



Pathogen Data Network

Onboarding Material for Pathogens Portals Nodes

Pathogen Data Network

Overview



Pathogen Data Network

An ecosystem of resources to support
FAIR infectious-diseases data sharing and reuse





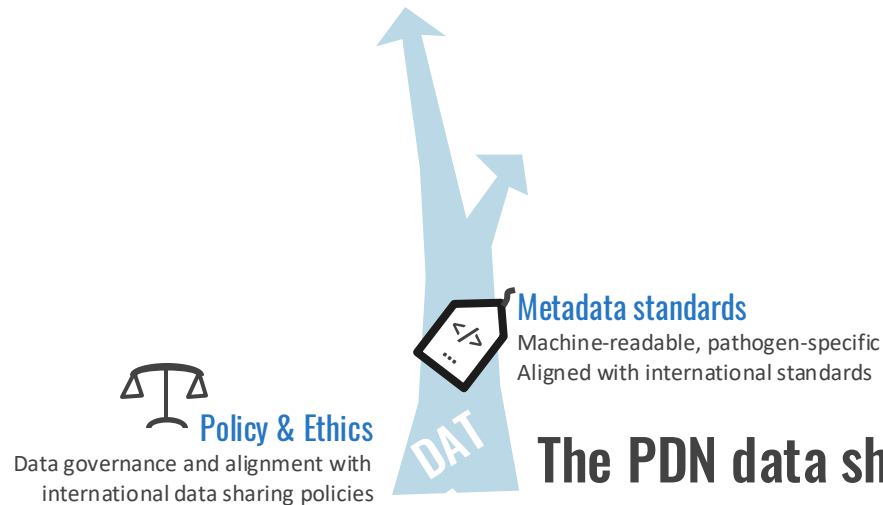
It all starts with data. PDN will cover diverse biodata types, including host and pathogen genomics, transcriptomics, proteins, pathways and networks, imaging and cohorts.

The PDN data sharing journey



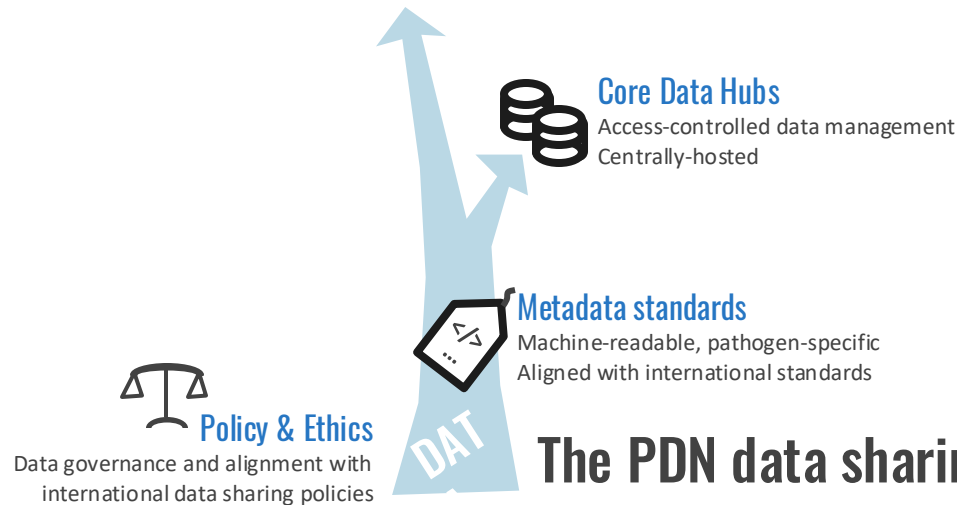
The PDN data sharing journey

Data sharing cannot be uncoupled from ethics and international policy. We need to carefully consider these aspects throughout the data journey, to ensure benefit sharing and trust.



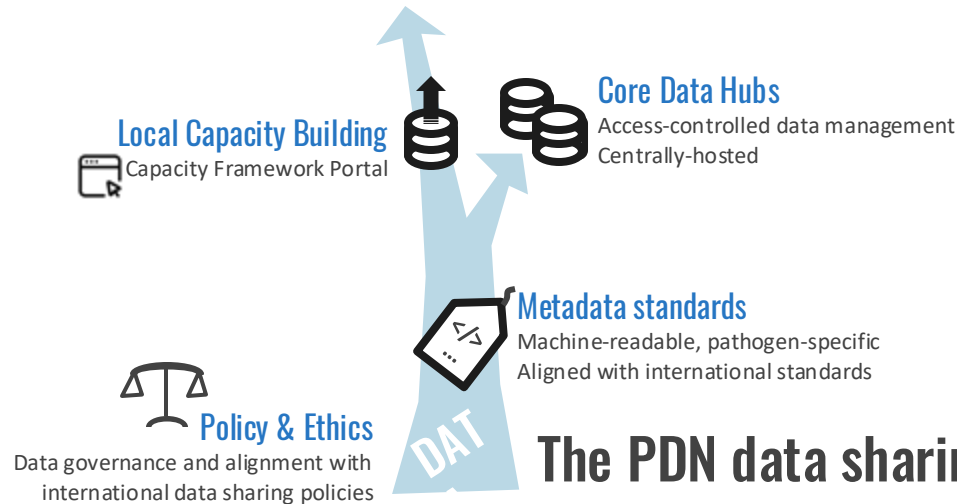
Data need to be standardized against international standards to ensure interoperability. These standards should be usable by machines, to support automated data validations.

The PDN data sharing journey



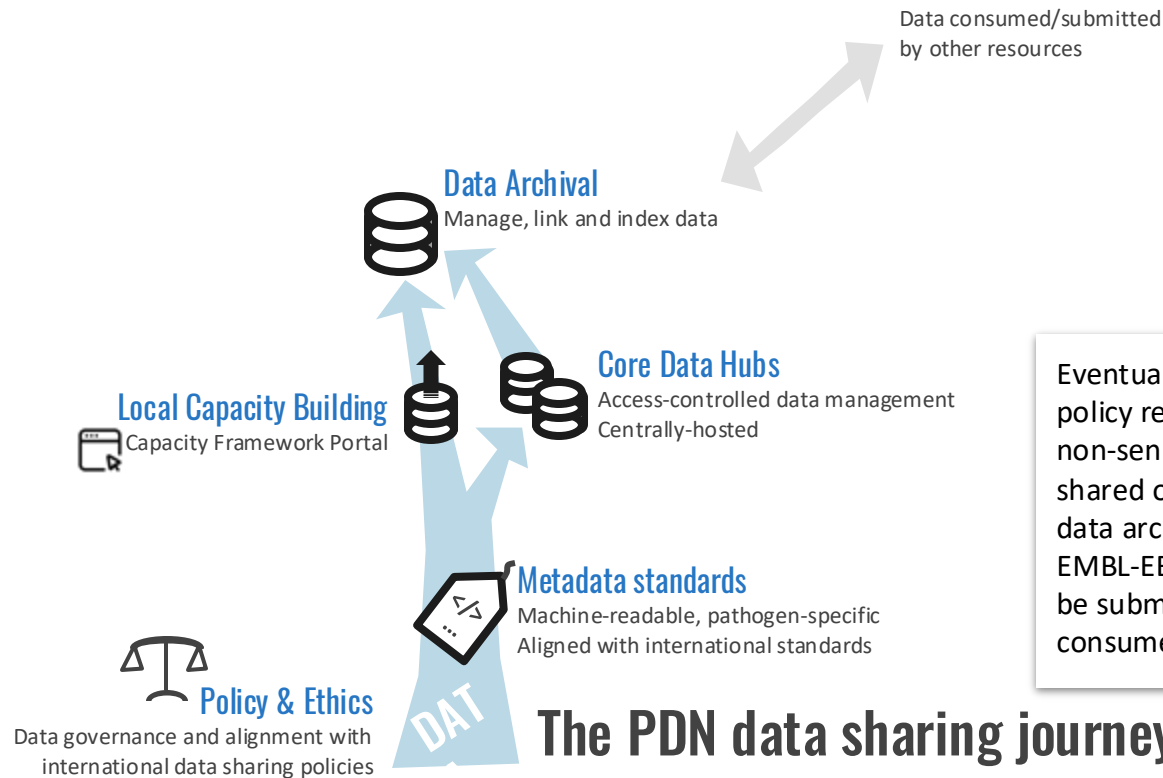
Data may transit through a data hub with time-limited controlled data access. EMBL-EBI will provide central hosting of pathogen data hubs with access control, analyses and visualizations.

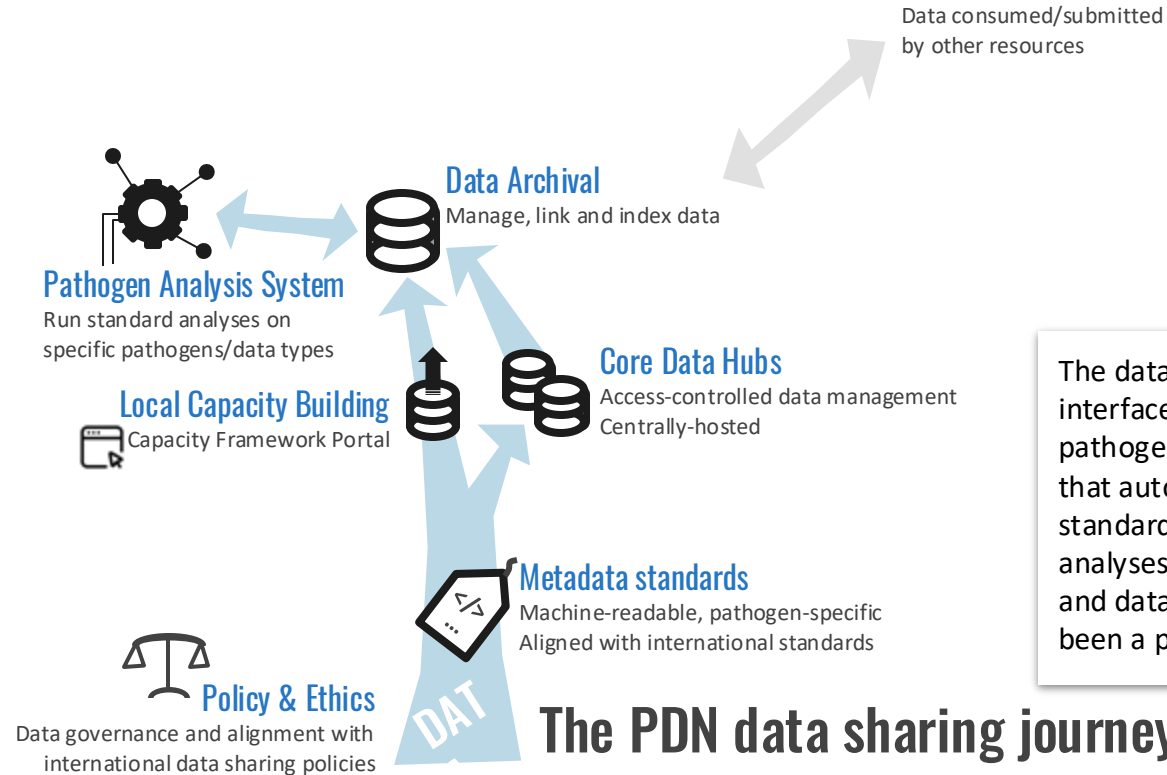
The PDN data sharing journey



Data may transit through local data hubs (e.g. at national level), that centralize data and may host personal data not to be openly shared. We will support capacity building for local hubs.

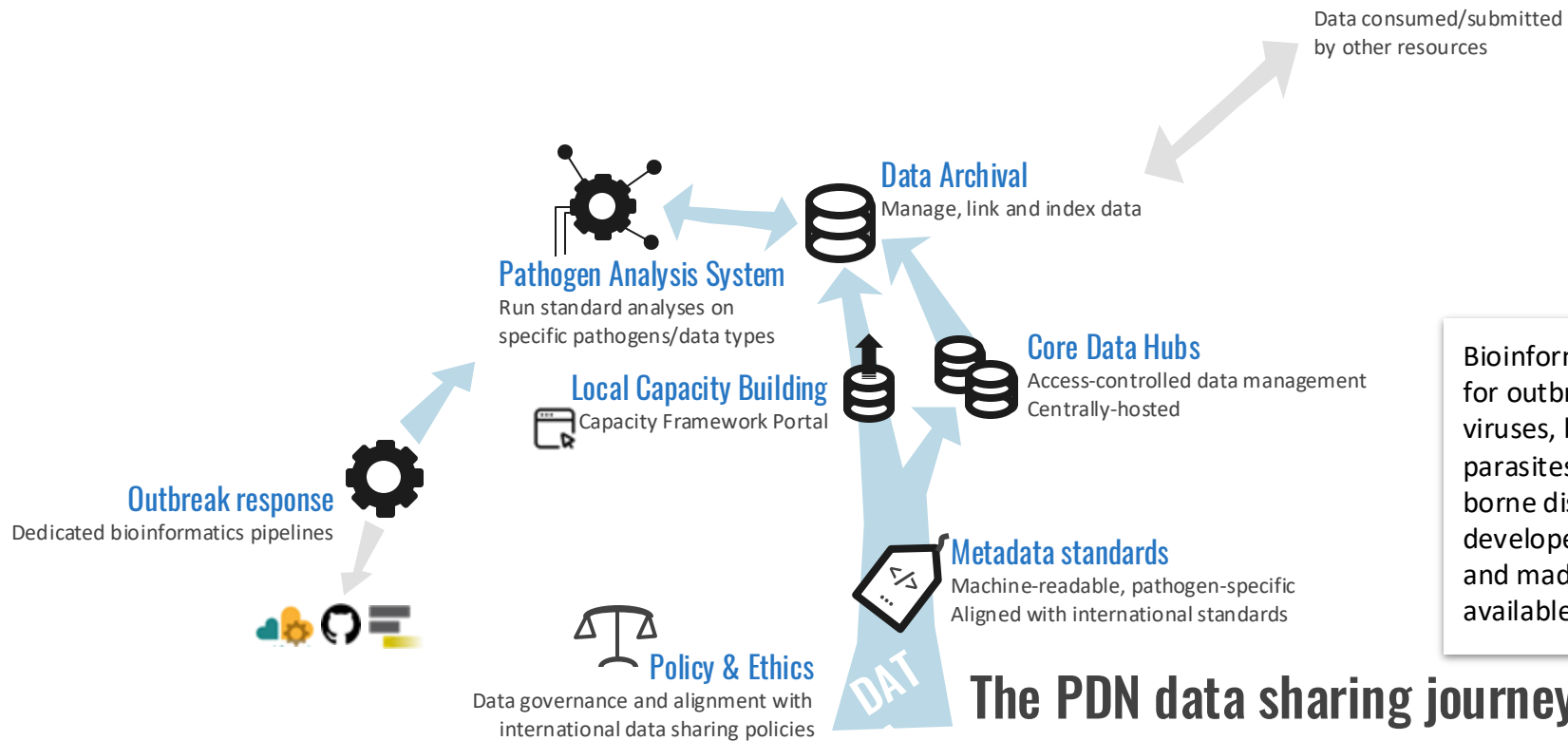
The PDN data sharing journey



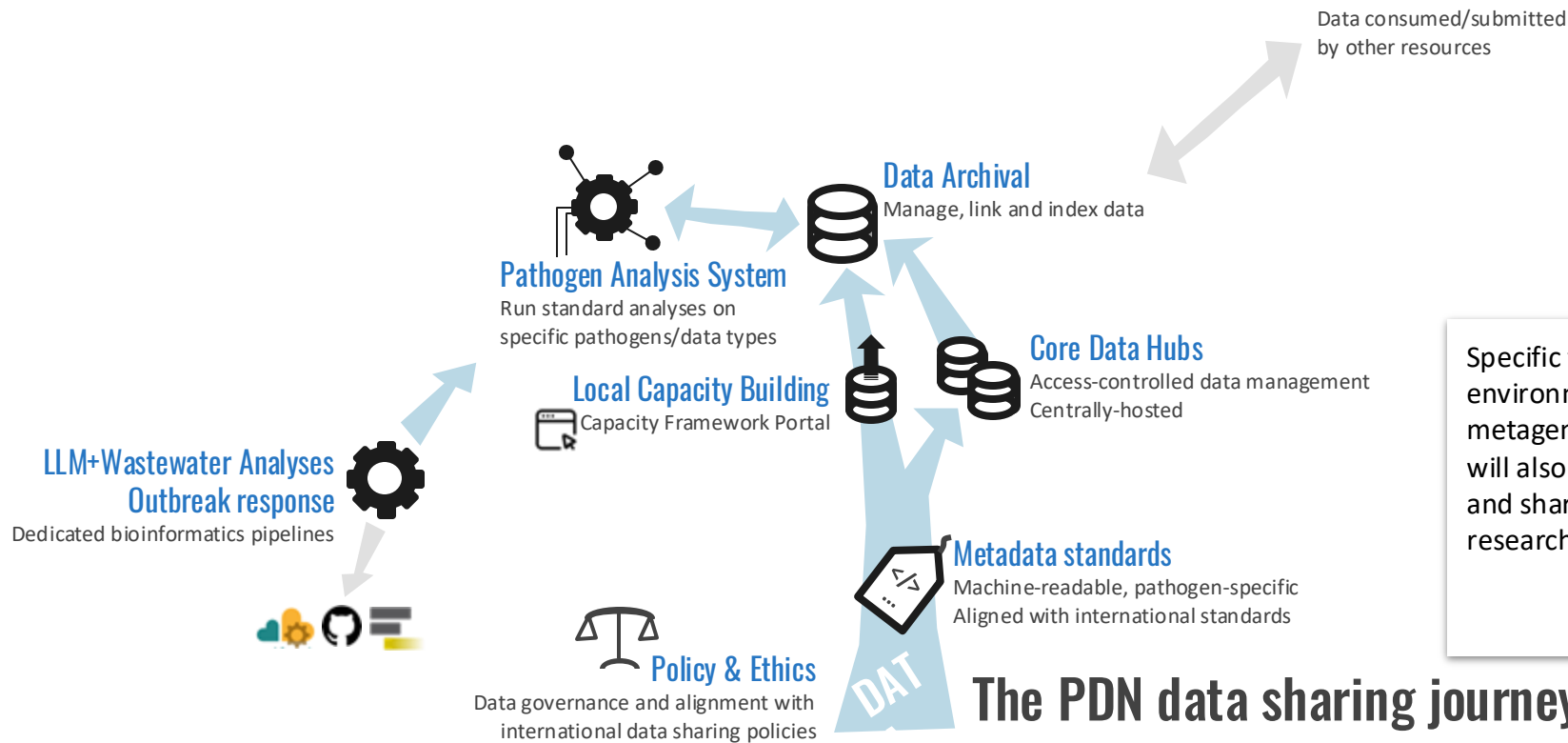


The data archival is interfaced with the pathogen analysis system that automatically runs standard bioinformatics analyses on pathogens and data types that have been a priori specified.

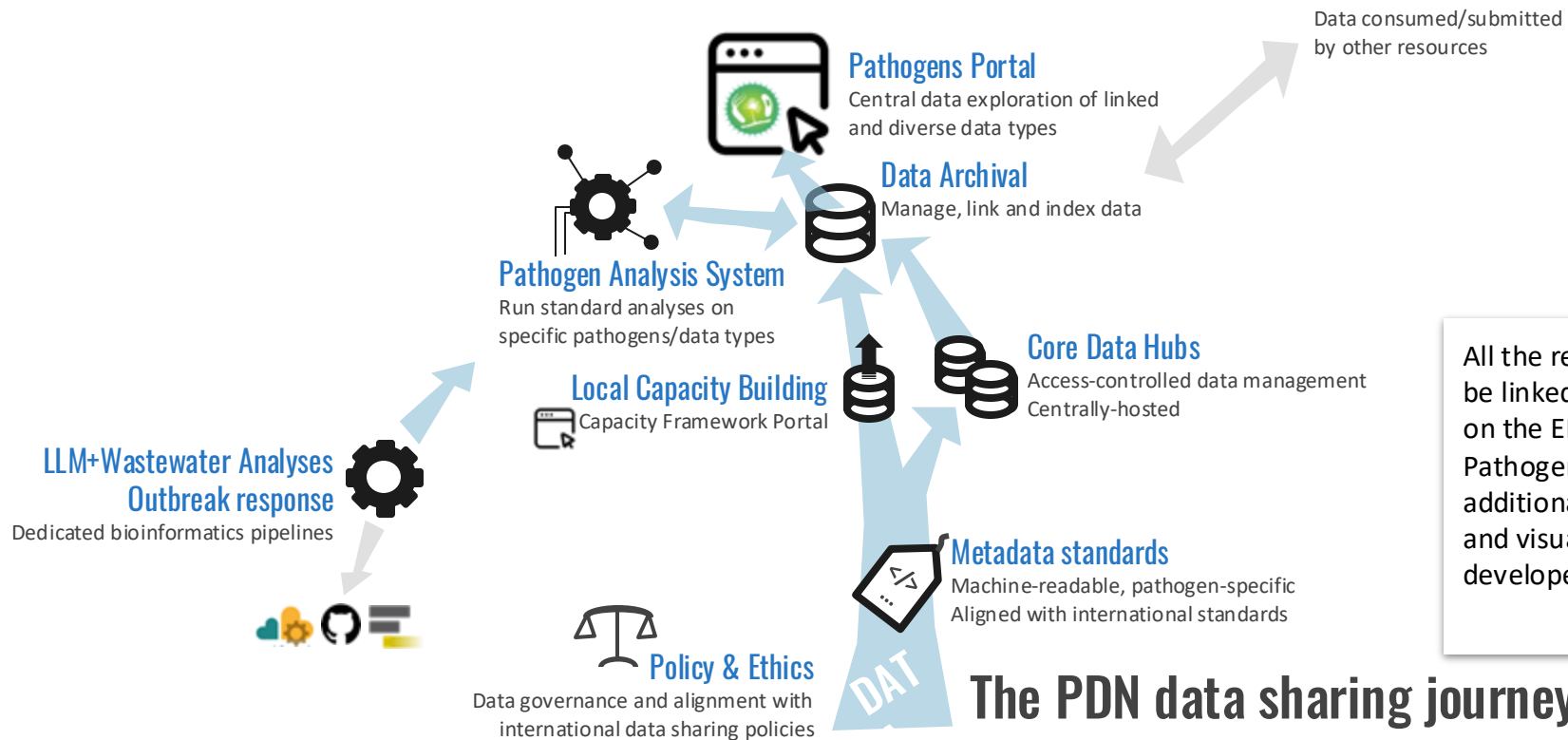
The PDN data sharing journey



Bioinformatics pipelines for outbreak analyses in viruses, bacteria, fungi, parasites, and vector-borne diseases will be developed, integrated, and made publicly available.

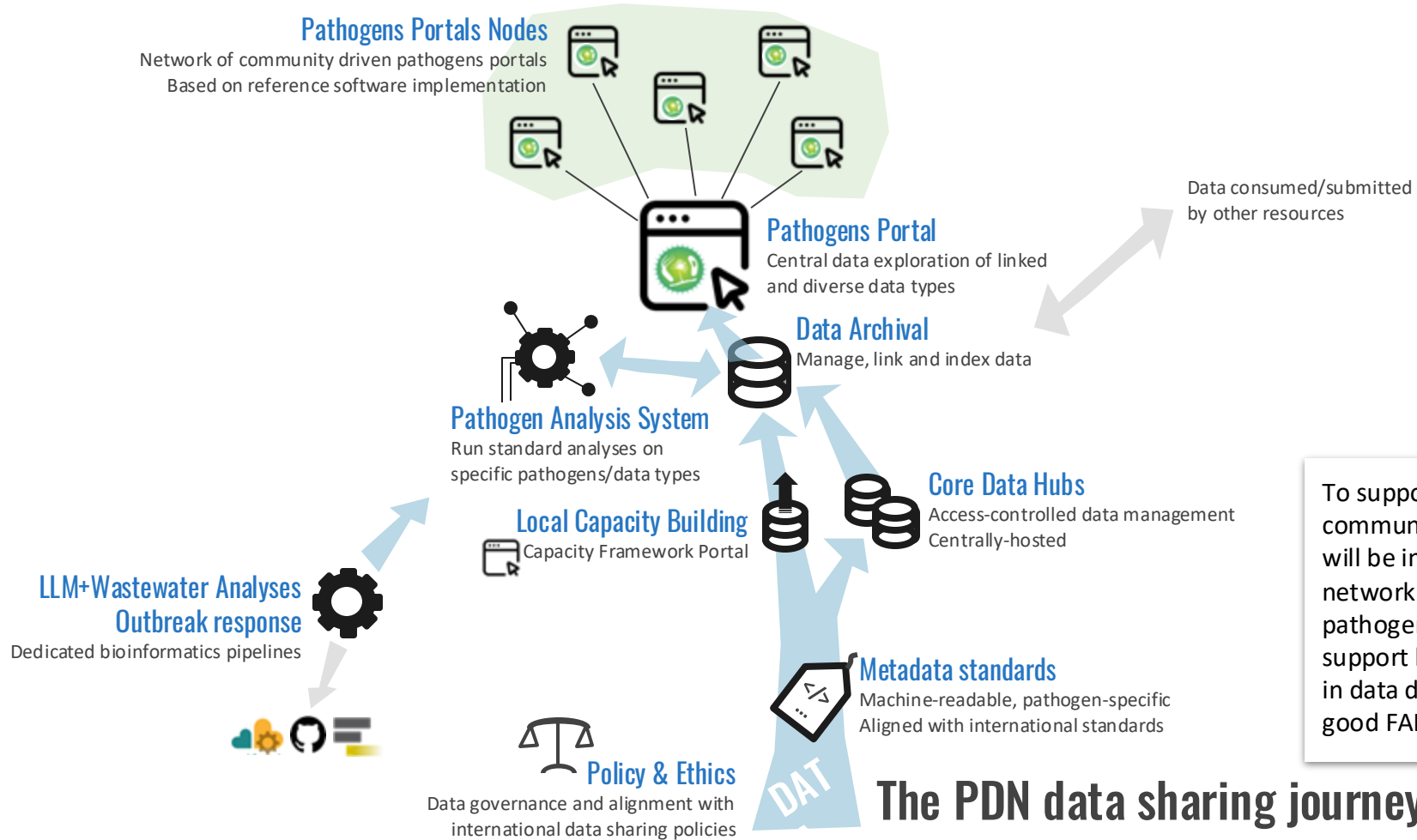


Specific tools to advance environmental metagenomics analyses will also be developed and shared with the research community.

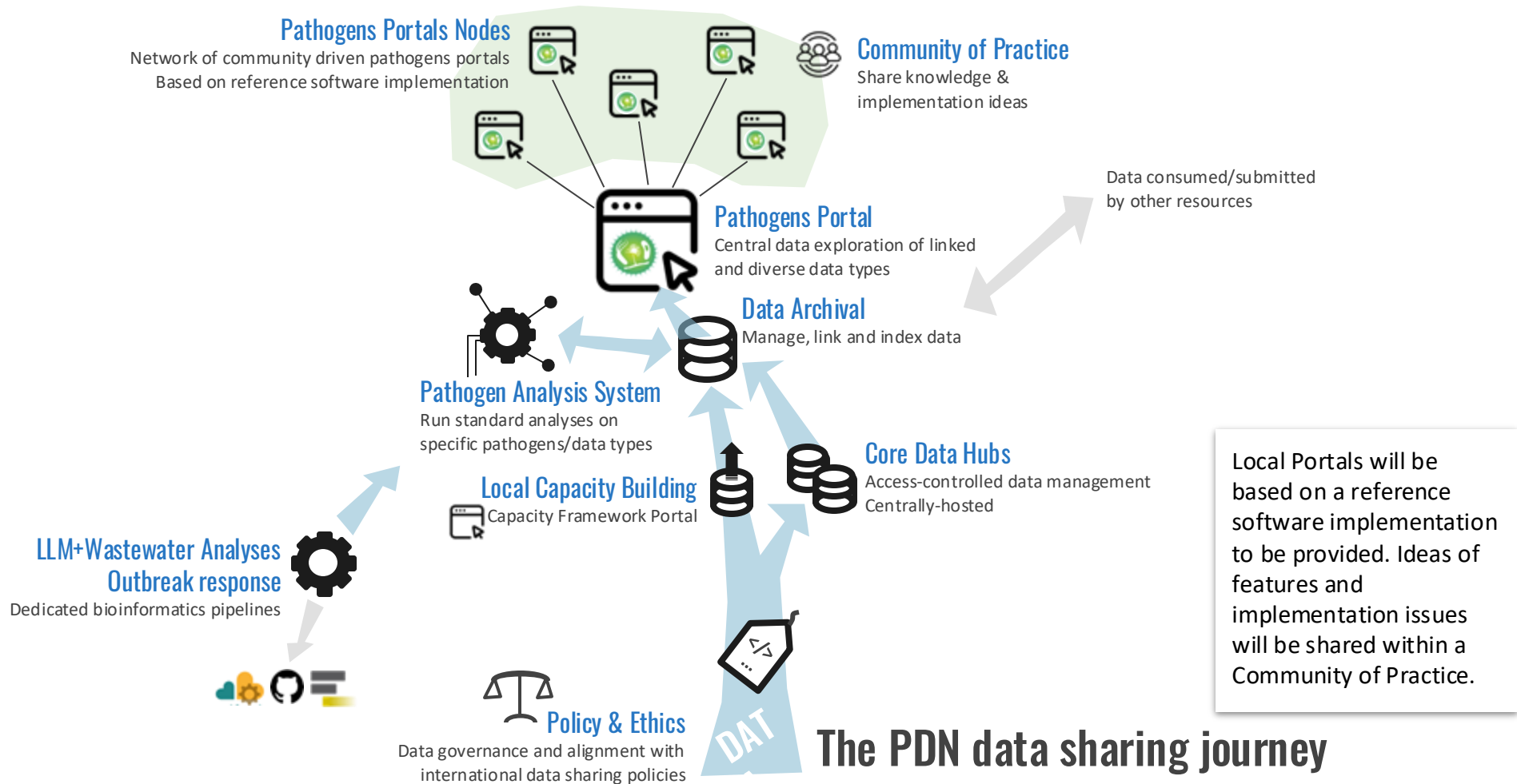


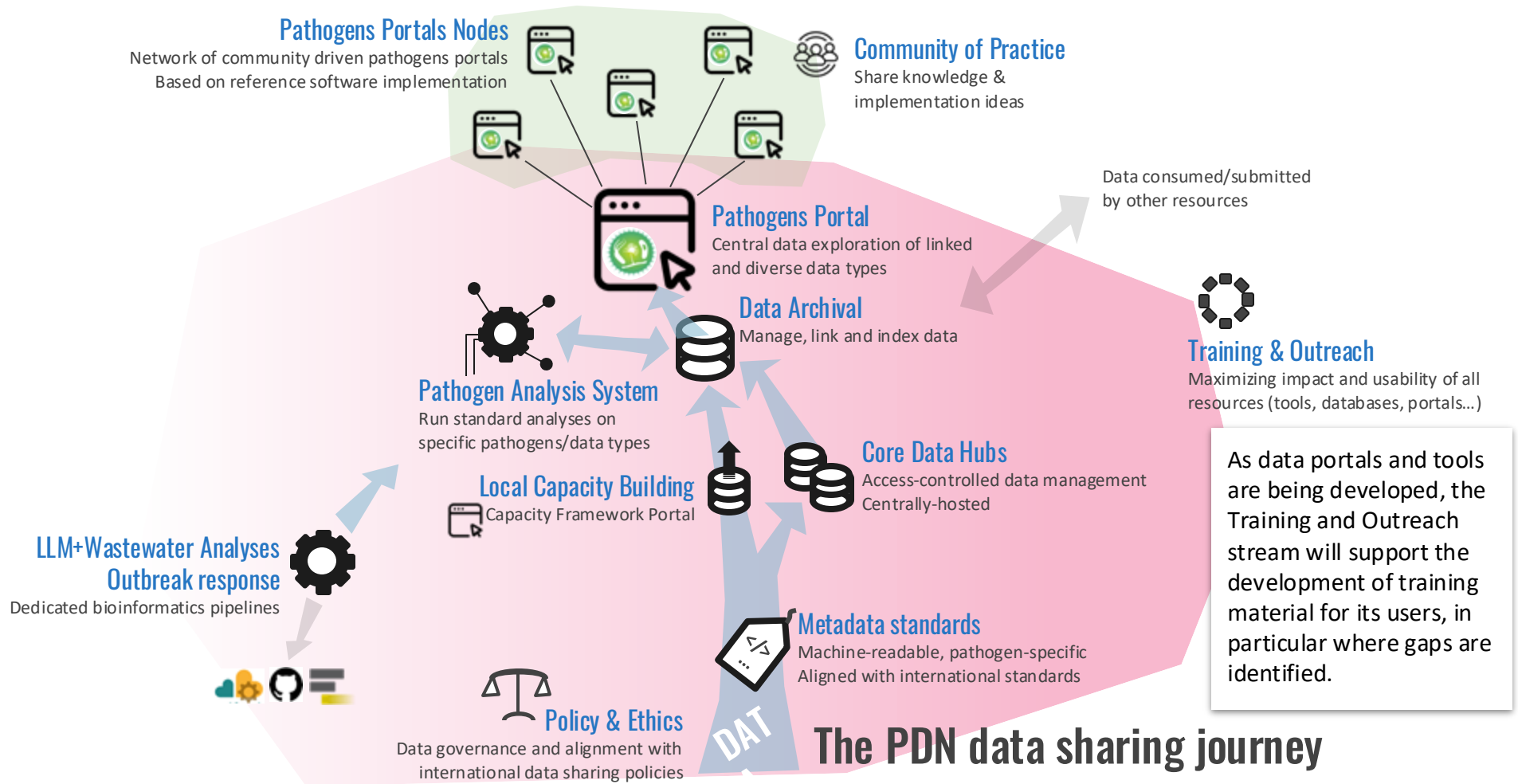
All the resulting data will be linked and searchable on the EMBL-EBI hosted Pathogens Portal, with additional dashboards and visualizations to be developed.

The PDN data sharing journey



To support local communities, the Portal will be interfaced with a network of local pathogens portals, to support local researchers in data discovery and good FAIR practices.





The PDN data sharing journey

Pathogens Portal

Overview



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Pathogens Portal

Central data exploration of
linked and diverse data types



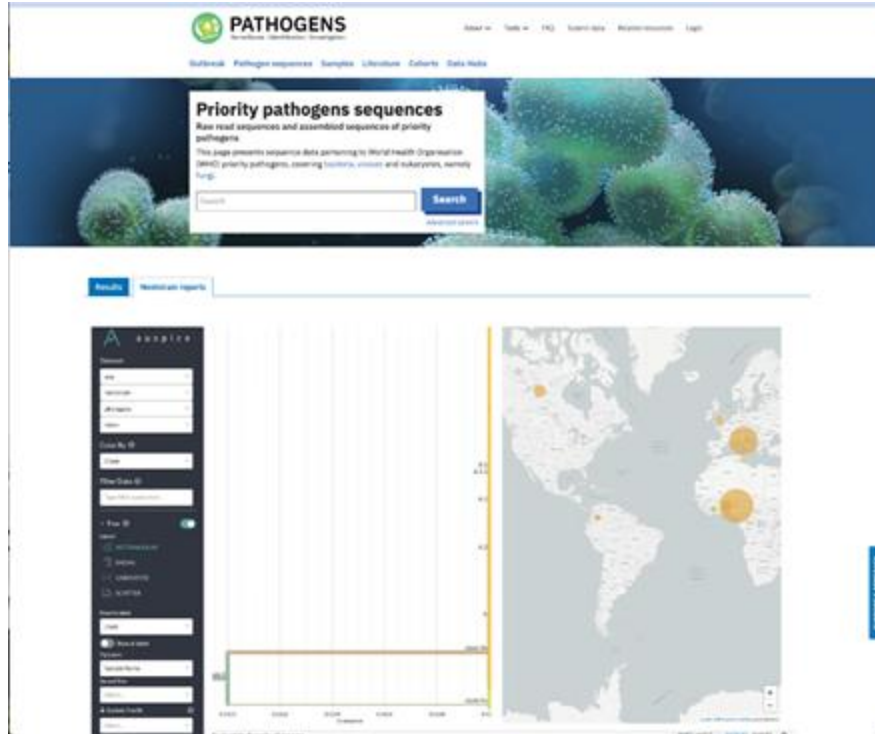
Pathogens Portal

<https://www.pathogensportal.org/>

- Current focus on sequence data
- Extend to diverse biodata types (based on Covid-19 Data Portal):
 - host and pathogen genomics,
 - Transcriptomics
 - Proteins
 - pathways and networks
 - imaging data
 - cohorts
- 1,000s of pathogen species
- Outbreak section to focus specifically on priority pathogens.
- Emerging user base

year	requests	uniq hosts	pages
2023	163,382	5,960	139,077
06/09/2024	665,884	8,629	478,017

Develop additional visualizations and dashboards



- Auspice-based phylogenomic and geospatial mapping tool integrated
 - <https://docs.nextstrain.org/projects/auspice/en/stable/>
- Additional visualizations and dashboards will be developed based on feedback from Covid-19 Data Portal users and from the PDN Open Community Forum.

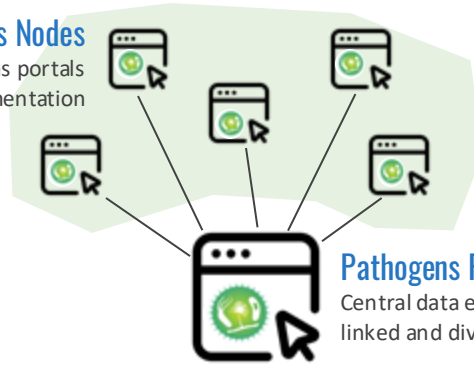
Pathogens Portals Nodes

**Overview & Examples from
Sweden, Norway and Switzerland**



Pathogens Portals Nodes

Network of community driven pathogens portals
Based on reference software implementation

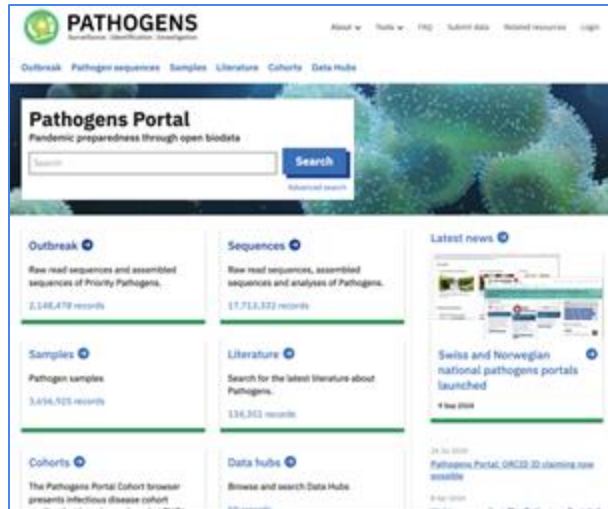


Pathogens Portal

Central data exploration of
linked and diverse data types



Pathogen Portal Nodes (PPN)



pathogensportal.ch



pathogens.se



pathogens.no



- Discovery of local data and services to support data management, analysis, and sharing.
- PDN will provide a reference software implementation for rapid deployment.
- Led by local communities.
- Aims to serve local research communities.
- Can be deployed in local language.
- Interfaced with the central Pathogens Portal (e.g. to allow data catalogues to be discoverable).



PPN Examples

Data management

The Swedish Pathogens Portal / Data management

"Research data management concerns the organization, storage, preservation, and sharing of data that is collected or analysed during a research project. Proper planning and management of research data will make project management easier and more efficient while projects are being performed. It also facilitates sharing and allows others to validate as well as reuse the data. As funding agencies are recognizing the importance of research data management and some now request Data Management Plans (DMP) as part of the grant application process." (NIOIS)

Here we give an overview of available resources regarding research data management relevant to Swedish researchers working on COVID-19 and Pandemic Preparedness research.

Available datasets

Biochemistry (34) ▶

Health (98) ▶

Protein (43) ▶

Social Science (59) ▶

Drug Discovery (15) ▶

Imaging (7) ▶

Public Health (63) ▶

PATHOGENS Sweden

Swedish COVID-19 Sample Collection Database

Filtering tools

- Name
- Diagnoses
- Materials
- Collection types

Name	Type	Size	Material
Anxov-19	Respiratory sample collection	1,000 - 10,000	Respiratory sample collection

The Swedish COVID-19 Sample Collection Database

Pathogen sequences

60,364 results

View all 31,467 results in Sequences

View all 1,188 results in Analysis

View all 16,259 results in Raw reads

View all 11,450 results in Assembly

Samples

17,507 results

View all 17,507 results in Samples

Outbreak

12,246 results

View all 236 results in Sequences

View all 338 results in Analysis

View all 5,880 results in Raw reads

View all 5,792 results in Samples

Datasets available from research groups in Switzerland

The table below lists the latest publications from research groups in Switzerland that are on Europe PubMed Central.

Data sources

All data (1920)

- Figshare (65)
- Zenodo (235)
- GitHub (722)
- Dryad (17)
- Gene Expression Omnibus (151)
- Protein Data Bank (296)
- Proteome Xchange (15)
- SASBDB (3)
- Electron Microscopy DB (76)
- ENA (72)
- Open Science Framework (265)

Publication

10 entries per page

"I will take part in the revolution with our people": a quorum sensing-mediated resistance after the 2021 Myanmar coup d'état.

Haar RJ, Crawford K, Fast L, Win TH, Rubenstein L, Blanchet K, Lillie M, et al. undefined

DOI: 10.1186/s13031-024-00611-7

"The Tragedy of the Commons": How Individualism and Collectivism Affect the Spread of Antimicrobial Resistance.

Masaeli Y, Levy A, Gur T, Confino S, Segal S, et al. undefined

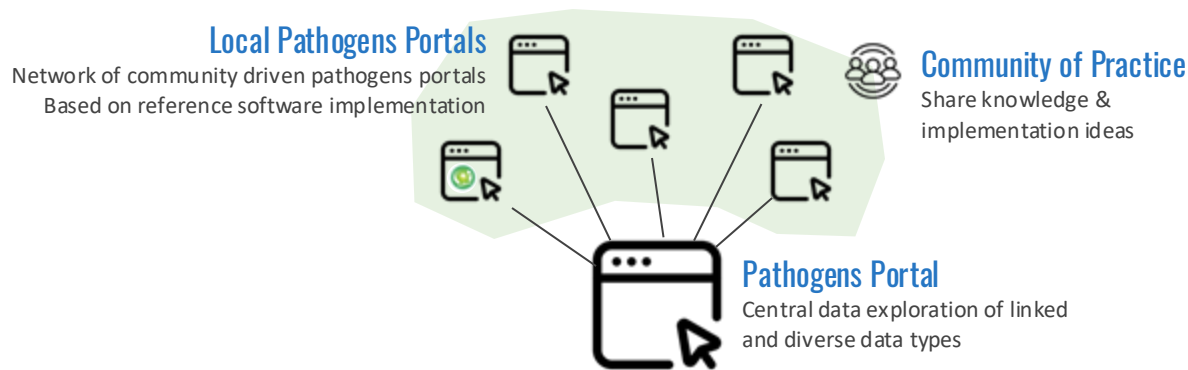
DOI: 10.3389/fpubh.2021.627559

- Swedish Pathogens Portal: <https://www.pathogens.se/>
- Norwegian Pathogens Portal: <https://pathogens.no>
- Swiss Pathogens Portal: <https://pathogensportal.ch/>

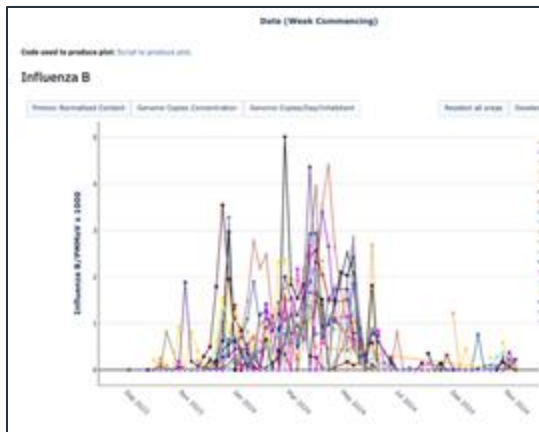


Node portals have dual roles

- Center for local data sharing and local community driven content
- Linking local community to international data resources (Pathogens Portal)
- Facilitating access to international data sharing resources (Pathogens Portal)
- Providing services, tools, guidelines, information to local community
- Hosting community driven content in a lightweight framework
- Supporting local users for data sharing and research data management support
- Local focal point in outbreaks



PPN Examples



Dashboards for local wastewater surveillance

PATHOGENS Sweden | ScilifeLab

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Ongoing research projects

The Swedish Pathogens Portal - Ongoing research projects

This is a manually curated overview of research projects on COVID-19, infectious diseases in general, and antibiotic resistance which are funded by major funding agencies in Sweden. New projects are added on an ongoing basis. If you would like your project to be listed here, please get in touch with us.

For a list of all projects on COVID-19 and SARS-CoV-2 funded by major Swedish funders since the start of the COVID-19 pandemic, see this page.

See also EuroCOVID, a database of all funded research projects for many of the larger funding agencies in Sweden, where it is interested specifically in COVID-19 projects, there is a list of all ethically approved clinical studies on COVID-19 in Sweden available only in Swedish.

Last updated: 2020-07-27

Topic

- ☐ Antibiotic resistance
- ☐ COVID-19
- ☐ Infectious diseases

Funder

- ☐ Permat
- ☐ Parus
- ☐ Swedish Research Council
- ☐ Swedish Social Science Agency
- ☐ Vetenskapsrådet
- ☐ Vinnova
- ☐ VR

PI Affiliation

- ☐ Chalmers University

Showing 1 to 10 of 77 projects

Project title

A comprehensive in-depth register-based analysis of the patient population diagnosed COVID-19 in Sweden (SveCovid)

Host Institute: Stockholm University
Principal Investigator: Maria Rignell

[Details](#)

A network to help build vaccine confidence among health workers and the population

Host Institute: Karolinska Institute
Principal Investigator: Stigge Ingvig van West

[Details](#)

All quality and COVID-19: An individual-based population study

Databases for local research projects

Norwegian Health Dashboard

This is a manually curated overview of research projects on COVID-19, infectious diseases in general, and antibiotic resistance which are funded by major funding agencies in Norway. New projects are added on an ongoing basis. If you would like your project to be listed here, please get in touch with us.

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Local data in international Pathogens Portal

PATHOGENS Switzerland | Swiss Institute of Technology

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Available Datasets

Swiss Pathogens Portal: supporting researchers for pandemic preparedness and response | [Share and Access Data](#) | [Available Datasets](#)

Access-controlled datasets

This is a manually curated list of available datasets with controlled access. New datasets are added on an ongoing basis. If you would like your project to be listed here, please get in touch with us.

30 entries per page

Name [Access data catalog](#) [Data access documentation](#) **Contact**

Swiss Pathogen Surveillance Platform <https://public.app.sls.swiss/> <https://public.app.sls.swiss/docs/data-access-and-re-use.html> adana.neved@sls.swiss arg@imm.univ.ch

Showing 1 to 1 of 1 entry

Pathogens Portal

Results for Switzerland

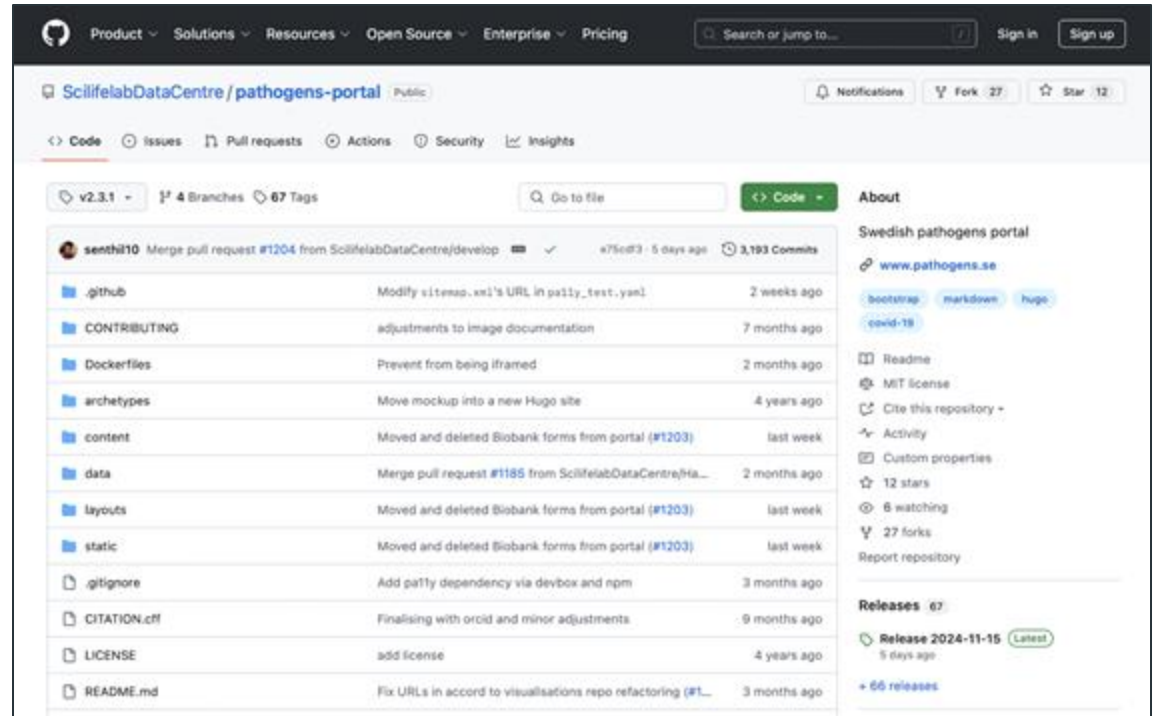
[Pathogen sequences](#) [Results](#)

[View all 1,588 results in Analysis](#) [View all 16,363 results in Raw reads](#) [View all 12,622 results in Assembly](#)

Facilitate access to locally relevant data resources, research and public health

Portal development

- PDN will provide base software repositories, provide development guidelines and recommendations
- Built on lightweight Hugo framework
- PPN software roadmap to support local developers in planning ahead
- Network of pathogen portals nodes share common software components, for example visualisation frameworks
- PPNs can align and share locally developed content proving useful for others
- Software components developed also together with Pathogens Portal
- Freedom to fork and develop in direction needed for local community
- Network of PPN developers



PPN Github repository





PDN | Pathogen Data Network

www.pathogendatanetwork.org

Please keep in touch, share ideas, feedback!

Contact everyone: pdn-all@sib.swiss

Contact executive board (PIs): pdn-eb@sib.swiss



THANK YOU!