

# NDS IICU

## *Kick off*

**Prof. Dr. Dr. Adrian Egli (PI SPHN)**

Until July 2022: University Hospital Basel and University of Basel

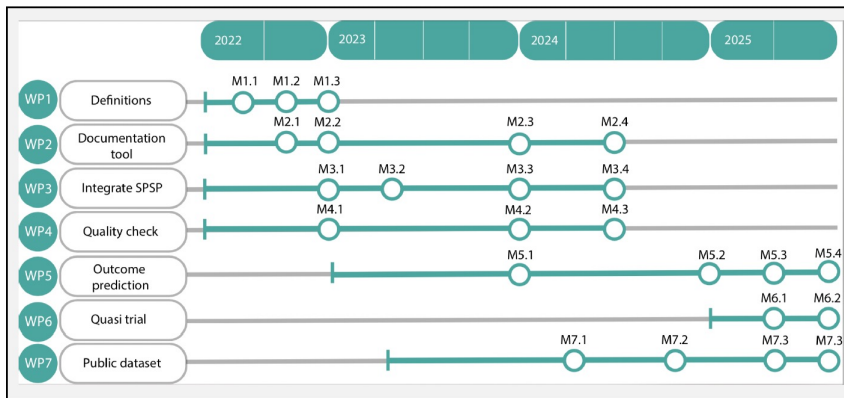
From August 2022: University of Zurich

**Prof Dr. Karsten Borgwardt (PI PHRT)**

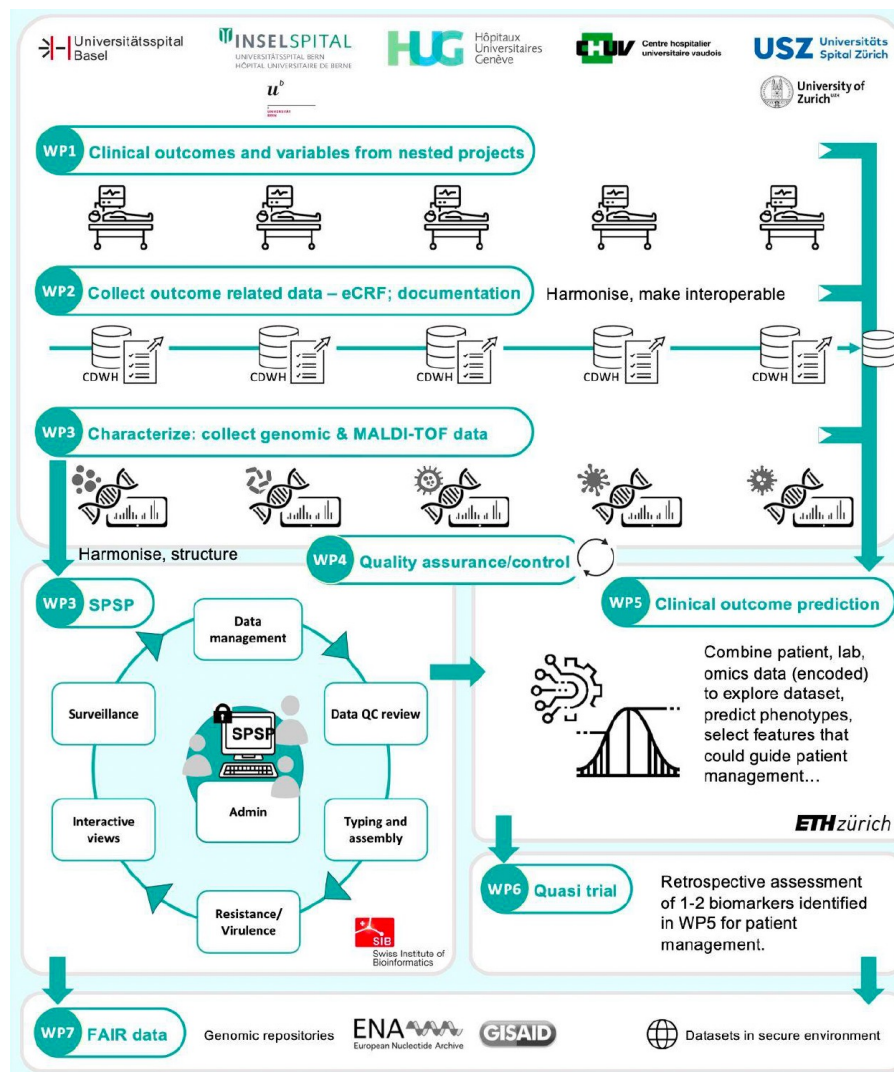
D-BSSE, ETH Zurich



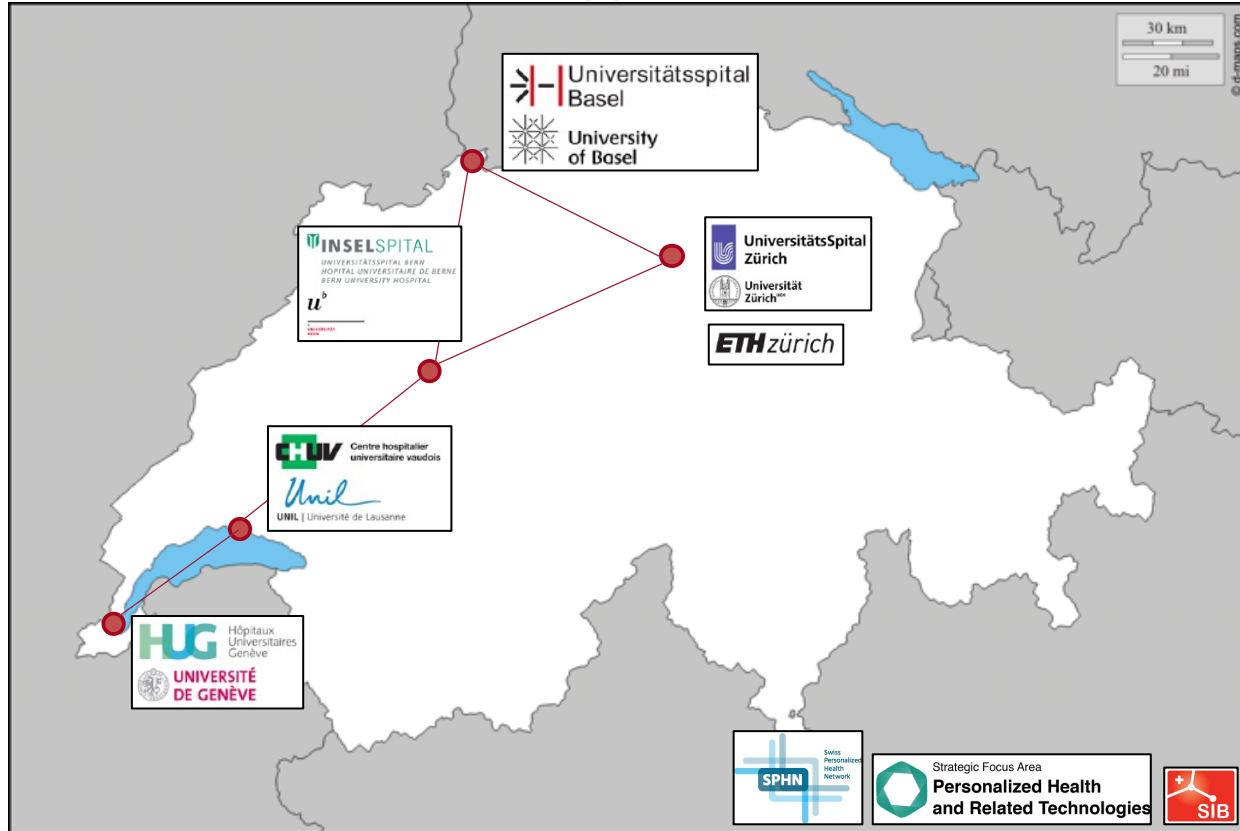
# Executive summary of NDS ICU



- **WP1:** harmonize definitions and catalogs of clinical outcomes
- **WP2:** build documentation tools
- **WP3:** Integrate SPSP genomics and proteomics data via CDWH and SPSP
- **WP4:** Control data quality
- **WP5:** Develop and integrate clinical and data driven phenotype assessments and characterization and outcome prediction
- **WP6:** quasi trial
- **WP7:** public data repository



# Our Team: ICU, infectious disease, clinical microbiology, and datascience



## Basel

Manuel Battegay (ID)  
Adrian Egli (CM)  
Martin Siegemund (ICU)  
Katrin Cramerli (DCC)

## Bern

Hans-Jakob Furrer (ID)  
Stephan Jakob (ICU)  
Stephen Leib (CM)

## Geneva

Laurent Kaiser (ID)  
Jerome Pugin (ICU)  
Jacques Schrenzel (CM)

## Lausanne

Thierry Calandra (ID)  
Jean-Daniel Chiche (ICU)  
Gilbert Greub (CM)

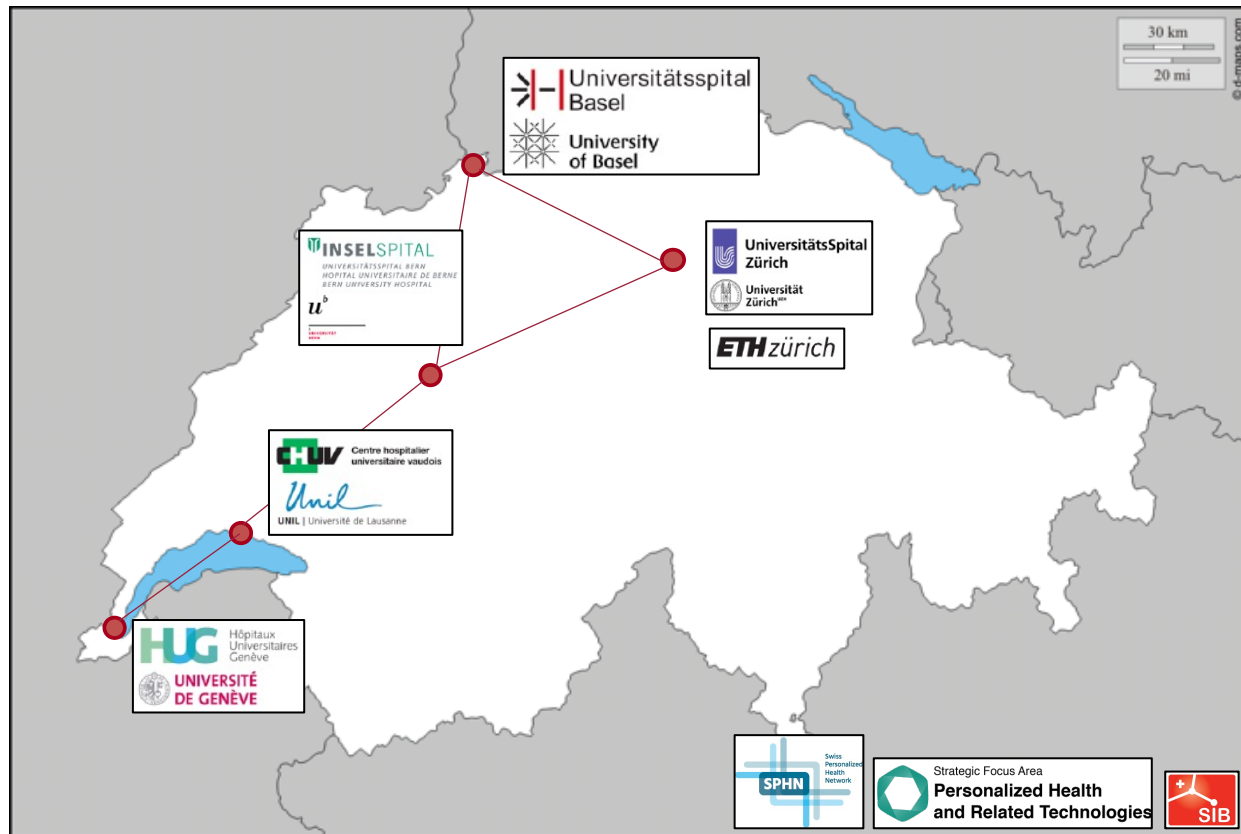
## Zurich

Karsten Borgwardt (machine learning)  
Peter Bühlmann (statistics)  
Peter Keller (CM)  
Nicolai Meinshausen (statistics)  
Gunnar Rätsch (machine learning)  
Reto Schüpbach (ICU)  
Rainer Weber (ID)  
Nicola Zamboni (metabolomics)  
Annelies Zinkernagel (ID)

+DIT members +Juliane Klatt (ETHZ)  
+ many more!

# New members

## → a network for sustainable research



### Basel

Sabine Kuster (ID)

Adrian Egli (CM) -> to be determined

Martin Siegemund (ICU)

### Bern

Hans-Jakob Furrer (ID)

Stephan L. Jakob (ICU)

Stephen Leib (CM)

Yok-Ai Que (ICU)

### Geneva

Laurent Kaiser (ID)

Aitana Neves (SIB)

Jerome Pugin (ICU)

Jacques Schrenzel (CM)

### Lausanne

Thierry Calandra (ID)

Jean-Daniel Chiche (ICU)

Gilbert Greub (CM)

Sylvain Meylan (ID)

Thierry Roger (ID)

### Zurich

Karsten Borgwardt (machine learning)

Catherine Jutzeler (machine learning)

Gunnar Rättsch (machine learning)

Reto Schüpbach (ICU)

Annelies Zinkernagel (ID)

Reinhard Zbinden (CM) -> Adrian Egli (CM)

Patient representative: [Jamila Hedjal](#)

IICU Data Manager: [Julinae Klatt \(ETH\)](#)

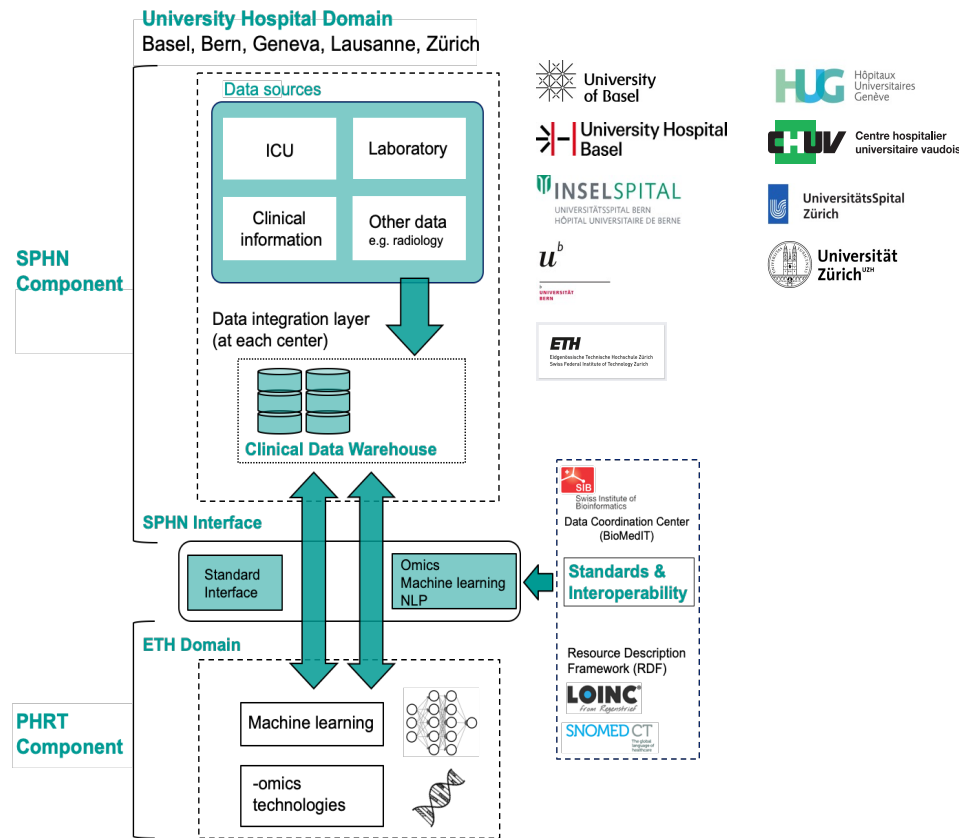
IICU Research Project Manager: [TBA](#)

IICU Administrative Project Manager: [TBA](#)

# PPI elements in NDS

- Collaboration with the 101 Fund
  - Survivors of resuscitation in 66 countries
  - Plan to interview Swiss patients and families in order to define patient-related outcome measures (PROMs)
  - Survey patients and families through the “Second Life by 101” app
  - Mrs Jamila Jedjal
- Public lectures during the World Sepsis Day

# Our setup during SPHN/PHRT driver project



- CDWHs connected via BioMedIT
- Centralized at Leonhard Med (ETHZ)
- Highly structured and organized data: rdf format, ontologies based on LOINC and SNOMED CT
- Careful curation to ensure quality
- So far **18'000 patients** included

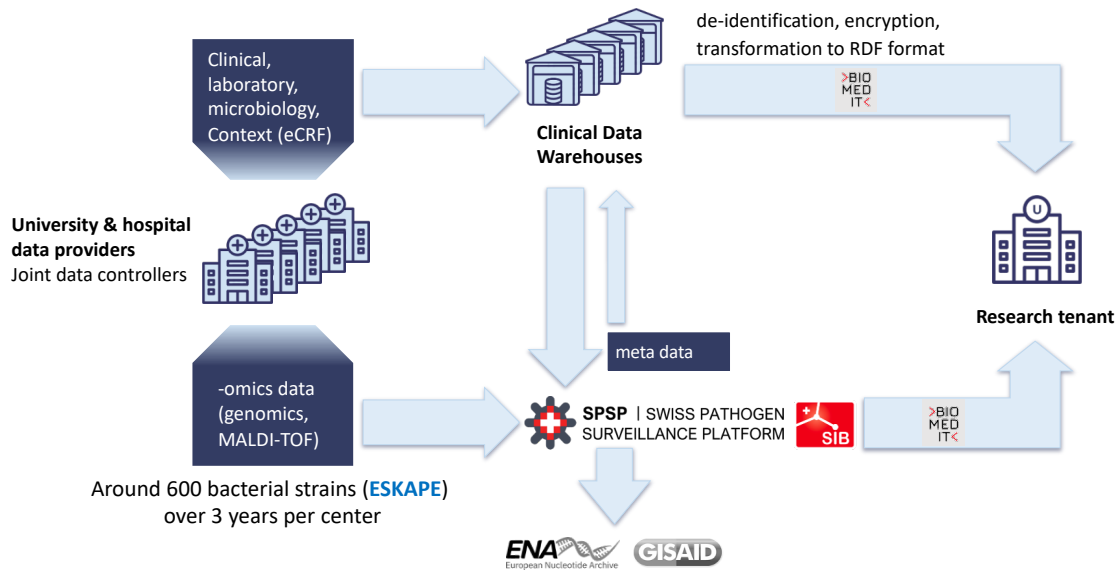
Egli A, Bategay M, et al. Stud Health Technol Inform 2020

# Goals of NDS:

NDS for ICU patient data with harmonized clinical annotation for infections and outcomes, as well as for infection-related context and interpretation

- Maintain **PSSS platform** and expand to **other infections**
- Focus on **data quality**
- Establish **sustainable network**
- Develop **procedures for rapid and precise assessment of patients**
- Provide **FAIR public data repository including machine learning toolbox**

# Data flow and new ways



## Established ways re-used

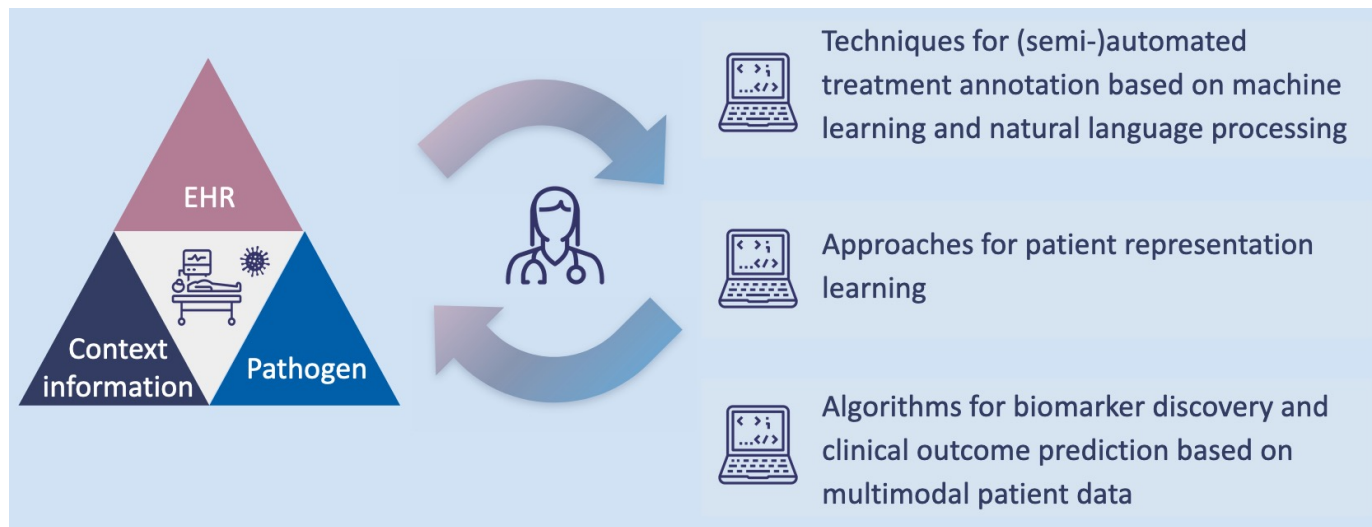
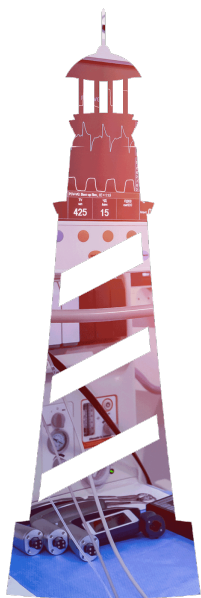
## Inclusion of two new datatypes

- Curated clinical context data via RedCAP and PDMS
- WGS/MALDI-TOF MS via SPSP

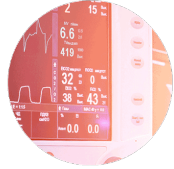
# Lighthouse project

**Research question:** Can we combine multimodal patient data (host, pathogen, and treatment information and their temporal dynamics) to enable prediction and interpretation of infection-related outcomes at an unprecedented level of detail?

**Outcomes:** Sepsis, immune dysregulation, acute infection-related encephalopathy, and infection-associated mortality



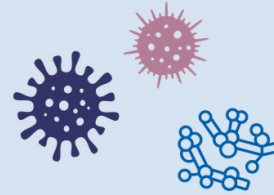
# Nested projects



## Endotype discovery



## Analysis of infection with viruses and fungi



## Virulence and resistance of bacteria: Linking genotypes to clinical phenotypes



## Treatment optimization



# Contact

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