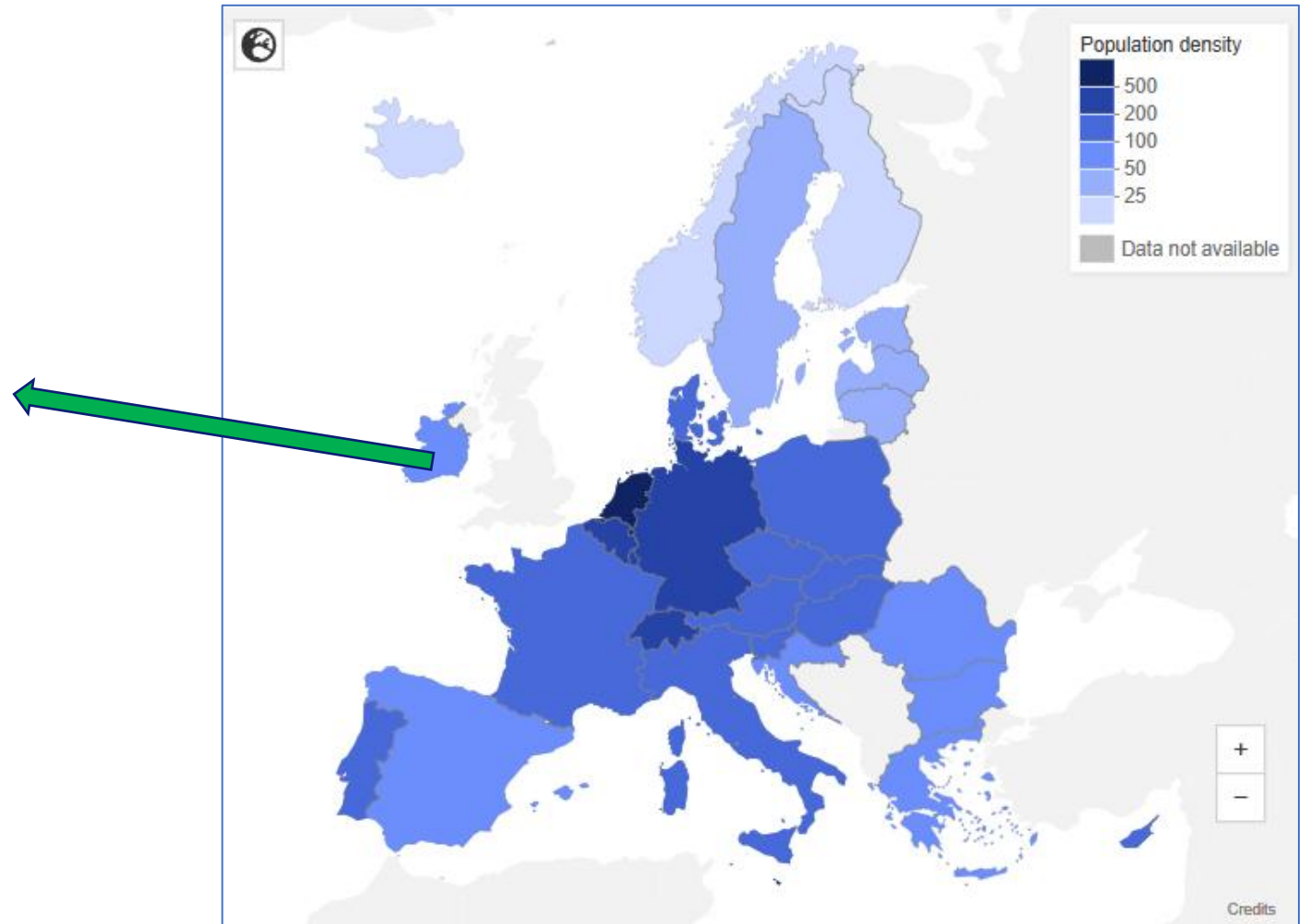
2nd September 2026



EU Population Density 2024

(persons per km²)

Ireland
5.15 million people



Source: Eurostat - [access to dataset](#)

Food Safety & Public Health in Ireland

- **Food Safety**

- **Food Safety Authority of Ireland (FSAI)**
- 3 main Official Agencies working under Service Contracts to FSAI, to enforce food law
 - **Department of Agriculture, Food and the Marine (DAFM)**
 - Inspectors - meat, dairy, horticulture
 - Laboratories, including National Reference Laboratories (Food chain)
 - **Health Service Executive (HSE)**
 - Inspectors - Environmental Health Officers
 - Laboratories
 - **Sea Fisheries Protection Authority (SFPA)**
 - Inspectors

- **Public Health**

- **Health Service Executive (HSE)**

- National**

- Health Protection Surveillance Centre (HPSC)
 - National Health Protection Office
 - National Reference Laboratories

- Regional**

- Regional Public Health departments
 - Clinical laboratories

National Reference Laboratories (NRLs) for Food Chain isolates

- Based in one location - DAFM's Laboratory Campus
- The National Reference Laboratories for:
 - *Listeria monocytogenes*
 - *Salmonella*
 - *Shiga toxin-producing Escherichia coli (STEC)*
 - *Campylobacter*
 - Coagulase positive *Staphylococcus*
 - Foodborne viruses
- Whole genome sequencing (WGS) is conducted by a core sequencing unit
- WGS method is accredited to ISO 17025 standard
- Data Providers for the EFSA One Health WGS system



Source of Food Chain isolates sequenced by the NRL

**Official Control sampling
&
Food Business Operator (FBO) ‘own check’ sampling**

Legal Basis

Zoonoses Directive 2003/99 which is transposed by Irish Statutory Instrument No 154 of 2004

Official Controls Regulation (EU) 2017/625

Ministerial conditions of approval of DAFM supervised plants (meat and dairy only)

New Commission Implementing Regulation 2025/179

Food chain isolates sequenced by NRL, of the pathogens covered by Regulation 2025/179

Approximate number of food, feed, animal and environmental isolates sequenced per year:

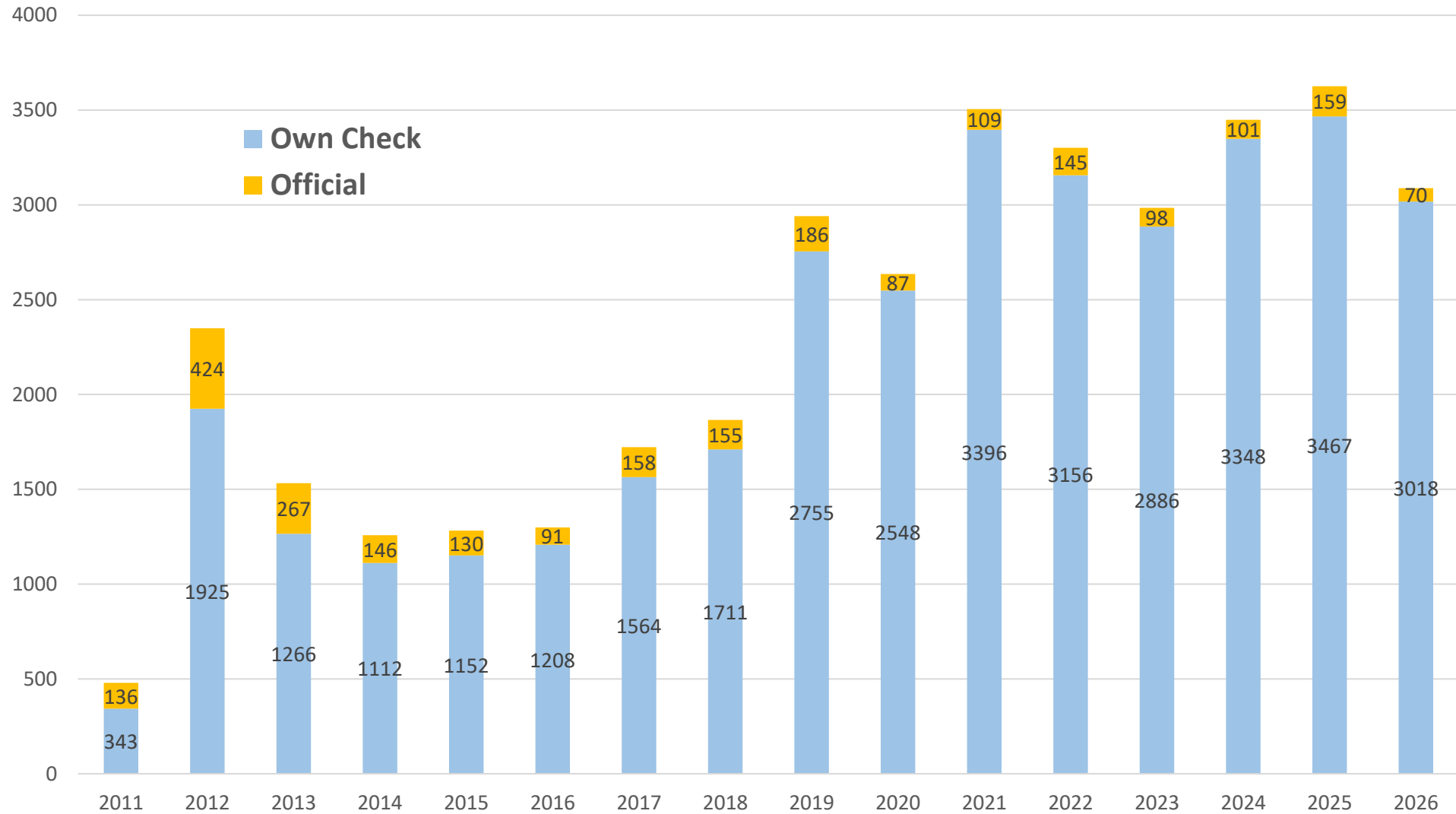
- ***Listeria monocytogenes*** ~ 1000
- ***Salmonella*** ~ 300
- **STEC** – typically < 10
- ***Campylobacter*** – currently sequenced periodically

What is sequenced

- All isolates suspected to be associated with an **outbreak** are sequenced
- In the case of ‘non-outbreak’ isolates:
 - ***Listeria monocytogenes***
 - All Official Control isolates and approx. 25% to 30% of FBO own check isolates
 - FBO isolates selected for sequencing based on representativeness and risk
 - ***Salmonella***
 - approx. 25% to 30% of isolates
 - Risk based selection
 - **STEC**
 - All isolates
 - ***Campylobacter***
 - Currently sequenced periodically

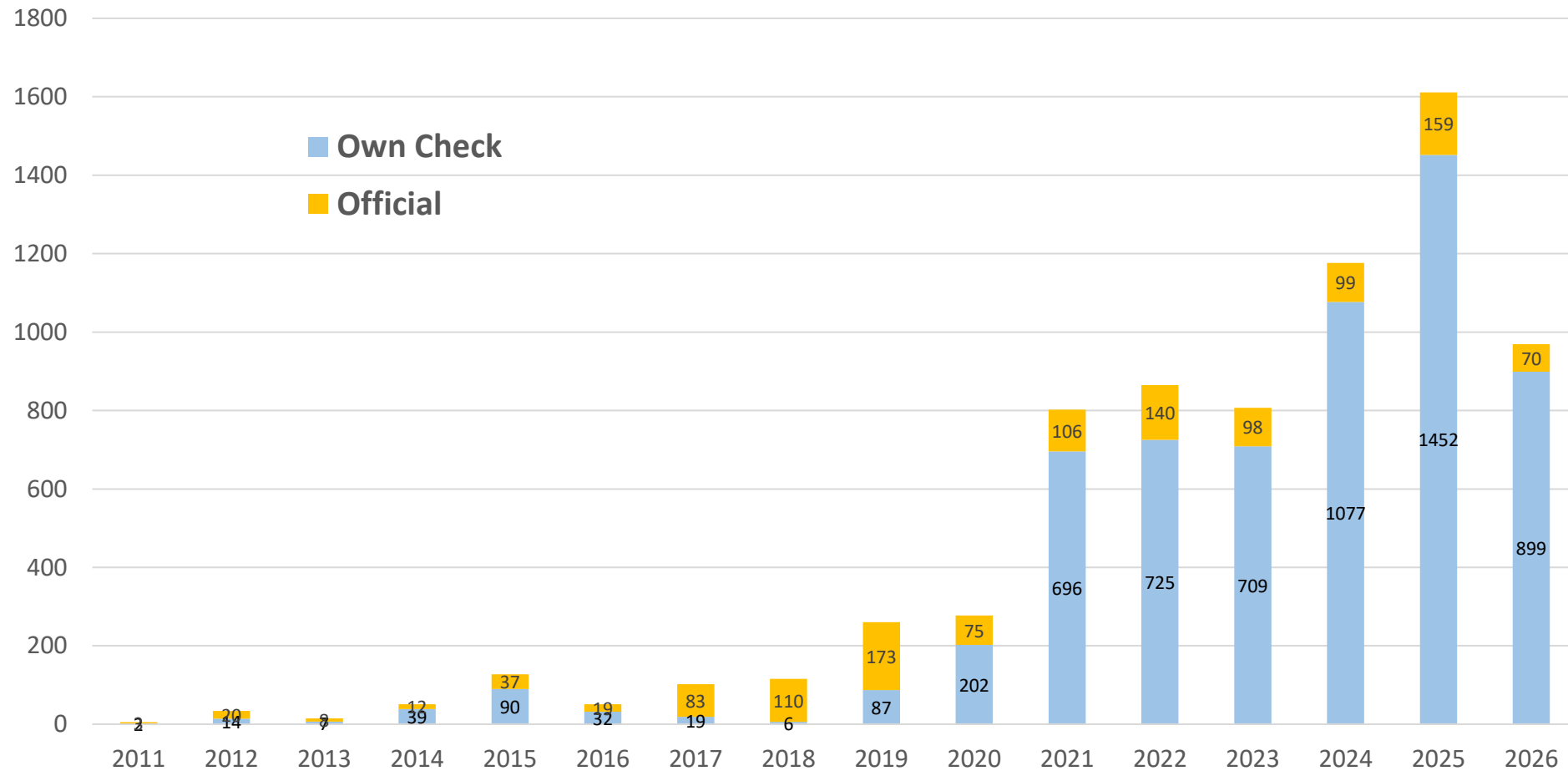
Looking at *Listeria monocytogenes* isolates in more detail

L. monocytogenes isolate submissions to NRL (2011 -2026 (to date))



L. monocytogenes isolates sequenced (2011 – 2026 (to date))

Approx 19% of isolates received are sequenced



Feedback from NRLs

Salmonella

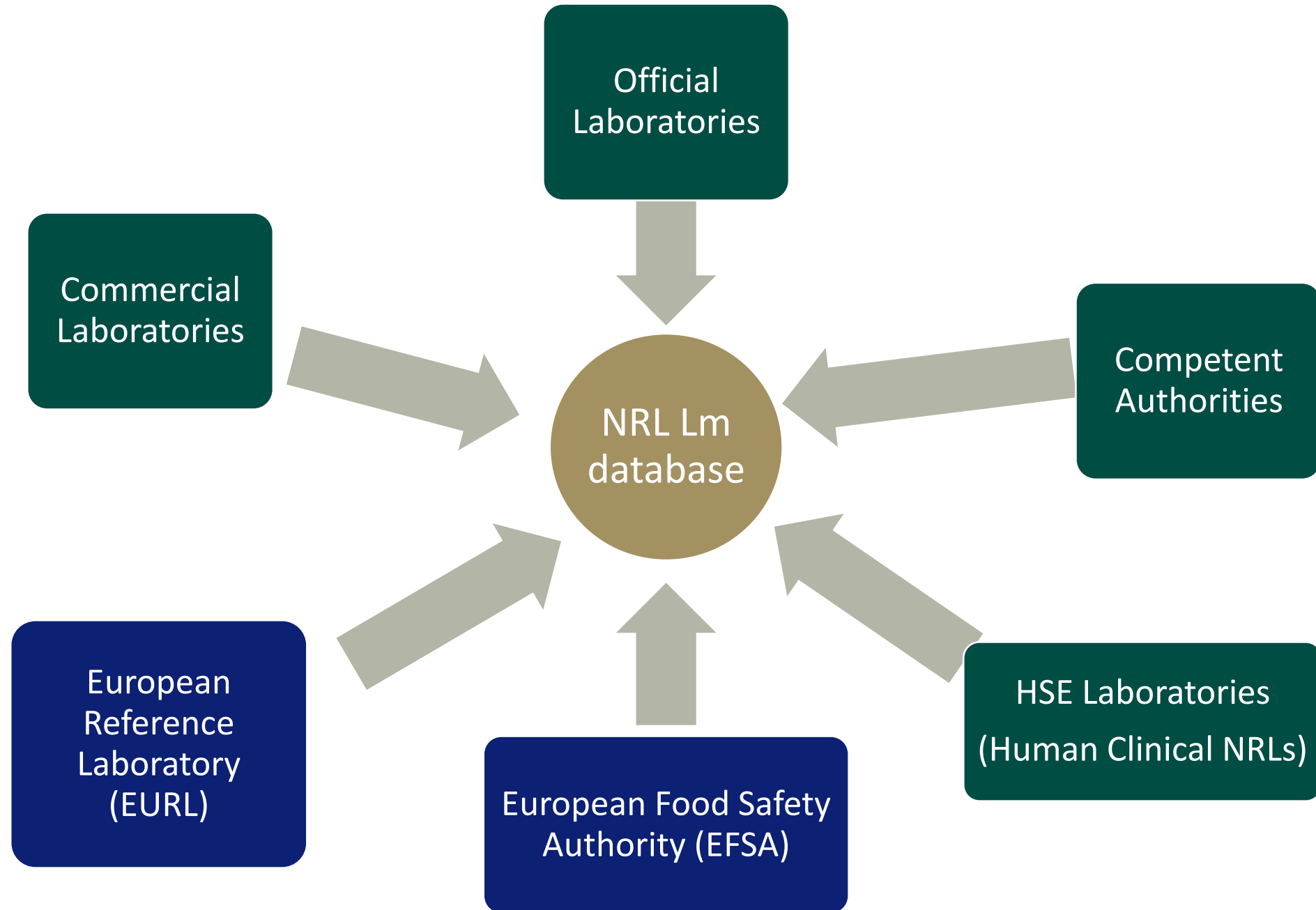
- FBOs phoning for WGS results before the isolate has even reached the NRL

L. monocytogenes

- An increasing number of “repeat customers”

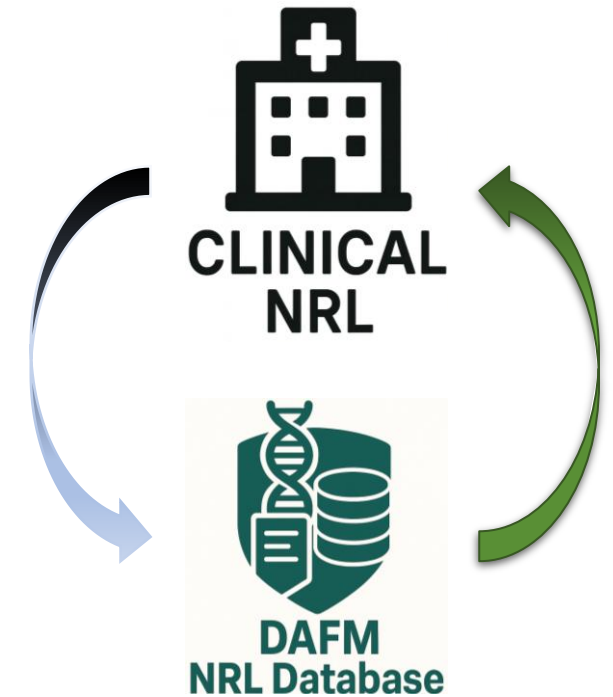
Year	Number of investigations in Lm NRL
2025	23
2026	28

Types of WGS investigation requests



Comparing Clinical & Food Chain isolates in Ireland

- Data sharing agreements in place, which respect **confidentiality**
- Sharing is currently
 - **Manual**; working towards automated sharing
 - **Reactive**, i.e. investigating an outbreak or an incident



Experience sharing clinical and food chain sequences: **Example 1**

- Food samples were taken on 30/7/2024 as part of an investigation of a case of listeriosis in a **patient thought to have contracted illness while in hospital**
 - *L. monocytogenes* detected in 5 samples of **sliced ham** sampled in the hospital
 - NRL **sequenced** the 5 isolates and isolates from the ham producer
- There was a delay in sending the **clinical** isolate to the NRL
 - When it was sequenced, it clustered with another case. Both were clonal complex 9 (**CC9**).
 - The ham isolates were **CC121**
 - The 2 clinical cases clustered with isolates from a **fruit and vegetable FBO** but there was **no epi link** between the cases and this 2nd FBO

Outcome: Source not identified but improvements were made in 2 businesses.

Workload: 435 entries in the 2 incidents files - 270 (ham) and 165 (fruit & veg)

Example 2

News Articles

Listeriosis outbreak under investigation

FRIDAY, 25 JULY 2025

A National Outbreak Control Team is currently investigating an extensive outbreak of listeriosis. A voluntary precautionary food recall of ready-to-heat meals is underway due to a link with the outbreak. Nine confirmed cases of listeriosis have been identified as of 22 July 2025. The HSE Health Protection Surveillance Centre has been notified of and is investigating



- **WGS helped identify the ready-to-heat meals. To note:**
 - The product had cooking instructions validated to kill *L. monocytogenes* and was therefore legally considered non-ready-to-eat.
 - *L. monocytogenes* testing was therefore not required under the microbiological criteria Regulation 2073/2005. Testing was being conducted as part of customer specification.

Growth in identification of listeriosis outbreaks linked to non-ready-to-eat foods

2018

- EU outbreak linked to frozen corn

2025

- UK outbreak linked to cook-chill meals
- USA outbreak linked to prepared pasta meals
- Irish outbreak linked to ready-to-heat meals

Irish guidance

	 Údarás Sábháilteachta Bia na hÉireann Food Safety Authority of Ireland
46	GUIDANCE NOTE
	Controlling <i>Listeria monocytogenes</i> and Ensuring Food Safety in the Production of Certain Cook/Chilled Ready-to-Heat Meals

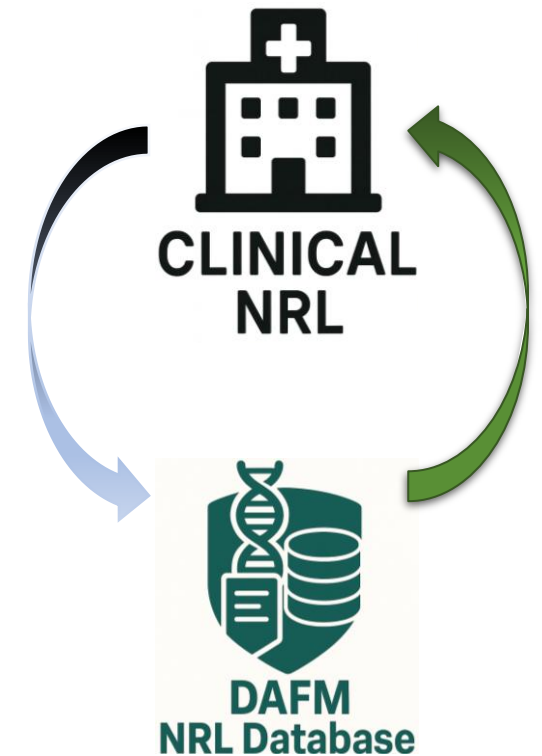
Proactive sharing of *Listeria monocytogenes* isolates

- Developing a protocol to cover genetic matches with a single human case and multiple isolates from an FBO
- “A genetic match of WGS profiles between a human isolate and a food isolate alone does not confirm the food as the outbreak source” (quote from EU Commission FAQs on Regulation 2025/179)



Proactive sharing of *Listeria monocytogenes* isolates **contd.**

- An FBO knows they have detected the pathogen either in food and/or the processing environment
- An FBO not conducting WGS analysis, will find out
 - The distribution of this strain in their food and/or processing environment. This **will help with root cause analysis**
 - That the strain in their food and/or processing environment is a genetic match with a strain that has caused human illness



Sharing of Irish WGS data with EFSA

- Voluntary
 - *L. monocytogenes* isolates from **Official Control** sampling
- In response to an EFSA request during a multistate outbreak
 - **All** relevant isolates from **Official Control** and **FBOs'** own checks sampling
- Under Regulation 2025/179
 - **All** relevant isolates from **Official Control** and **FBOs'** own checks sampling

Automatic Notifications of matches with ECDC clusters

“You are receiving this email because you have subscribed to receive weekly emails containing information about matches found in ECDC's queries.”

“Please go to the WGS portal if you suspect an action is required.”

Entry ID	Date of last modification	Owner organization	ECDC Cluster ID	View query	Date of ECDC query
EFSA-S-2025-005367	5/22/2025 8:14:13 AM	Department of Agriculture, Food and the Marine	2026-01.LIST.01.CC11	Link	1/20/2026 9:10:12 PM
EFSA-S-2025-005361	5/22/2025 8:13:54 AM	Department of Agriculture, Food and the Marine	2026-01.LIST.01.CC11	Link	1/20/2026 9:10:12 PM
EFSA-S-2025-005368	5/22/2025 8:14:16 AM	Department of Agriculture, Food and the Marine	2026-01.LIST.01.CC11	Link	1/20/2026 9:10:12 PM
EFSA-S-2025-005364	5/22/2025 8:14:03 AM	Department of Agriculture, Food and the Marine	2026-01.LIST.01.CC11	Link	1/20/2026 9:10:12 PM
EFSA-S-2025-005363	5/22/2025 8:14:00 AM	Department of Agriculture, Food and the Marine	2026-01.LIST.01.CC11	Link	1/20/2026 9:10:12 PM

Obligations under Regulation 2025/179

Competent Authority obligation to **sequence** and **submit to EFSA**

What this potentially means for our workload, based on previous years **national outbreaks** -

- In **2024**, 20 foodborne outbreaks were reported.
 - 6 of these outbreaks involved pathogens covered by the new Regulation.
 - An isolate was obtained and available for WGS analysis in 2 of those 6 outbreaks.
 - Provisional data for **2025**, indicates a similar workload.
-

Obligations under Regulation 2025/179

FBO obligations to **share isolates** and **WGS analysis**, where available

- Not many FBOs conducting WGS analysis
 - Not many FBOs store their isolates
 - In Ireland, isolates being sent to and stored by the NRLs
 - In some cases, an FBO code is used instead of the FBO name. But an FBO has never refused to share their identify when the NRL has contacted the commercial lab during an investigation
-

Experience submitting under Regulation 2025/179

Our 1st submission was unusual because

- The *Salmonella* isolate detected in the implicated food was not the outbreak strain.
- The outbreak was declared and the investigation meetings were chaired by a 3rd country, the UK.
- The epidemiological **evidence** to implicate the food and the supplier was strong, based on food histories and trace back data
- We **decided** to submit under Regulation 2025/179 as this isolate could represent mixed contamination or ongoing hygiene issues and we had issued a RASFF referring to the UK outbreak
- **EFSA helped** us to ensure the unusual aspects were captured in the way we made our submission to the database.



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