



Development of laboratory-based surveillance for human cases in EU

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On behalf of the ECDC Food and Waterborne Diseases programme

Molecular surveillance of food and waterborne diseases at EU/EEA level



Participants

- National public health reference laboratories.
- Voluntary participation, nominated by national competent body.

Pathogens and molecular typing methods

- *Salmonella*: PFGE, MLVA (for *S. Typhimurium*).
- *Listeria monocytogenes*: PFGE.
- *E. coli*: PFGE.



Participation and cluster detection



Participating countries

Pathogen	AT	BE	DE	DK	EL	ES	FI	FR	HR	IE	IT	LU	NL	NO	RO	SE	SI	UK	Cases Total / 2013-14
<i>Salmonella</i>	S	S	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	20863 / 5369
STEC/VTEC	Y	Y	Y	Y	-	Y	Y	-	-	S	Y	S	-	-	-	S	Y	-	1078 / 558
<i>L. monocytogenes</i>	Y	-	Y	Y	-	-	Y	S	-	Y	Y	Y	-	-	-	Y	Y	Y	1823 / 572

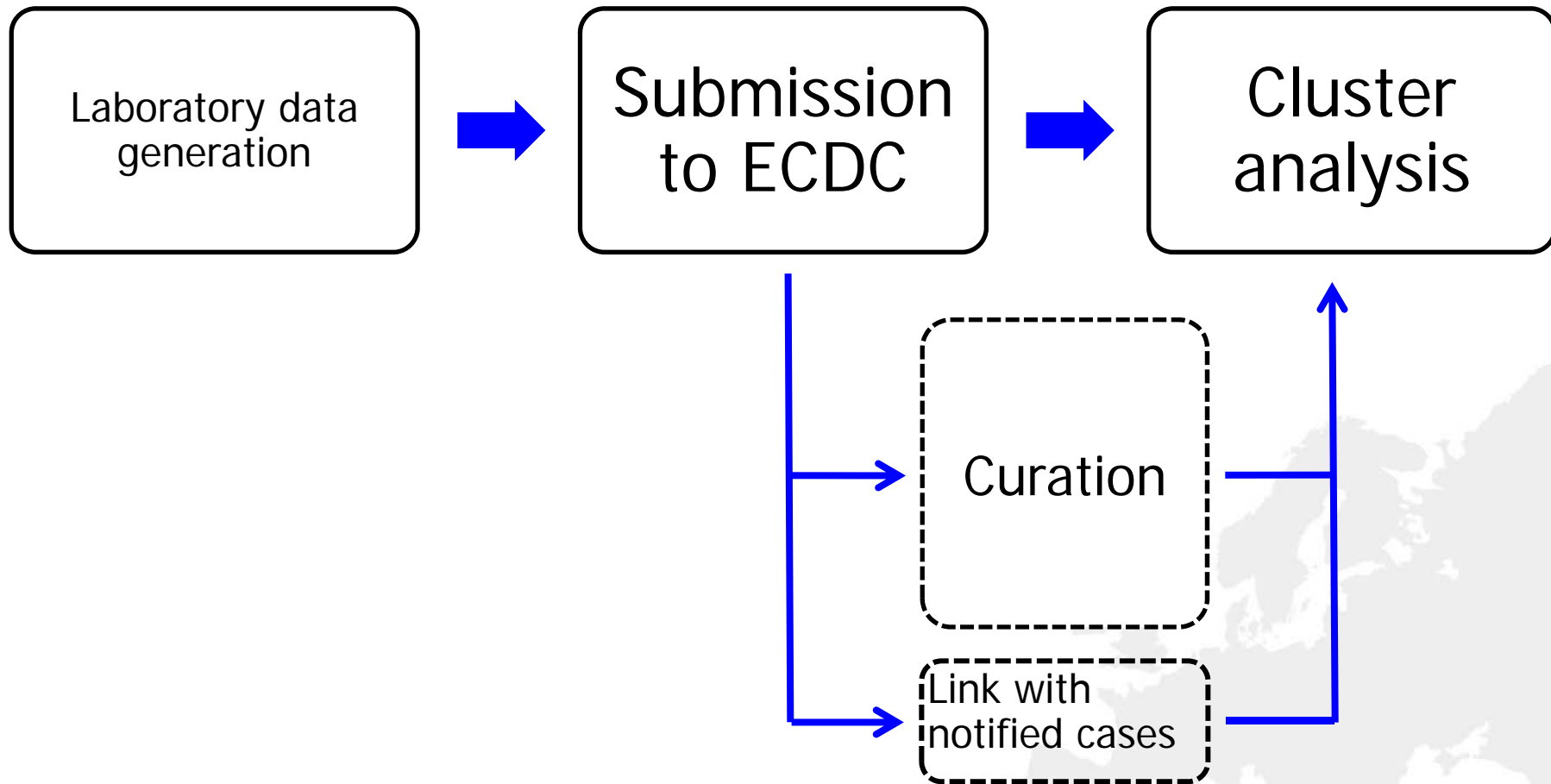
Y: Actively submitting data; S: technical setup phase.

Multi country cluster detection

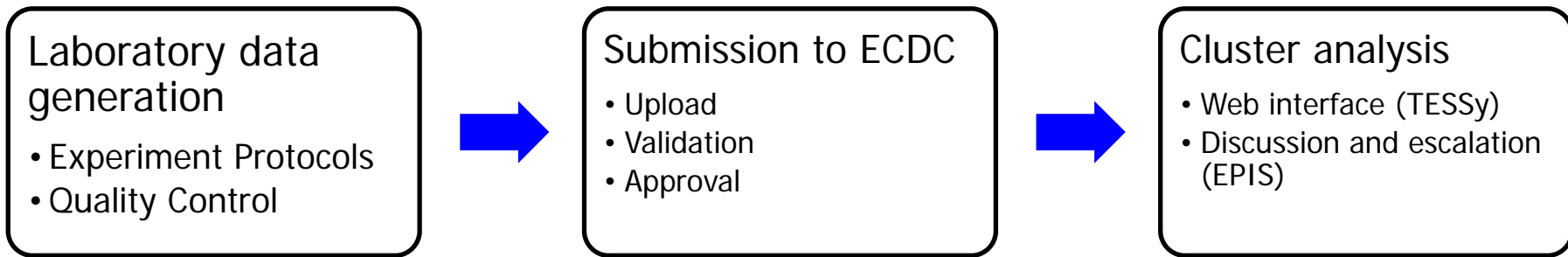
Pathogen	2013-Q2	2013-Q3	2013-Q4	2014-Q1	2014-Q2	2014-Q3	Total
<i>Salmonella</i>	9	22	19	12	15	18	95
STEC/VTEC	-	-	-	-	-	-	-
<i>L. monocytogenes</i>	1	8	4	5	5	3	26

Data as of 2014-09.

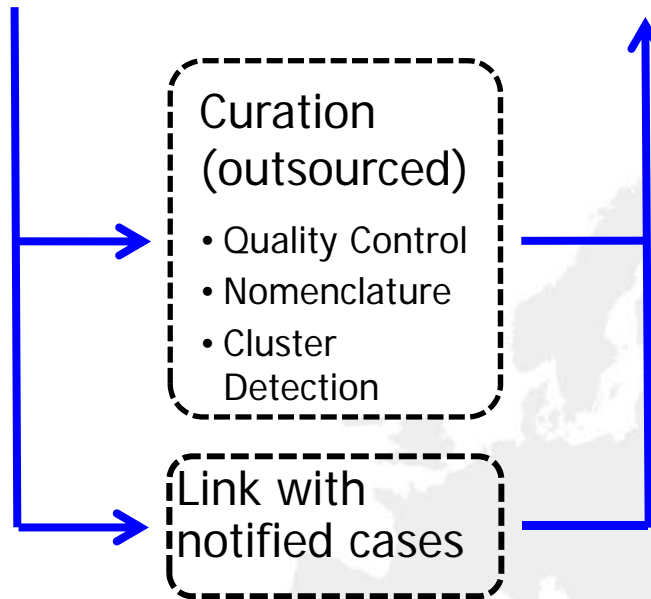
Process for collecting, analysing and acting on molecular typing data

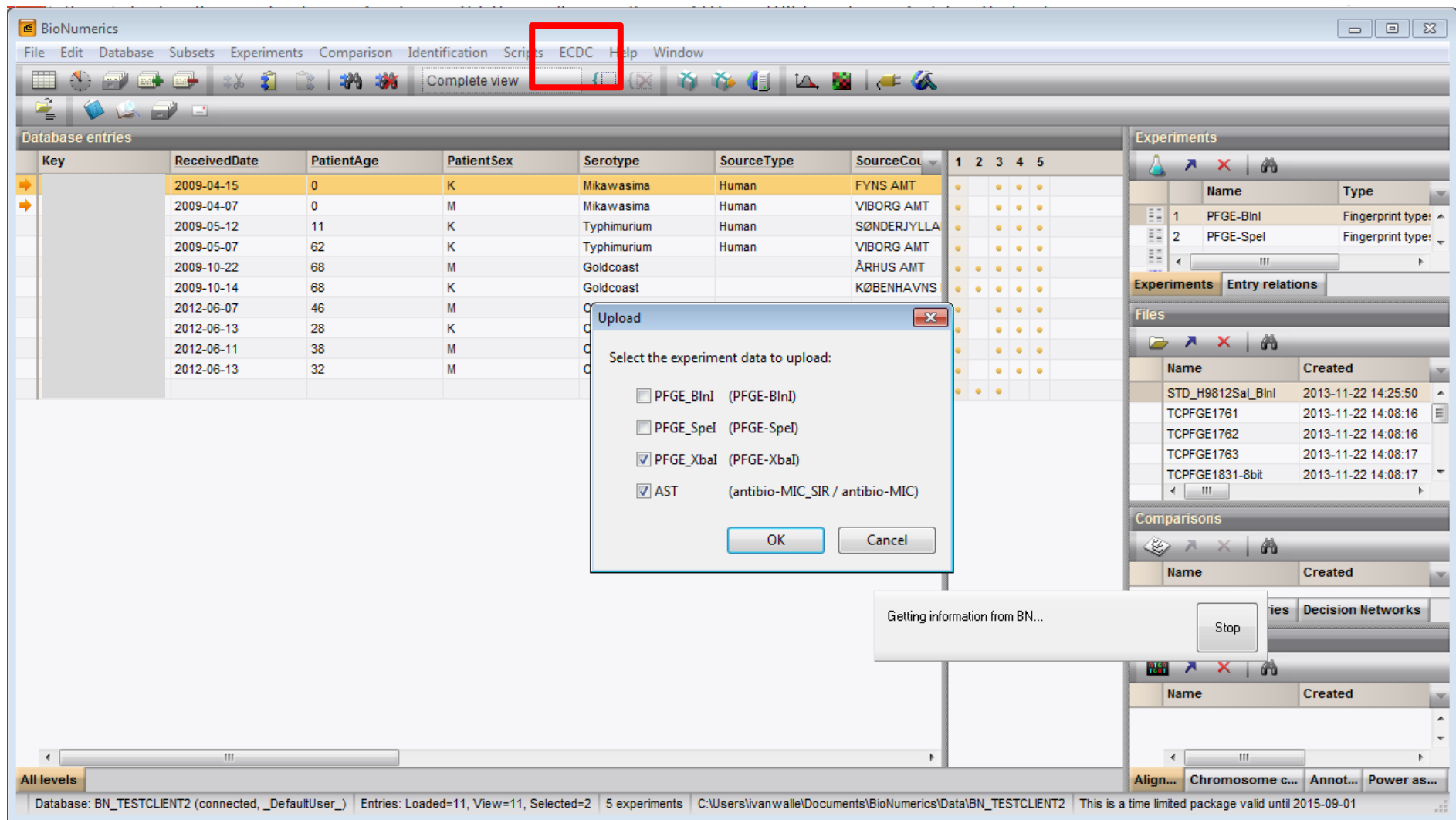


Process for collecting, analysing and acting on molecular typing data



- Main characteristics**
- Designed to incorporate new typing methods and pathogens as they become approved.
 - Data can be submitted through an open XML standard and via machine to machine communication.
 - Only accessible to users nominated by the national competent body.
 - Both typing data and epidemiological/clinical data can be collected and linked.
 - Web interface to search database including cluster analysis.
 - Quality of typing data assured by contracted national public health institute.
 - Initial discussion on clusters limited to affected countries.
 - Fully covered by Standard Operating Procedures.





Fast upload of Member State data to ECDC: select isolates to upload, data prepared automatically and sent machine to machine in less than 10 clicks.

After validation and upload: single click to go to ECDC web page to match these isolates against European wide data. There is no need for Member States to perform this matching each time: ECDC also does this for all uploads in the background and notifies when relevant matches/clusters are found.

Query data

Query criteria Cluster Analysis Results

Cluster Search

Full screen

Search database for similar isolates

Genetic distance: PFGE XbaI bands difference: days (optional) Update

Results

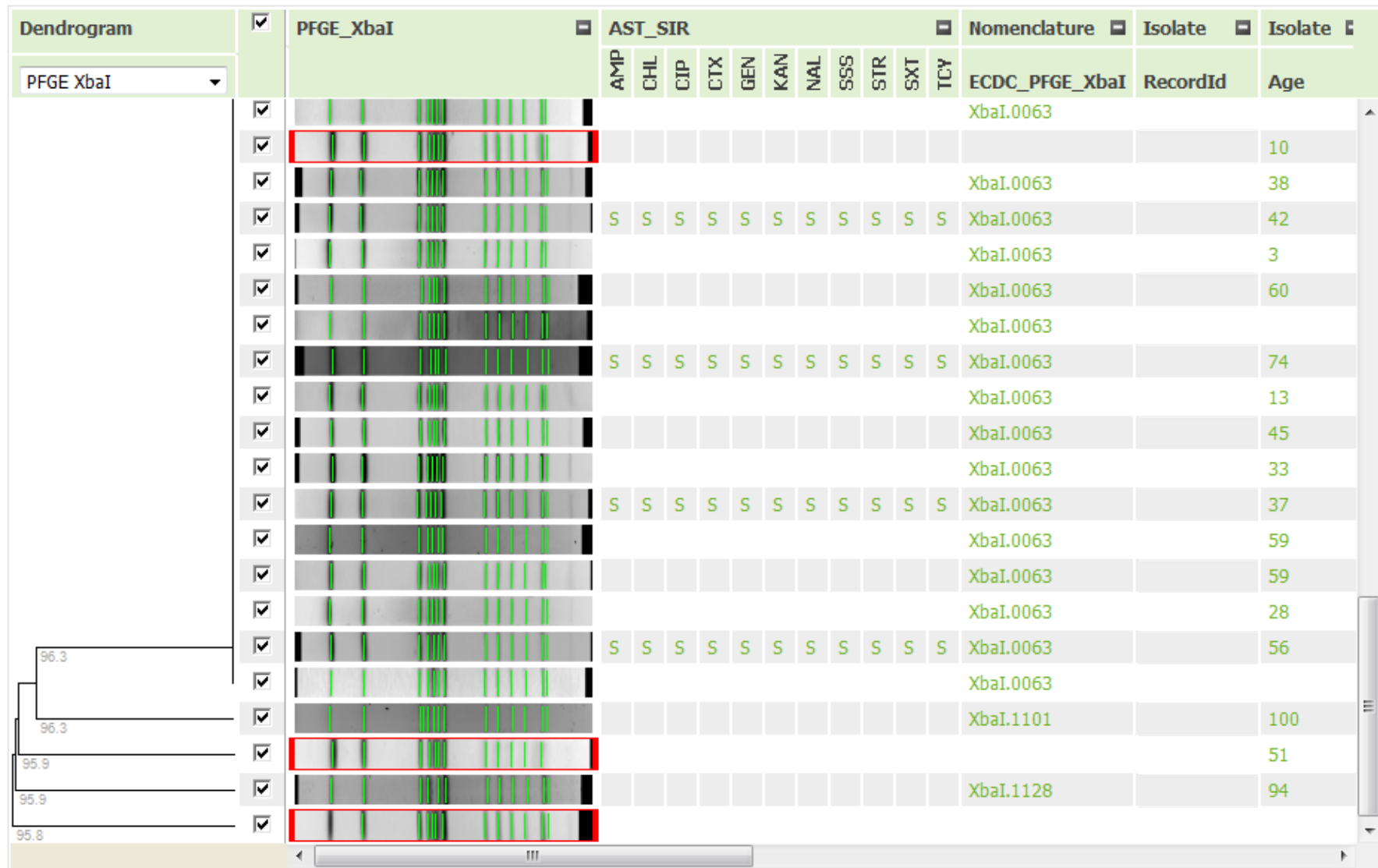
Tree algorithm: Experiments:

Performing search

- ▶ Searching additional isolates - 63 found
- ▶ Calculating dendrogram
- ▶ Retrieving isolate(s) data
- ▶ Retrieving statistical data

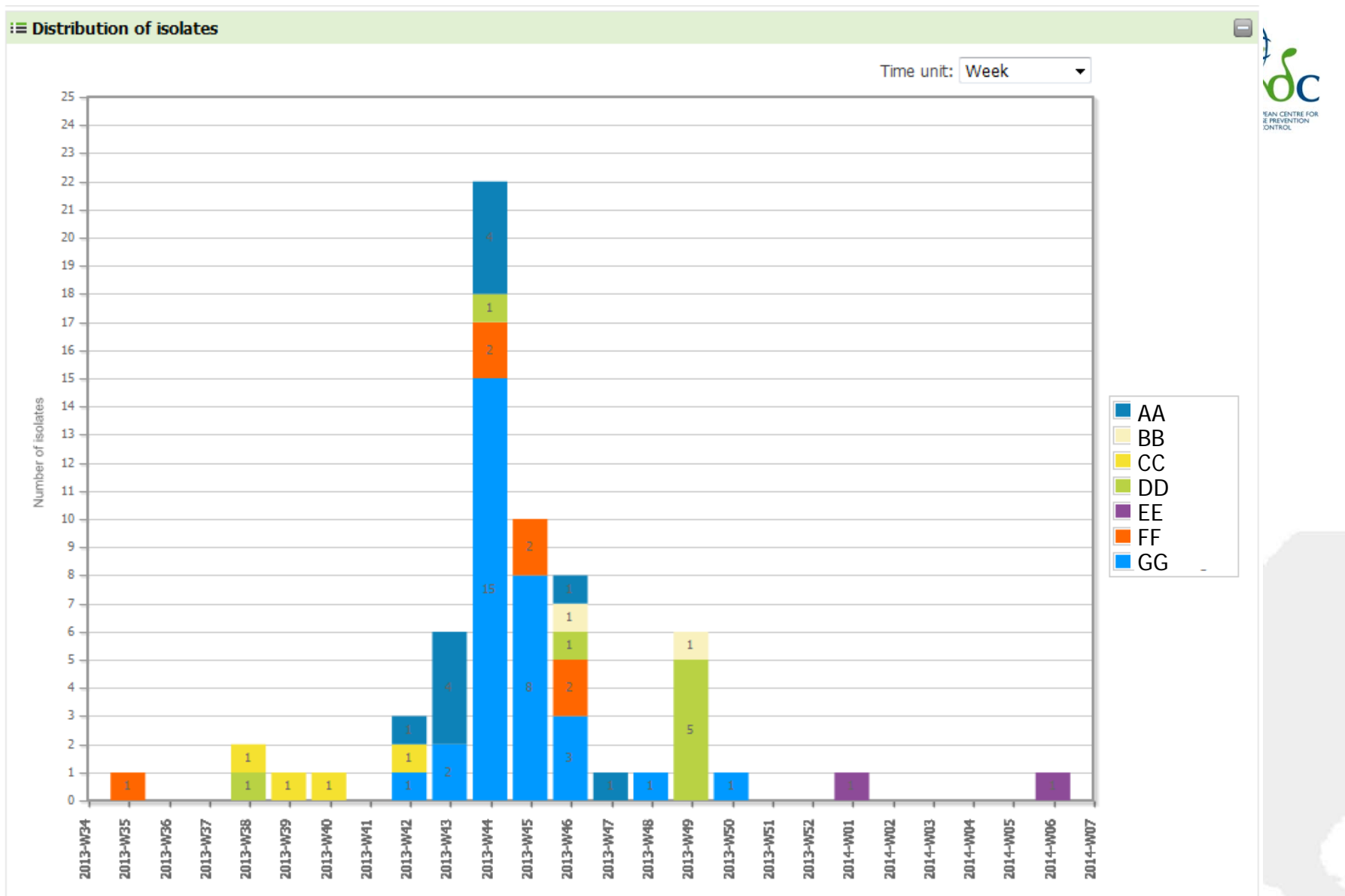
Dendrogram	PFGE_XbaI	VNTR_vals	AST_MIC							Nomenclature	Nomenclature	
			AMP	CHL	CIP	GEN	NAL	SSS	STR			SXT
<input type="text" value="PFGE XbaI"/>											XbaI.0063	
<input checked="" type="checkbox"/>											XbaI.0063	
<input checked="" type="checkbox"/>											XbaI.0063	
<input checked="" type="checkbox"/>											XbaI.0063	

Several matches found in other countries within 100 days from the isolates just uploaded by MS. Data can be explored by microbiological similarity (dendrogram), time (epi curve) etc. Isolates can be linked to the clinical/epidemiological data of the case they were taken from by means of a unique identifier supplied by ECDC. Food isolates will in the future also be uploaded via EFSA, allowing initial linkage of cases with food.



Dendrogram based on Pulsed Field Gel Electrophoresis. Designed to incorporate other techniques as relevant, in the future likely whole genome sequencing.





Clear multi country cluster: what action to take and how?
 Timeliness is an issue.

EPIS Molecular Typing Cluster Investigation



List Tools
Browse Items List

ECDC - Reader.
Ivo Van Walle

ECDC Extranet | **EPIS FWD** Epidemic Intelligence Information System
 Food- and Waterborne Diseases and Zoonoses

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Molecular typing cluster investigations: Listeria- Cluster 2013-07.LIST.01.ASCI.0026.APAI.0142.0147

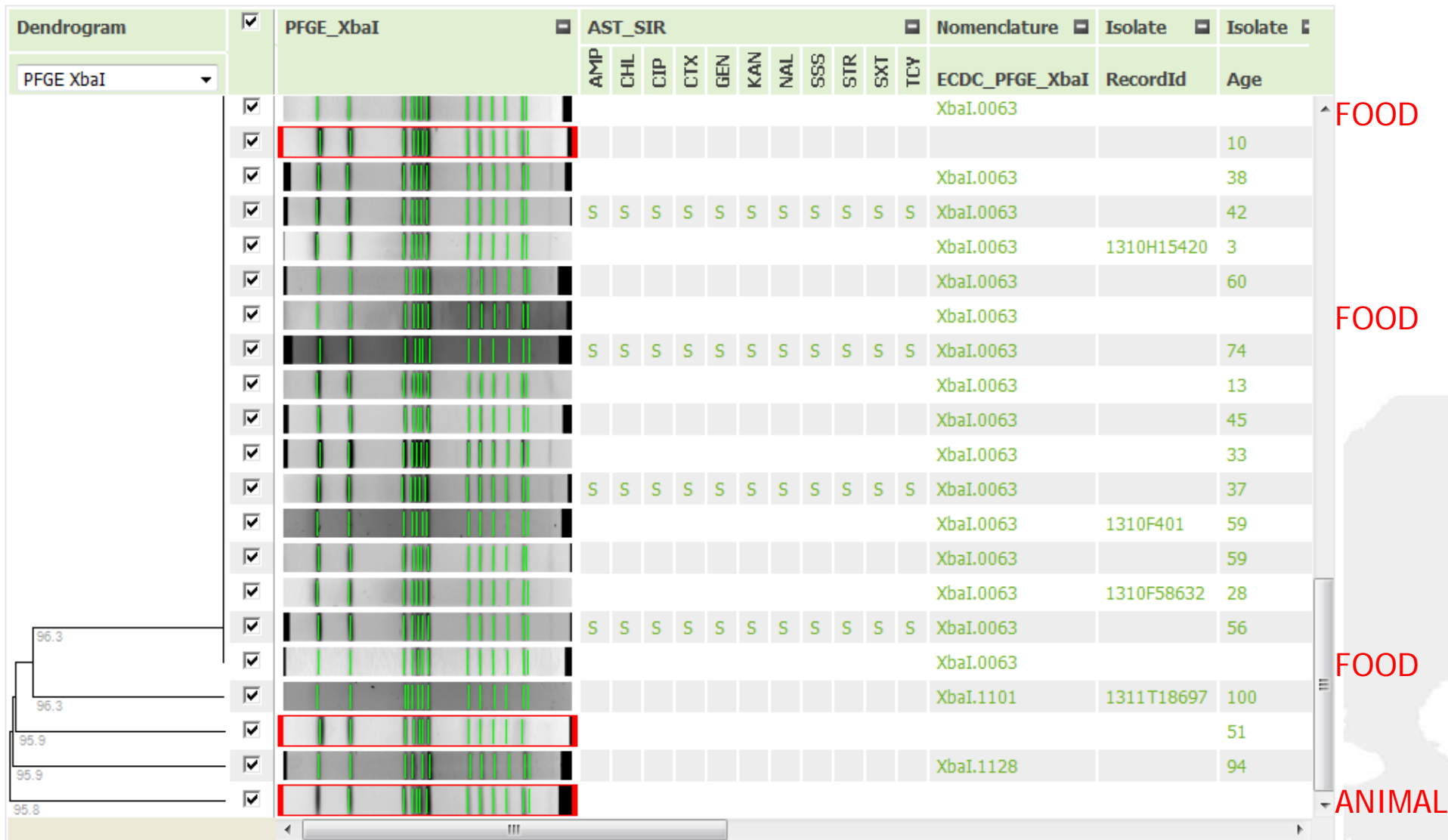
Comments

MTCI ID	MTCI-006
TESSy report(s)	2013-07.LIST.01.ASCI.0026.APAI.0142.0147
Disease	listeriosis
Pathogens	Listeria monocytogenes
Countries Involved	AA, BB, CC
Urgent inquiry	
Line listing	line listing
Status	Open

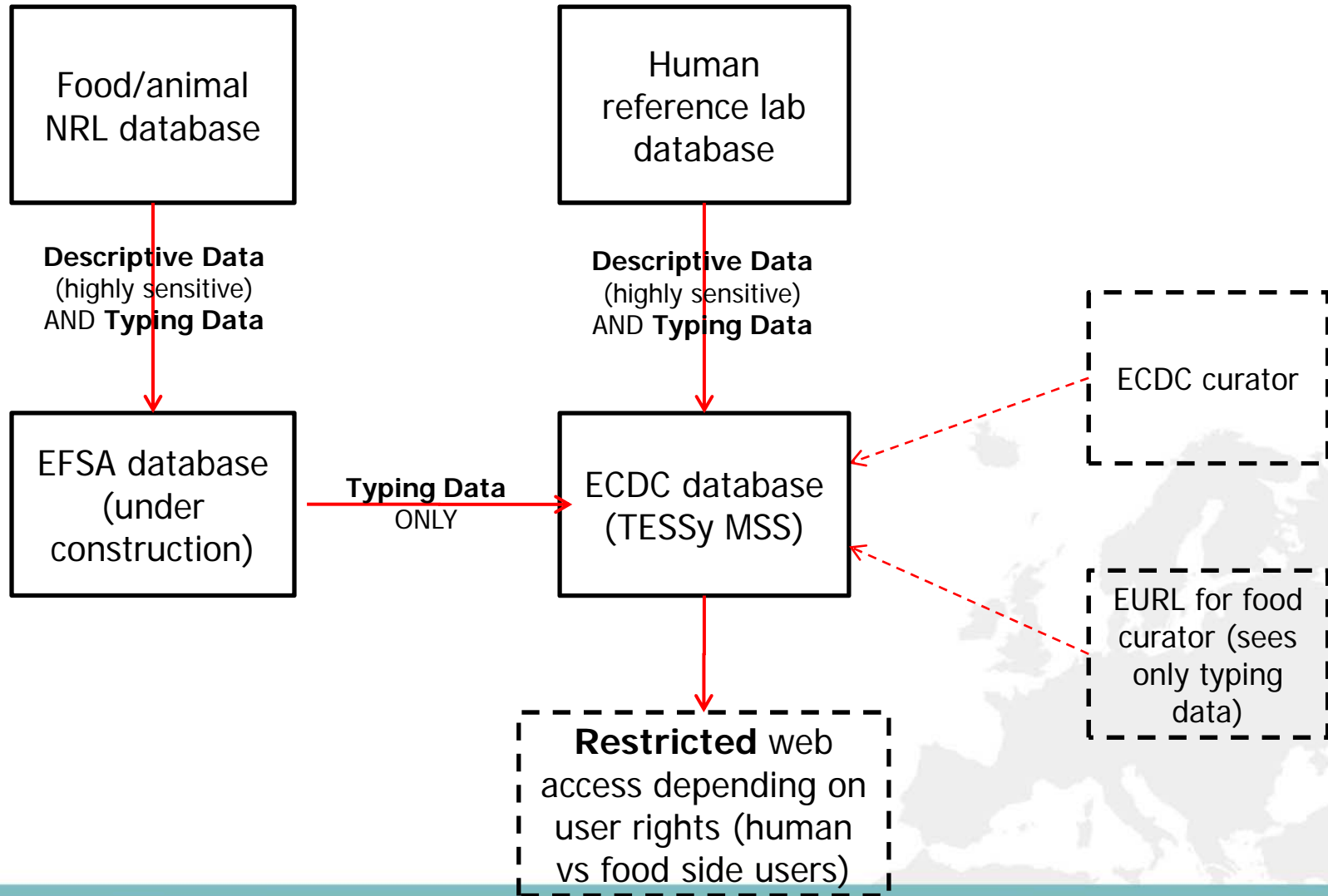
Initial investigation and comments

<input type="checkbox"/> Country or institution	Modified	Comment	Modified By
<input checked="" type="checkbox"/> ECDC	30/08/2013 02:16 PM	A molecular typing cluster of Listeria was detected through TESSy molecular surveillance pilot on 12 July 2013. The detected cluster comprises five isolates with an indistinguishable PFGE ApaI-AsCI pattern submitted by Germany (2), Finland (2) and Denmark (1) with date of statistics during the previous 120 days. Subsequent search of additional cases with this specific PFGE ApaI-AsCI pattern in the existing database	Celine Gossner

The joint ECDC-EFSA database: linking human, food, feed, animal and environment typing data



Joint ECDC-EFSA database – General data flow



Further steps



- **Surveillance of human cases**

- Increase timeliness and efficiency of data upload.
- Incorporation of MLVA for *Salmonella* Enteritidis.
- Assist transition to whole genome sequencing as a typing method: FWD-NEXT Expert Group.

- **Joint ECDC-EFSA database**

- EFSA is currently implementing molecular typing data collection from food side.
- Agreement ECDC-EFSA-EC-EURL on data access and usage.
- ECDC to upgrade TESSy Molecular Surveillance Service to be able to receive also food data, and show this data with appropriate visibility to different users.

- **What is your opinion on VTEC molecular surveillance?**

