

The establishment of an Italian repository of WGS of STEC and other foodborne pathogens

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13th Annual Workshop of the National Reference Laboratories for *E. coli* in the EU

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European Union and National Reference Laboratory for *E. coli*, Rome, Italy



Sequencing service at ISS

2017

Start

Regolamento di accesso
Richieste di servizio
Brochure
Sezione riservata

Aree

- Citometria
- EPR
- Cell factory FaBioCell
- NMR
- Microscopia
- Proteomica
- Sequenziamento**
- Calcolo Scientifico

Servizi e strumenti in collaborazione

- Servizio di Bio/statistica
- Criostato
- Centrifuga
- Multilabel counter

Eventi

Novità

Per-corso di Statistica di Base

Server intranet

ISS - Servizio Grandi Strumentazioni e Core Facilities

Missione


- Supporto alla gestione strategica del patrimonio delle apparecchiature dell'Istituto Superiore di Sanità;
- progettazione e sviluppo di strumentazioni e nuove tecnologie;
- razionalizzazione dell'utilizzo di tecnologie ad alto costo aventi possibilità trasversali di utilizzo all'interno dell'Istituto.


Il Servizio svolge altresì, nell'ambito della propria competenza, attività di ricerca.

Visione

La struttura promuove un miglioramento continuo delle professionalità e delle capacità tecnologiche dell'Istituto Superiore di Sanità contribuendo a mantenerne ed aumentarne la competitività nella ricerca biomedica avanzata e la funzione di riferimento scientifico per il Paese.

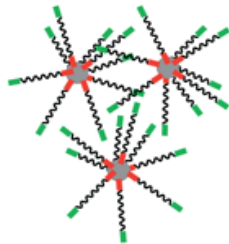
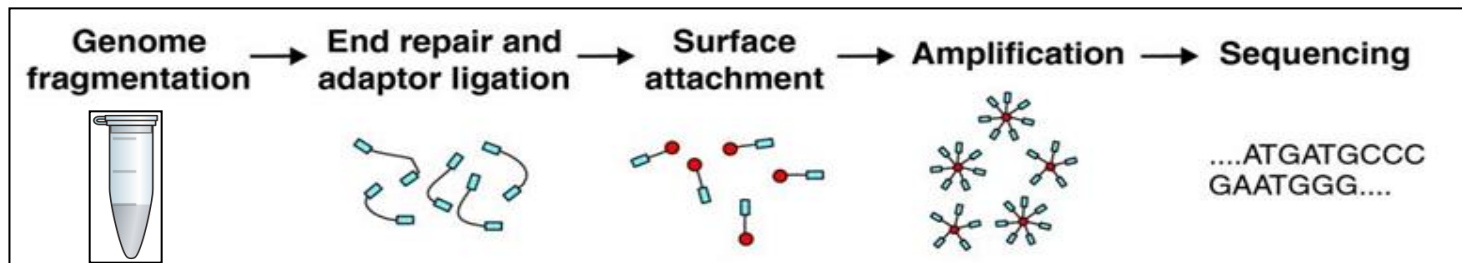
Le competenze multidisciplinari presenti nella struttura favoriscono lo svolgimento di attività di ricerca di eccellenza, sostenibile in forma autonoma o collaborativa, e la fornitura di servizi tecnologicamente avanzati.

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 **+39 06 4990 3163**

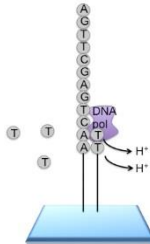
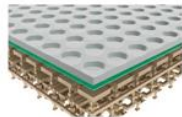


A central diagram showing the 'Core Facilities' at ISS. It consists of a central white hexagon labeled 'Core Facilities' surrounded by eight colored hexagons, each representing a different facility: Microscopia (blue), Proteomica (red), Calcolo Scientifico (purple), Cell Factory FaBioCell (orange), Sequenziamento (yellow-green with a blue star), Citometria (green), EPR (pink), and NMR (light blue).

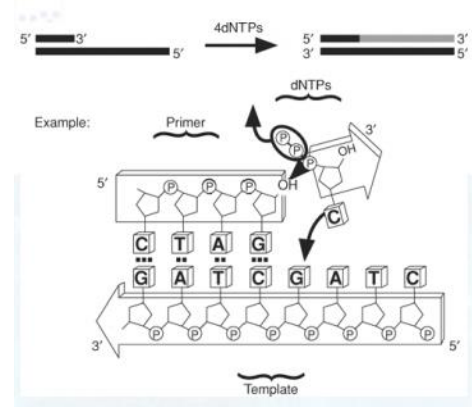
WGS strategy at ISS



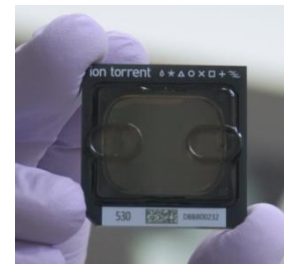
Ion Semiconductor Sequencing Chip



pH variation once a new nucleotide is incorporated

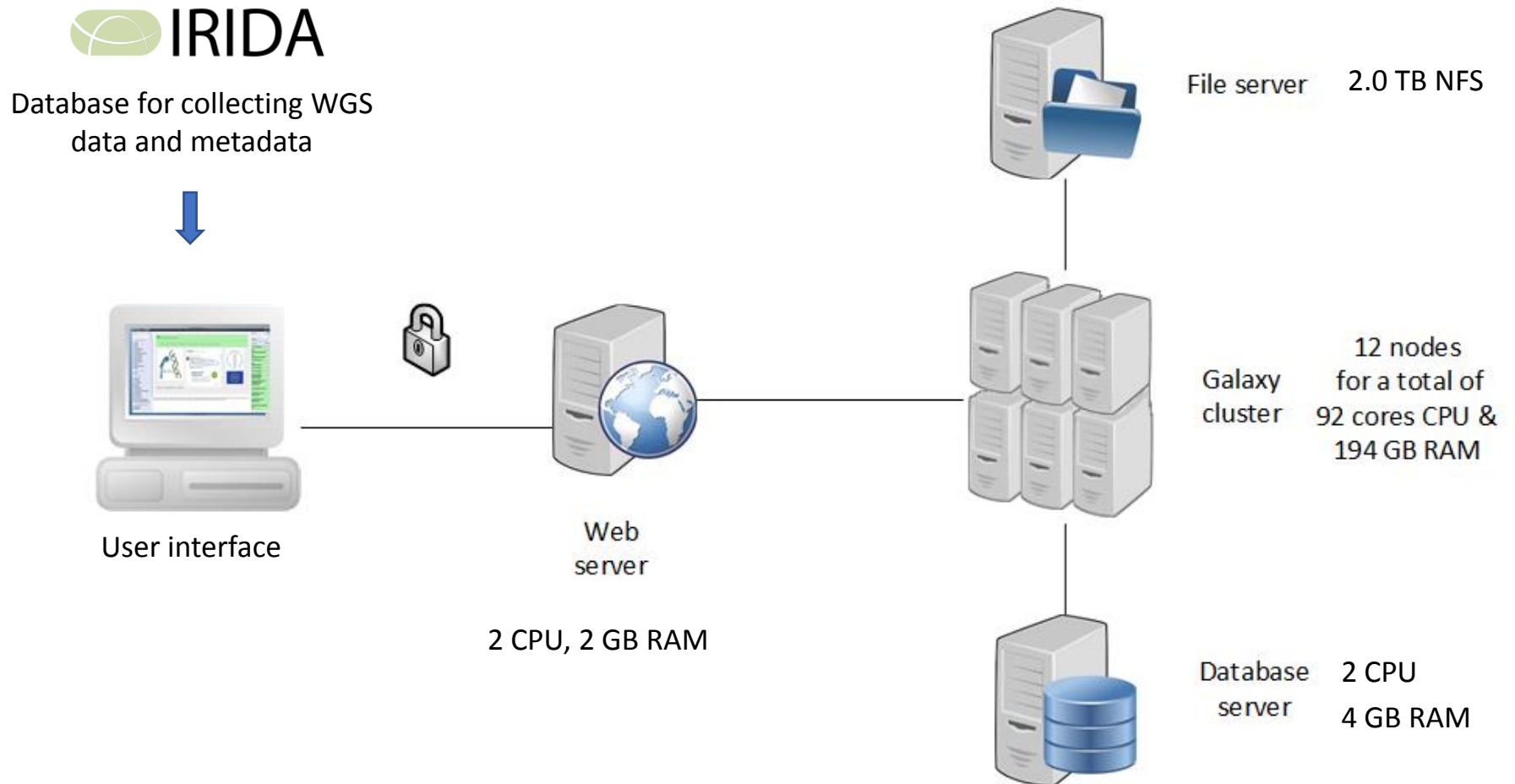


**Ion
GeneStudio
S5 System**



Adjustable yield
Up to 60 bacterial
genomes/run (200
genomes/week)

Bioinformatics infrastructure



Data collection

Associated Projects ▾

Sample Tools ▾

Export ▾

No samples selected

Name

▲ 03-3333

02-2222

01-1111

10-7165

E.

10-6366

E.

10-8231

E.

10-7700

E.

10-6966

E.

10-5737

E.

15-6439

E.

Show 10 ▾ entries

Toggle Metadata Columns

Templates

Show All Fields ▾

Save Template

Export

Search:

Sample Name	phageType	lastName	secondaryPfge	city	SourceType	onsetDate	PFGE-BlnI-pattern	SourceCity
01-1111	5	Doe	DEF456	Winnipeg		2015-10-15T10:16:42+00:00		
02-2222	DT4b	Dooley	DEF456	Vancouver		2015-02-11T10:16:42+00:00		
03-3333	DT13	Bar	SENBNI.0016	Comox		2015-06-04T10:16:42+00:00		
test-0001	7				Human		SINBNI.0045	
test-0002	7				Human		SINBNI.0012	
test-0003	7				Human		SINBNI.0045	
test-0004	7				Human		SINBNI.0012	Toronto
test-0005	7				Human		SINBNI.0013	Hamilton
test-0006	7				Human		SINBNI.0049	Toronto
test-0007	7				Human		SINBNI.0045	Ottawa
test-0008	7				Human		SINBNI.0012	Winnipeg

Showing 1 to 17 of 17 entries

ARIES: genomics analysis infrastructure/1

Galaxy / ARIES - ISS

Analyze Data Workflow Shared Data Visualization Help User

Using 8.0 GB

Tools

search tools

--- COMMON TOOLS ---

Get Data

Send Data

Lift-Over

Text Manipulation

Filter and Sort

Join, Subtract and Group

Convert Formats

Extract Features

Fetch Sequences

Fetch Alignments

Statistics

Graph/Display Data

--- HREVAP TOOLS ---

HReVAP

Assembly

NCBI Blast

Manipulation

Mapping

Gene Annotation

FASTA manipulation

NGS: Mapping

NGS: QC and manipulation

Operate on Genomic Intervals

MetaGenomics

Workflows

Species finder (16S)

MLST_coli_Warwick

E_coli_Virulence_finder

SerotypeFinder

Assembly_SPADES_IonTorrent

All workflows

Istituto Superiore di Sanita'

ARIES - Advanced Research Infrastructure for Experimentation in Genomics - Galaxy Instance at ISS



History

search datasets

metagenomics biosolids

19 shown, 55 deleted

6.7 GB

74: Krona chart on data 73

73: speciesassigned to Mobio 15 trimmed

70: blastx FASTQ to Fasta on data 55 vs Viral proteins Database_31052015

65: FASTQ to FASTA on data 55

63: FastQC on data 55: RawData

62: FastQC on data 55: Webpage

56: FASTQ positional and quality trimming on data 1: log

55: Mobio15-trimmed_Fasta

45: viral.1.1.genomic.fna

44: Viral proteins Database_31052015

43: viral.1.protein.faa

36: viral.nonredundant_protein.1.protein.faa

26: protein.BLAST database from data 25

25: viral.nonredundant_protein.1.protein.faa

19: Species assigned to megablast FASTQ to FASTA Mobio15 vs 16S_20150128

4: Mobio15 FASTA vs Viruses_DB

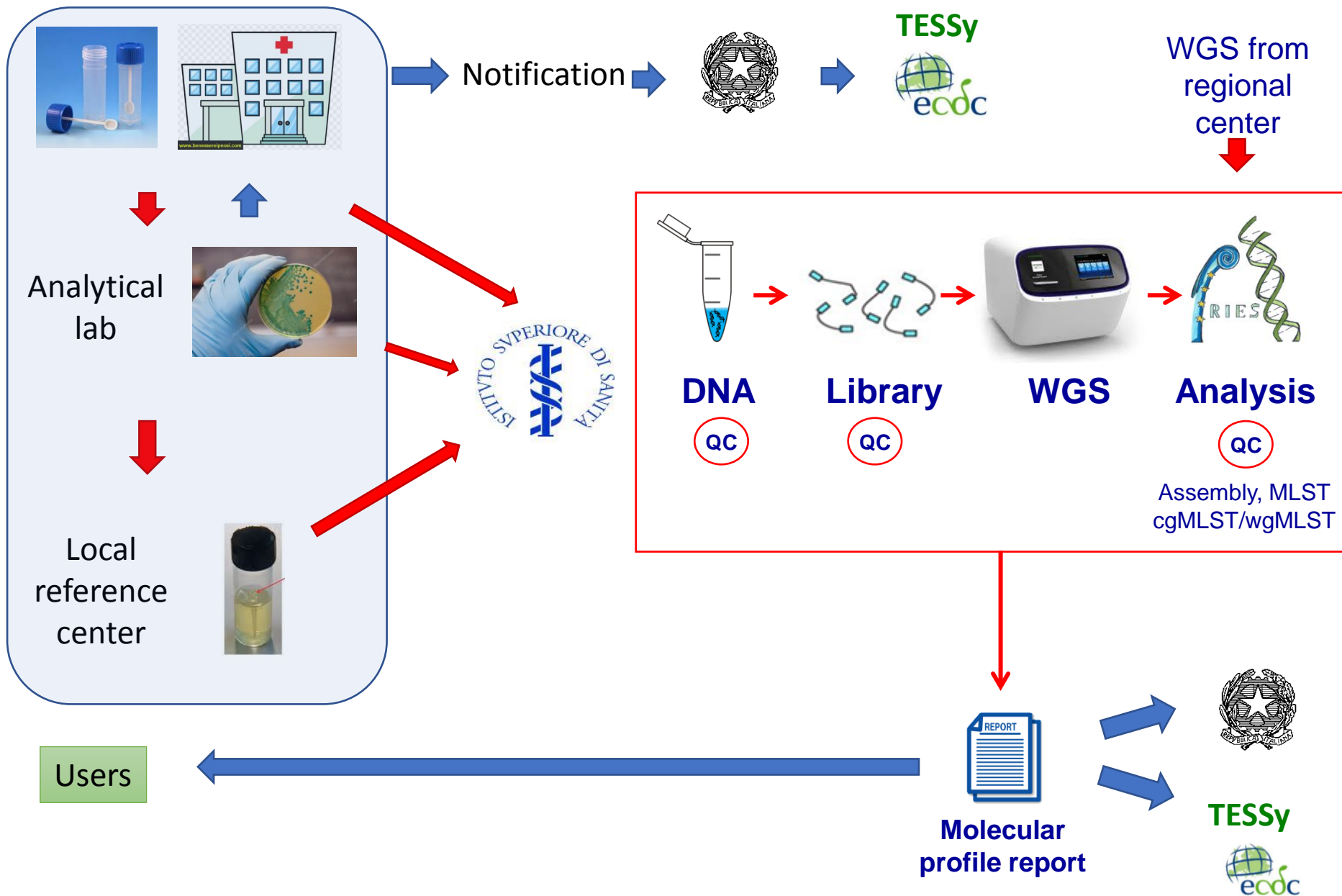
3: Mobio15 FASTA E.coli virulence genes

2: FASTQ to FASTA Mobio15

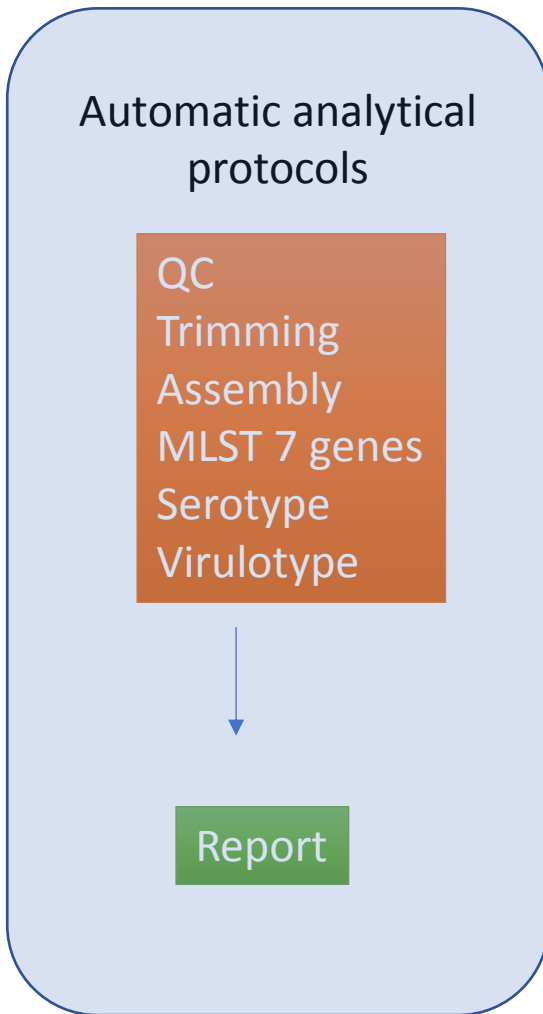
1: Mobio15_05052015.fasta

Galaxy is an open, web-based platform for data intensive biomedical research. The Galaxy team is a part of BX at Penn State, and the Biology and Mathematics and Computer Science departments at Emory University. The Galaxy Project is supported in part by NHGRI, NSF, The Huck Institutes of the Life Sciences, The Institute for CyberScience at Penn State, and Emory University.

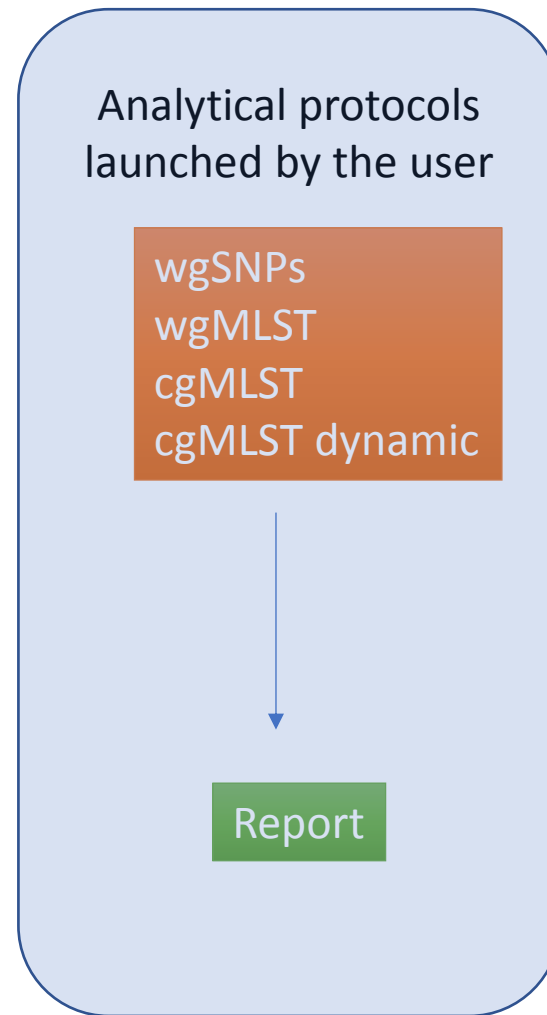
Surveillance flux for STEC infections



ARIES: genomics analysis infrastructure/2

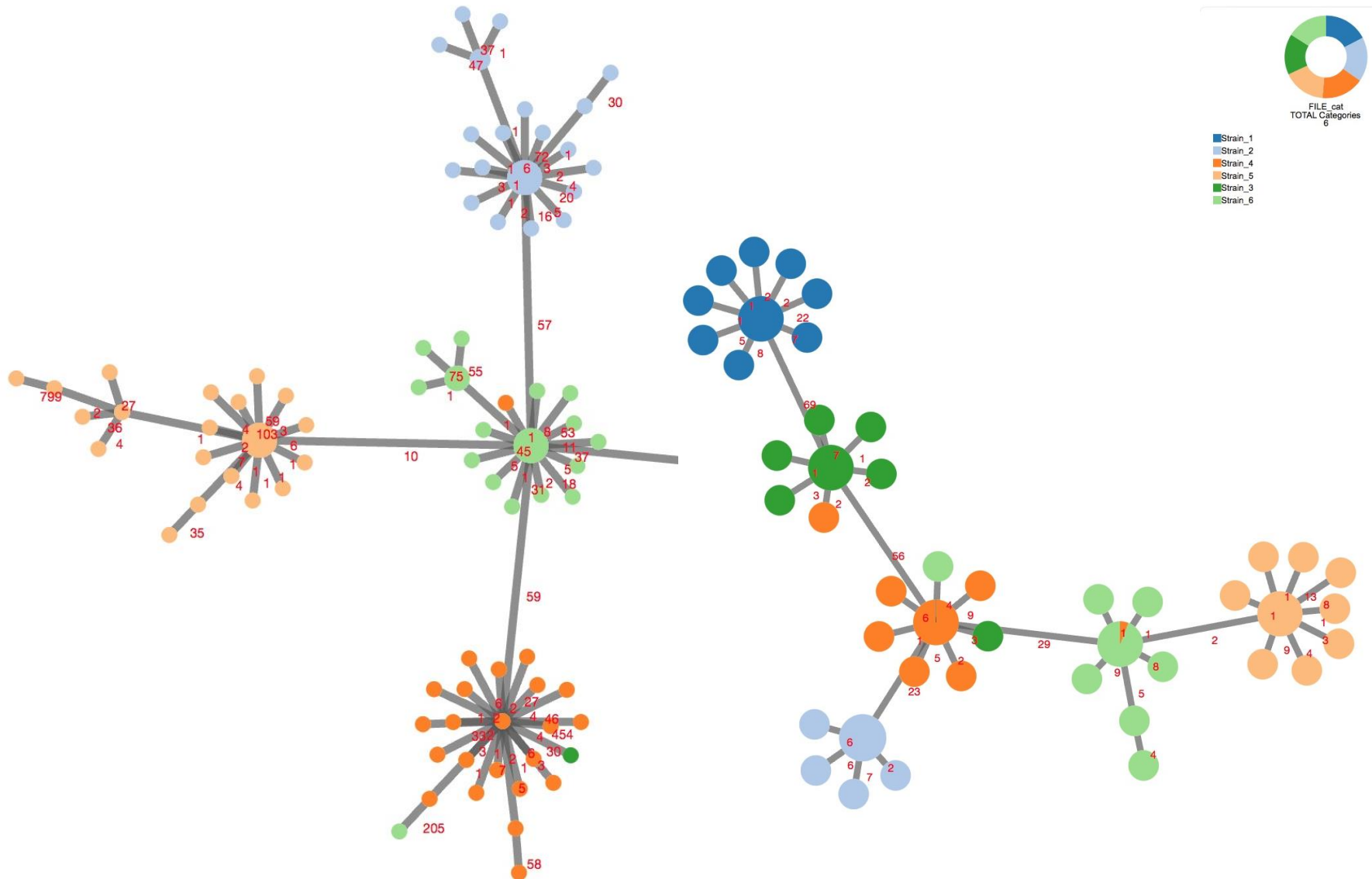


Immediate report

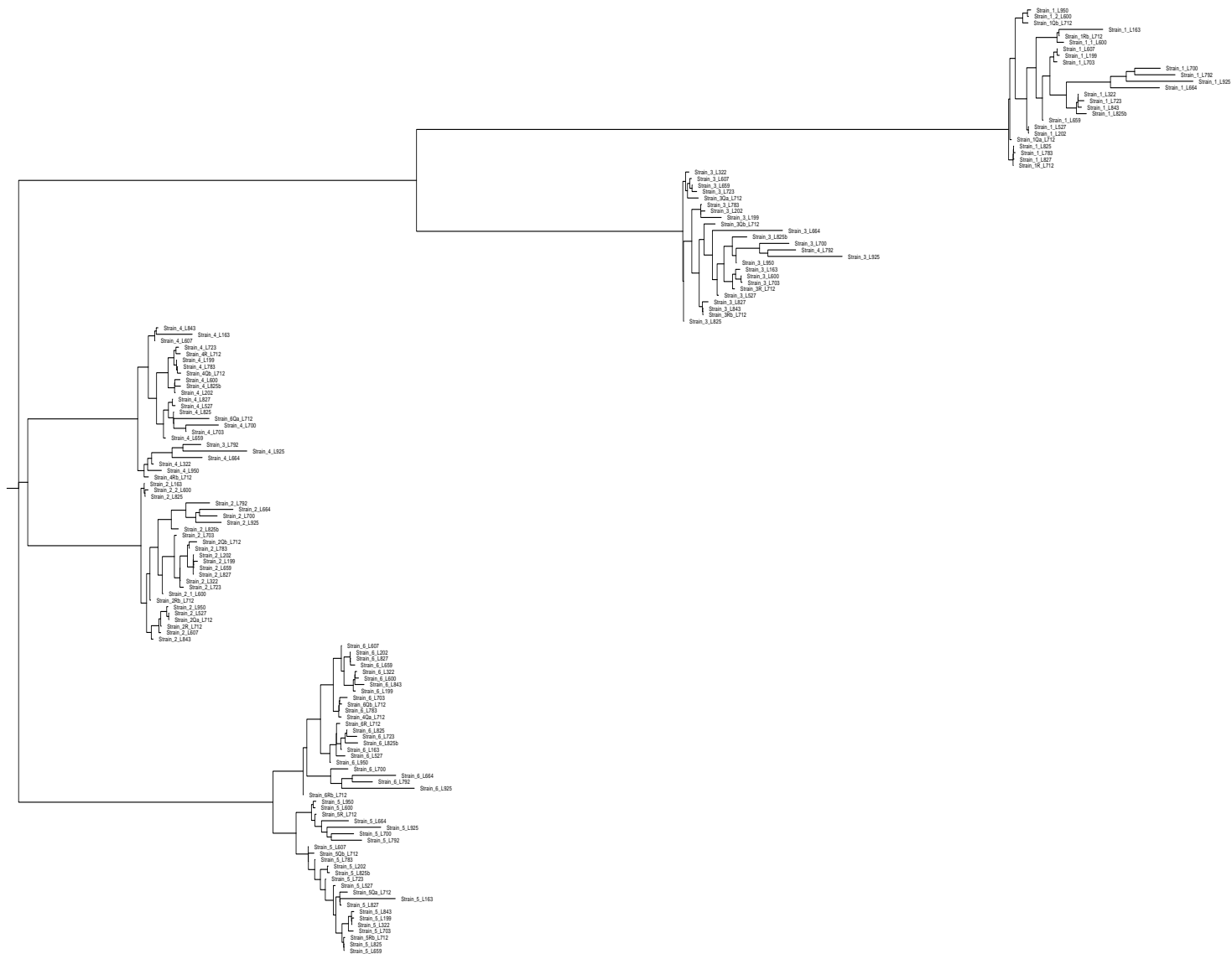


Periodic report

Reports and outputs: Strain typing - wg/cgMLST



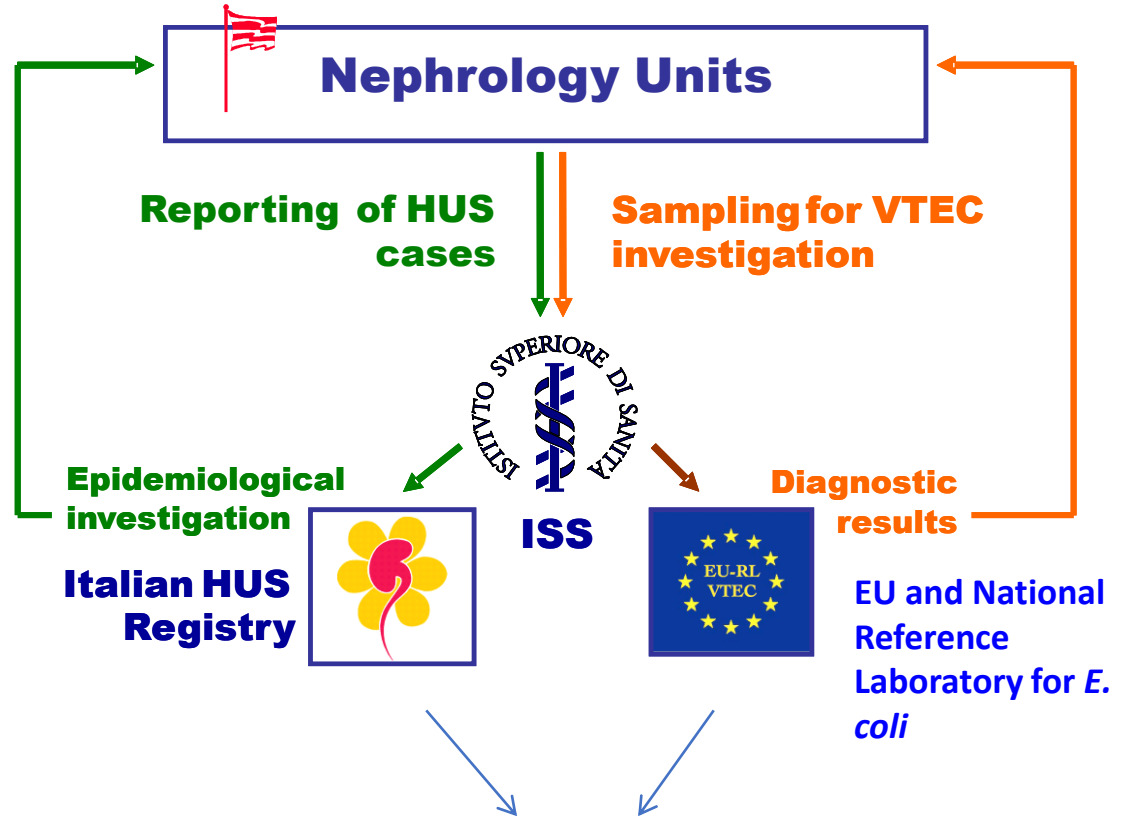
0.08



The Italian network and the information flow




Pediatric Nephrology Unit

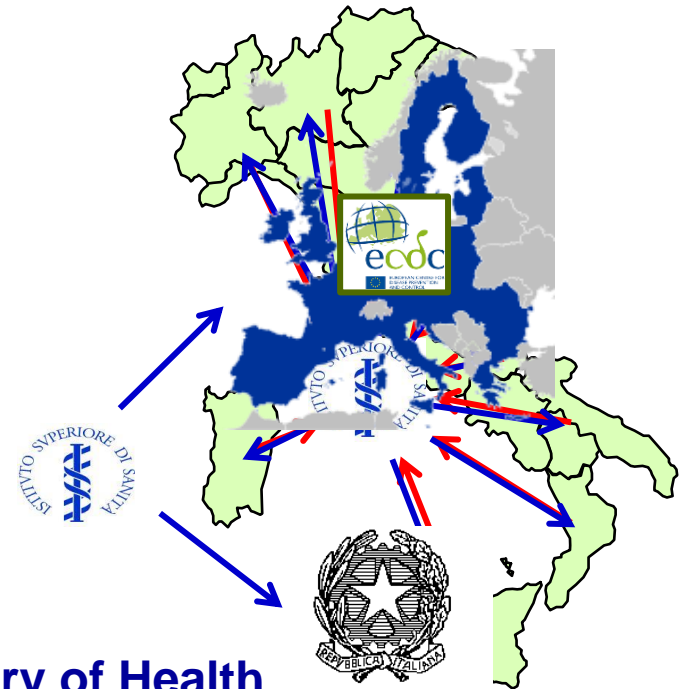


Investigation on HUS cases and outbreaks

Connection with the Vet network with units all over the country and the regional competent authorities

Wrap up

- **Isolation of STEC from clinical sample at ISS**
(or shipment of isolated strain from local lab)
 - **Whole genome sequencing (WGS)**
(or upload of WGS by local lab)
 - **Automatic protocols launched**
 - **Feedback to local center (report)**
 - **Monthly feedback on national situation to Ministry of Health**
 - **Immediate feedback to Ministry of Health in case of clusters**
 - Local authorities among recipients
- 
- The diagram illustrates the data flow for STEC monitoring. It features a map of Italy with a red dot in the north and a green dot in the south. A blue arrow points from the red dot to a central circular logo of the Istituto Superiore di Sanità (ISS). Another blue arrow points from the green dot to the same ISS logo. A third blue arrow points from the ISS logo to the green dot. A fourth blue arrow points from the ISS logo to the red dot. This indicates a two-way communication between the ISS and the local centers, with data being sent to the ISS and reports being sent back to the local centers.



Detailed feedback to TESSy ECDC

Roadmap

- February 2018: IRIDA test for data upload (PT-WGS1)
- January – July 2018: bioinformatics development for genomics analysis
- November 2018: Real time sequencing
- November 2018: beta test for sequences upload on IRIDA
- January - April 2019: multi-users test

**2019: Launch of the pilot system for molecular surveillance
of STEC human infections at ISS**