

Foodborne viruses in Europe:

Web-based technologies for
investigation of transnational
outbreaks of viral gastroenteritis

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for:

The Foodborne Viruses in Europe Consortium

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Background

- Foodborne viral infections are increasingly recognised as a public health concern
- Norwalk-like viruses (NLV) are the **most common** cause of enteric disease
 - Large human reservoir
 - Stable outside the host
 - Small infectious dose (10-100 particles)
 - Cause outbreaks among all age groups
- Multiple genetic variants of NLV co-circulate in the community

Background II

BBC NEWS

You are in: UK: **Scotland**

Tuesday, 22 January, 2002, 20:38 GMT

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Virus leads to second hospital closure



The Victoria Infirmary remains closed

Background III



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Tuesday, March 19, 2002

Associated Press

LOS ANGELES — A disease that spreads through food infected with sewage pollution likely is responsible for a mystery illness that overcame at least 100 guests at a pre-Oscar ceremony earlier this month, public health officials said.


The March 2 event at the Regent Beverly Wilshire hotel in Beverly Hills honored scientific and technical achievement in cinema. About 500 people attended the dinner and awards presentation.

Days afterward, dozens of guests began complaining of vomiting, diarrhea and nausea. The illness lasted several days in most cases.

Burden of Norwalk-like virus gastroenteritis in US

Agents	Total Illnesses	Foodborne Illnesses	% of all foodborne illness
All Bacteria	5,204,934	4,175,565	30.2
All Parasites	2,541,316	357,190	2.6
Norwalk-like viruses	23,000,000	9,200,000	66.6

Foodborne Viruses in Europe



National Institute for Public
Health and the Environment
Koopmans et al.

PHLS Colindale
Brown et al.

IFREMER
LeGuyader et al
University Dijon
Pothier et al

Central Public Health
Institute, Madrid
Sanchez et al

University of Barcelona
Bosch et al

University of Helsinki
von Bonsdorff et al

Swedish Institute Infectious
Disease Control; Svensson et al

Statens Serum institute
Bottiger et al

Robert Koch Institute
Schreier et al

Central Public Health Institute
Rome, Ruggeri et al

Objectives of the network

- 1) study the epidemiology of enteric viruses across Europe
- 2) determine high risk foods & transmission routes
- 3) identify novel strains at the onset and trace their spread.
- 4) investigate mechanisms of emergence of these novel strains

Harmonisation of European Surveillance

Epidemiological Data

Virological Data



Harmonisation of methods



Development of web-accessible database

Harmonisation of European Surveillance

Epidemiological Data

Virological Data



Harmonisation of methods



Development of web-accessible database

Epidemiological Data I

- Harmonised clinical definitions
 - **CASE** of viral gastroenteritis
 - **OUTBREAK** of viral gastroenteritis
- Standard Outbreak Questionnaire
 - Etiology
 - Transmission
 - Setting
 - Case Information
 - Diagnostic Results
 - Food Vehicles

Epidemiological Data II

- **Web-Based outbreak report form**
- Active Server Pages technology
- Microsoft Access Database

<http://www.eufoodborneviruses.net>

Viral Gastroenteritis Outbreak Report Form



*Fields with a * must be entered*

Reporting Institute :

Please select *

Outbreak Reference:

* (your unique reference number)

Be sure to retain you outbreak reference. You will need it to update the record.

Reporter's Name:

* (First Last)

Today's date:

* dd/mm/yyyy

[submit ONLY virological data](#)

Transmission

Mode of transmission:

Please select one

if foodborne, "PREPARED" takes precedence over "SERVED".
if person-to-person "SERVED" takes precedence over "PREPARED".

Place where transmission of infection occurred:

Please select one

Was the outbreak the result of a point source exposure?

(e.g. acafusion?)

Viral Gastroenteritis Outbreak UPDATE Form



Reporting Institute : *

Outbreak Number: * (your unique reference number)

Reporter's Name: * (First Last)

Today's date: * dd/mm/yyyy

Transmission

If foodborne, "PREPARED" takes precedence over "SERVED".
If person-to-person "SERVED" takes precedence over "PREPARED".

Mode of transmission:

if "other", specify

Place where transmission of infection occurred:

Specify:

Was the outbreak the result of a point source exposure?(e.g. at a function?)

Viral Gastroenteritis Outbreak Search Page



Search by reporting institute:

Search by mode of transmission:

Search by setting:

Institute	Outbreak Reference	Reporter Name	Report Date	Organism	Mode of transmission	Setting	First date of onset	Characterisation data entered?
GB-Public Health Laboratory Service	020080	Celia Penman	18/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	23/01/2002	No
NL-National Institute for Public Health and the Environment	EP2002040	Yvonne van Duynhoven	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	08/01/2002	Yes
GB-Public Health Laboratory Service	020070	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	04/01/2002	No
GB-Public Health Laboratory Service	020069	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	03/11/2001	No
GB-Public Health Laboratory Service	020073	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Hotel/Guest House	25/12/2001	No
GB-Public Health Laboratory Service	020072	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	16/01/2002	No
GB-Public Health Laboratory Service	020031	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	07/01/2002	No
GB-Public Health Laboratory Service	020023	Celia Penman	14/03/2002	Rotavirus	PERSON TO PERSON	Residential institution	13/01/2002	No
GB-Public Health Laboratory Service	020012	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	25/12/2001	No
GB-Public Health Laboratory Service	010587	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Hospital	30/11/2001	No

Short Outbreak report

Reporting Institute

NL-National Institute for Public Health and the Environment

Outbreak reference

EP2002040

Reporter's name

Yvonne van Duynhoven

Report date

14/03/2002

Mode of transmission/ setting

Mode of transmission

PERSON TO PERSON

Setting of outbreak

Residential institution

Details of setting

nursing home

Was the outbreak the result of a point source exposure?

No

Date of point source exposure

Aetiology

Was the organism identified?

Yes

Organism name:

Norwalk-like virus

Case information

Number of cases

433

Harmonisation of European Surveillance

Epidemiological Data

Virological Data

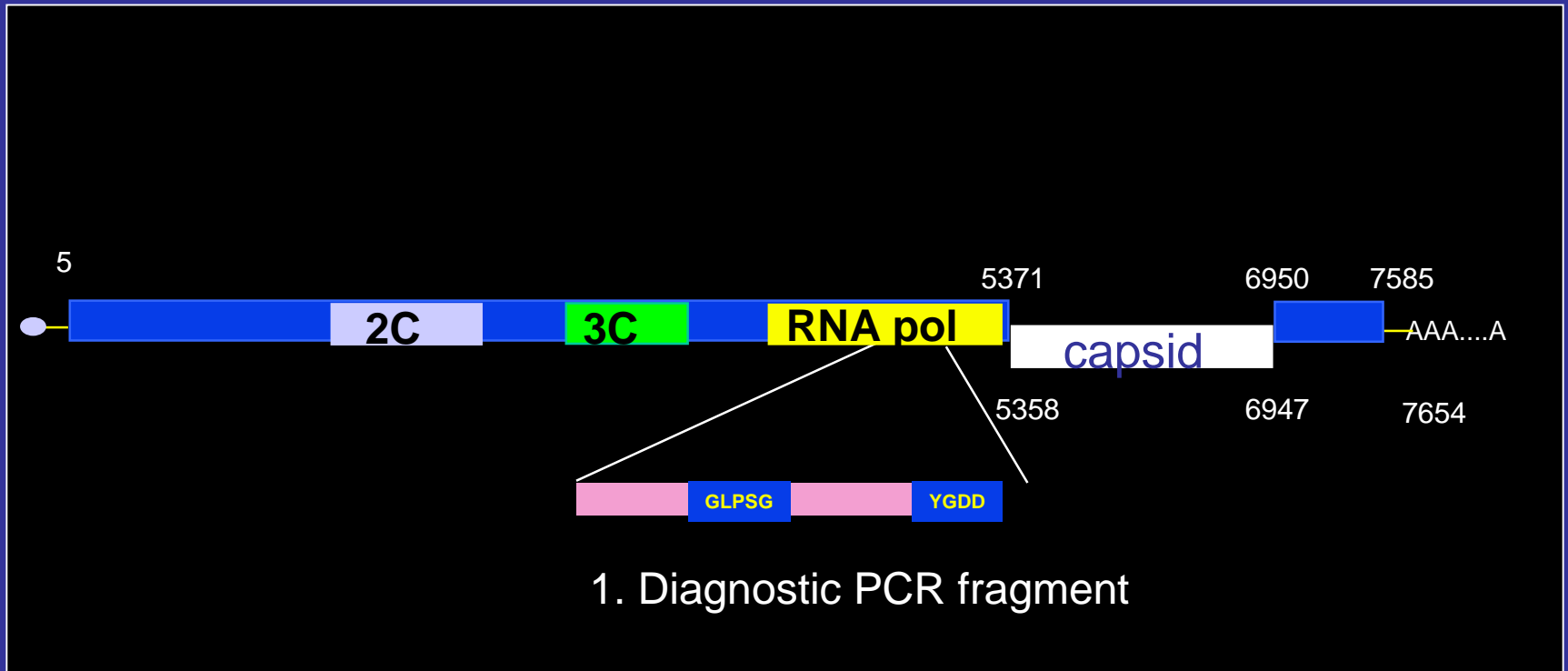


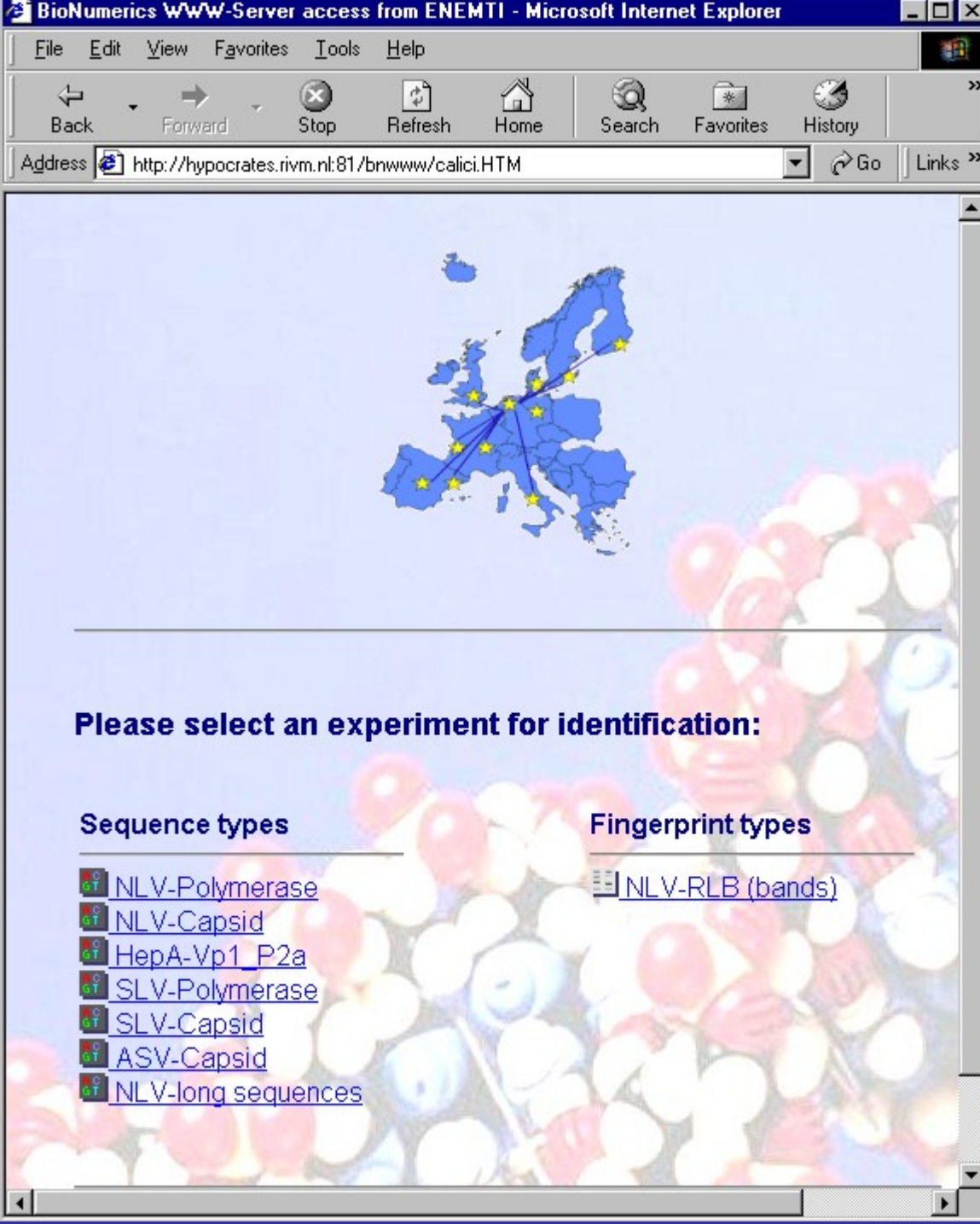
Harmonisation of methods



Development of web-accessible database

Virological Data: Sequencing of NLV





Virological Data II

- Web-based genetic bank



Applied Maths,
Ghent, Belgium



Sequence data

Database

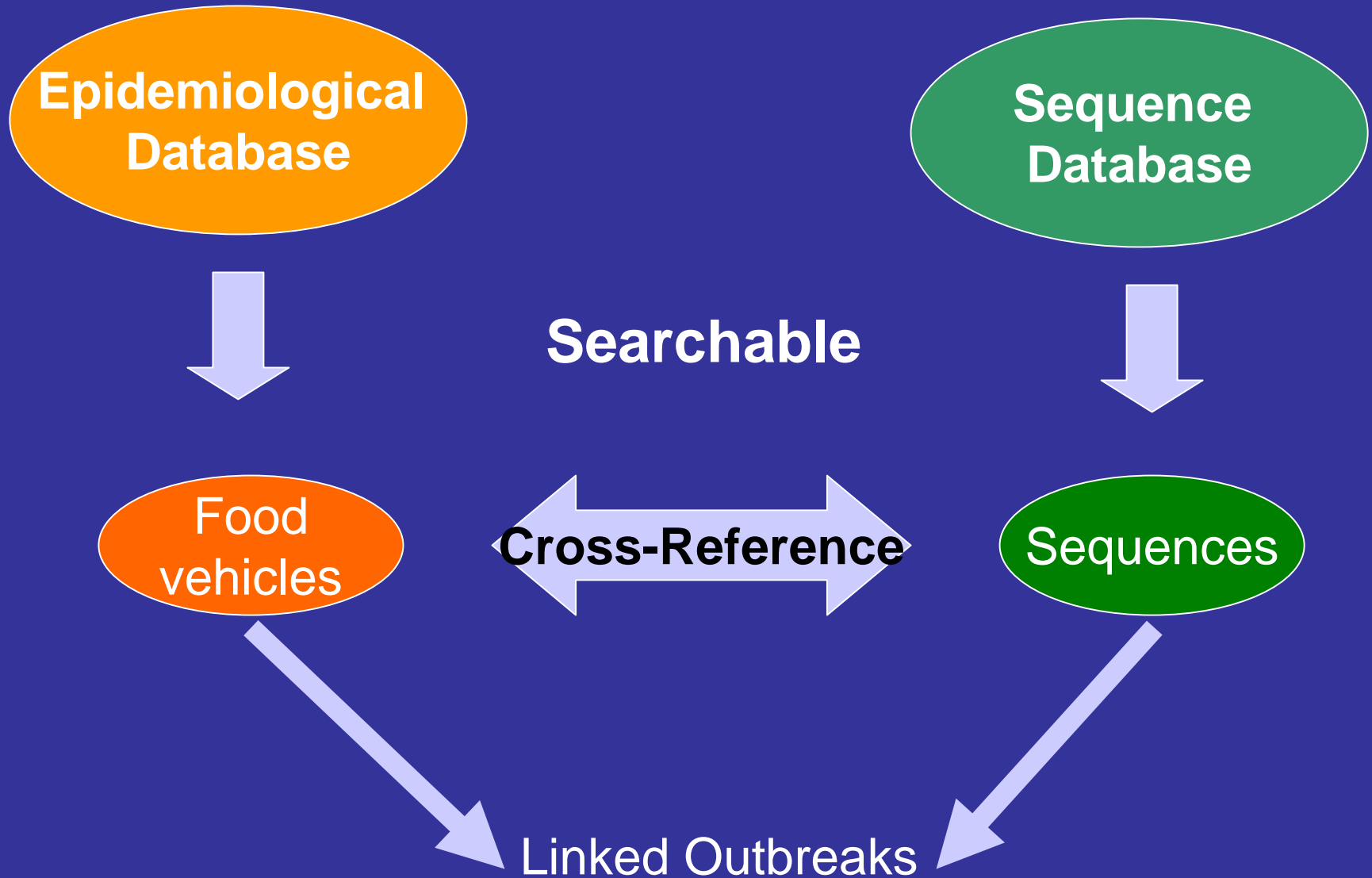
- Login
- Password
- Experiment

Identification

- Display up to

[Back to the main menu page](#)

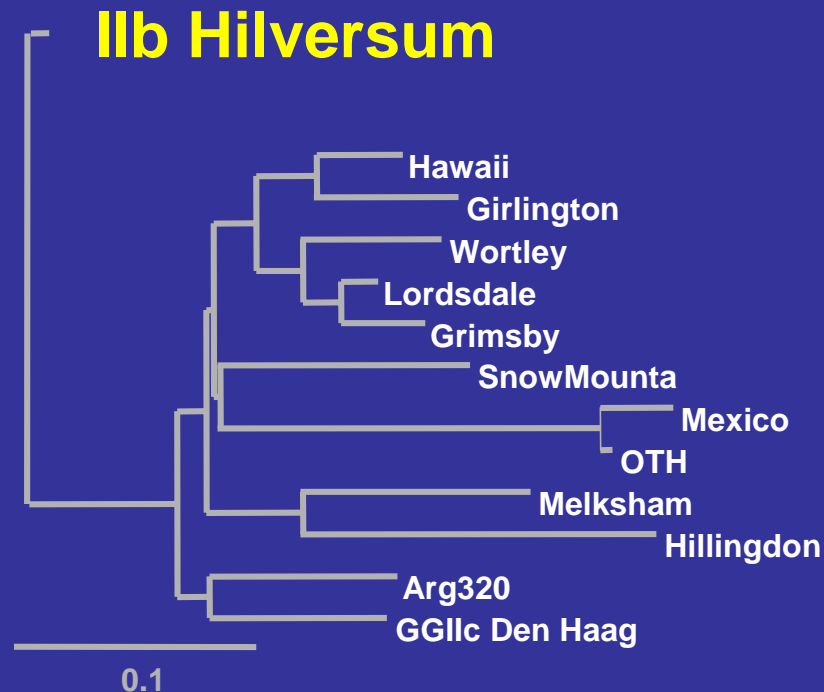
The databases are relational.



A group of linked outbreaks

Phylogenetic inference of emerging variant NLV IIb Hilversum:

Polymerase gene

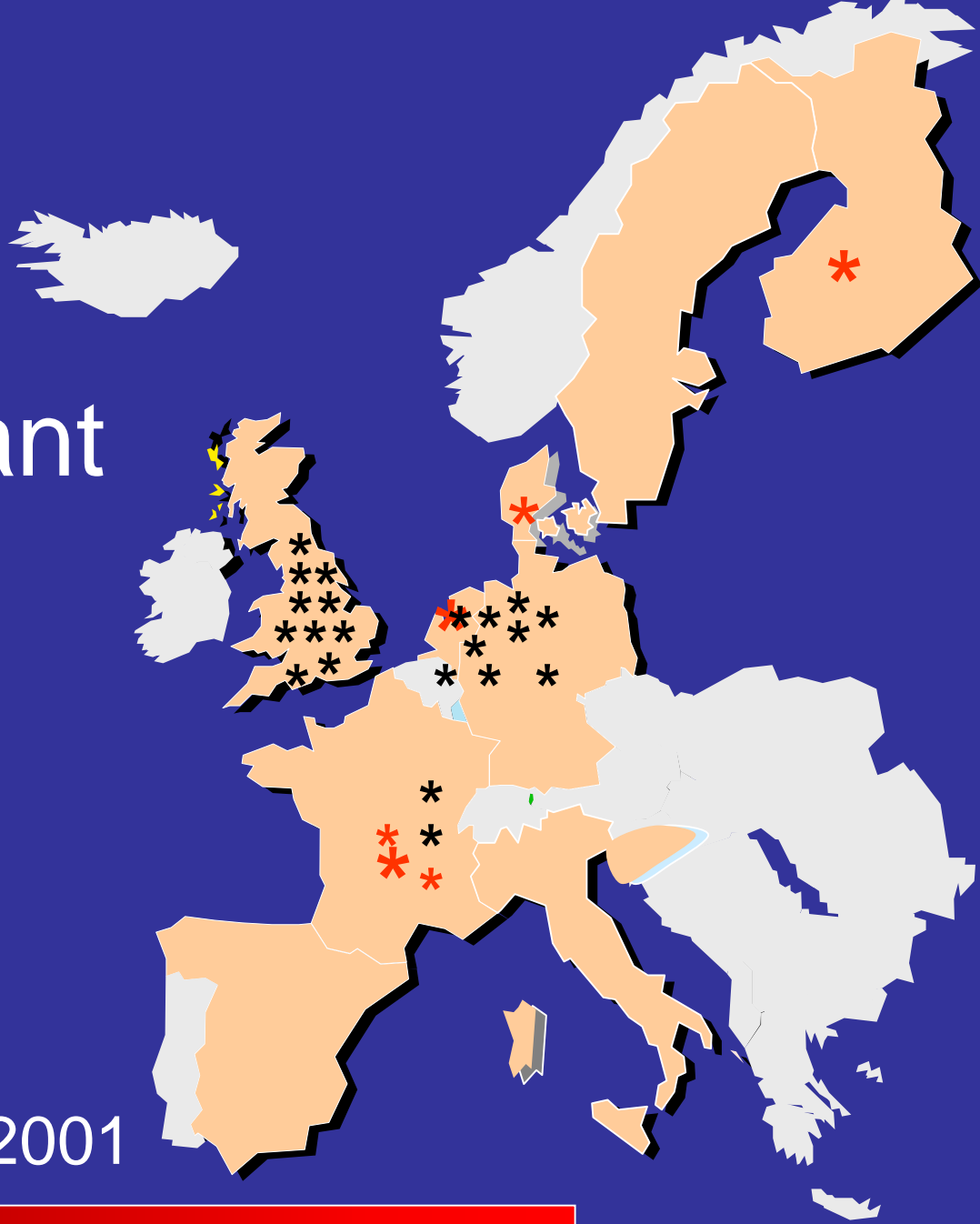


Emerging variant

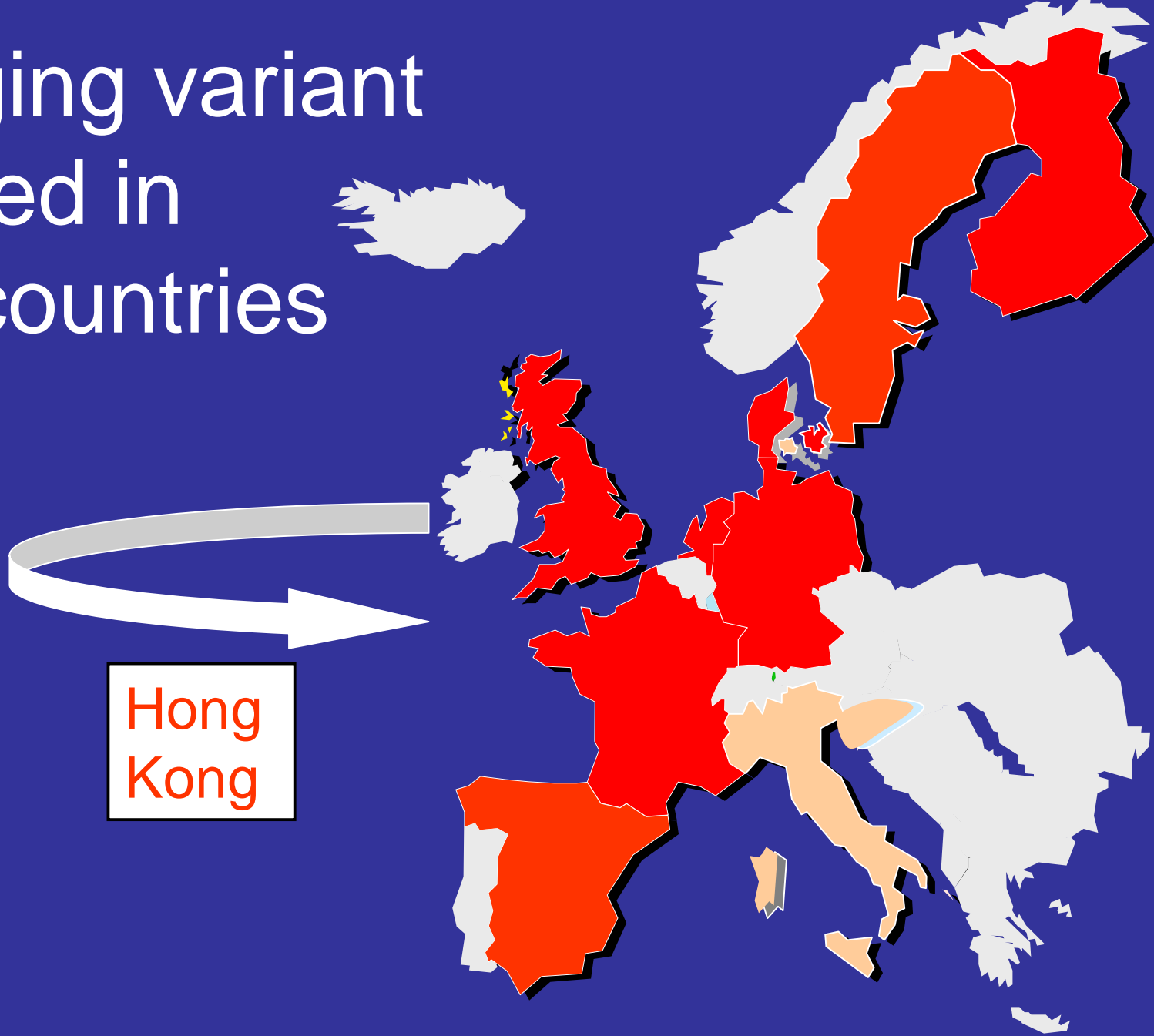
2000

2001

Aug Sep Oct Nov Dec Jan Feb Mar Apr

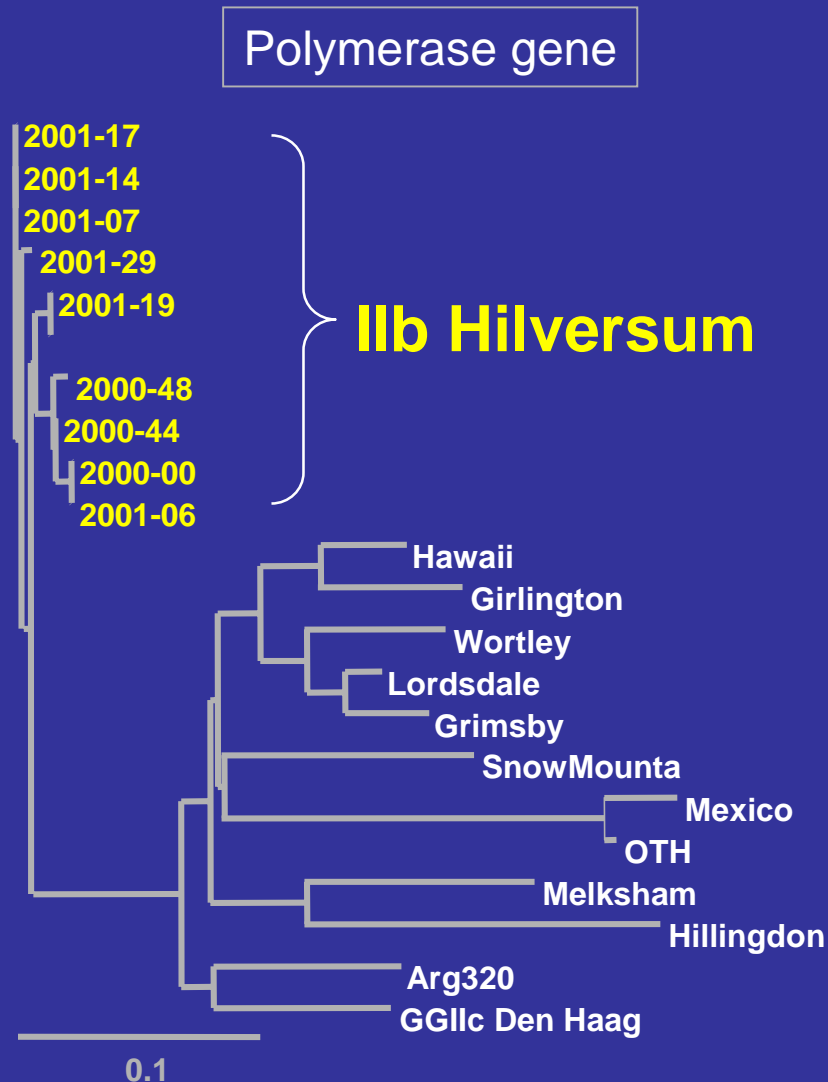


Emerging variant
detected in
eight countries



A group of linked outbreaks

Phylogenetic inference of emerging variant NLV IIb Hilversum:



Summary

- We have identified linked outbreaks on an international scale
- Transnational outbreaks may be common
 - Introduce new genetic variant to an area
- The Foodborne Viruses in Europe group has developed a model for the detection of transnational outbreaks
 - Web accessible password protected database
 - Open to all participants
 - Links can be recognised from epidemiological OR virological characteristics of outbreaks

Conclusions

- Recognition of international outbreaks relies on both molecular typing and epidemiological data
- Preliminary results from our network show the value of standardised international databases for the recognition of transnational outbreaks

www.eufoodborneviruses.net

Acknowledgements

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