

SPHN Short Report (2018)

Yearly update and overview of activities.

1. Editorial

The beginning of 2018 was dedicated to the conclusion of collaboration agreements with the five University Hospitals. In the frame of these collaboration agreements, SPHN supports the hospitals with a budget of CHF 3 Mio over 3 years, in order to develop compatible clinical data management systems. The signature of the collaboration agreements constituted a strong signal of support towards the SPHN initiative. In addition, the beginning of 2018 was marked by the initiation of the projects awarded in the frame of the call for proposals 2017.

On 15 March 2018, the second call for proposals was published in coordination with the ETH-Domain Strategic Focus Area in Personalized Health and Related Technologies (PHRT). Applicants could submit a proposal for 'Infrastructure development projects' and 'Driver projects' until 30 June 2018. A total of 38 proposals, 6 of which were joint SPHN-PHRT project proposals, were received, requesting CHF 31.9 million in total. After the evaluation phase, 10 projects for a total amount of CHF 9.65 million were funded, 3 of which were joint SPHN-PHRT project proposals.

In parallel to the call for proposals, the Ethical-Legal-Social-Issues Advisory Group (ELSlag) published a second version of the '*Ethical Framework for Responsible Data Processing in Personalized Health Research*'. This version includes guidance for human biological material and is endorsed by Swiss Biobanking Platform (SBP) and PHRT. A SPHN Glossary was published with the aim to foster a common understanding of the most common legal and technical terms used in the context of SPHN among stakeholders and partners. A Working Group was also setup to harmonize Data Transfer and Use Agreement templates among Swiss research institutions and the University Hospitals. This work is done in close collaboration with SBP's efforts to harmonize Material Transfer Agreement templates.

SPHN organized a Summer School on "Precision Medicine and Personalized Health" from 24 to 27 September 2018 in Geneva in partnership with the European Society of Pharmacogenomics and Personalized Therapy (ESPT) and the Swiss Group of Pharmacogenomics and Personalised Therapy (SPT). 76 doctoral and post-doctoral students from all over Europe benefited from a complete training program including some forty conferences in the multidisciplinary field of pharmacogenomics and personalized medicine. SPHN also participated in the organisation of the 1st Joint Personalised Health Day Switzerland, led by PHRT, which was held on 23 March 2018 in Bern. In addition, SPHN co-organized the FEAM 2018 conference and participated in international meetings.

Yours sincerely,

Prof. Peter Meier-Abt
Chairperson of the
National Steering Board

Prof. Urs Frey
Vice-Chairperson of the
National Steering Board

Dr. Adrien Lawrence
Managing Director

2. Activities and achievements in 2018

SPHN's activities are outlined according to four main categories:

- Funding activities;
- Data Coordination Center & BioMedIT;
- National and international collaboration;
- Events & communication.

2.1 Funding activities

The call for proposals 2018 was open to two types of projects: 'Infrastructure development projects' and 'Driver projects'. Funding applications could be submitted from all research areas, however, among outstanding applications, priority would be given to projects that address gaps in the following three areas: 1. Imaging and radiology interoperability, 2. Public health and healthy citizens, 3. Nationwide interoperability of cohorts and registries. The call 2018 was again coordinated with the 'Personalized Health and Related Technologies' program of the ETH Domain (PHRT).

38 proposals were received by 30 June 2018 (18 Infrastructure development projects, 20 Driver projects, including 11 requesting co-financing with PHRT) for a total amount of CHF 31.8 million. The 38 proposals passed the formal check performed by the SPHN Management Office and were evaluated by the International Advisory Board (IAB) of SPHN. Each request was reviewed by a referee and a co-referee during the months of August and September. Their opinions were used as a basis for discussion at the evaluation meeting which took place on 29 September 2018 in Geneva. At the end of the meeting, the IAB gave funding recommendations to the National Steering Board (NSB) of SPHN. At its meeting on 2 November 2017, the NSB decided to reduce the maximum amount of contributions and to increase the call budget in order to support a larger number of projects. In total, SPHN awarded contributions to 10 projects for a total amount of CHF 9.65 million (5 Infrastructure development projects and 5 Driver projects. 3 out of 10 projects will be co-funded by SPHN and PHRT) (See: Table 1, Table 2). A lay-summary of each project is available on the SPHN website: www.sphn.ch/en/projects.html

In parallel to the call for proposals, the collaboration agreements with the University Hospitals were signed in January 2018. The projects awarded in the frame of the call 2017 were initiated and lay-summaries for each project were published on the SPHN website. Reporting guidelines and templates were also developed in preparation for the first annual reports of these projects due on 31 March 2019.

Table 1: Infrastructure development projects awarded in 2018

Project title	Amount awarded
SwissGenVar: A platform for clinical grade interpretation of genetic variants to foster personalized health care in Switzerland Prof. Anita Rauch, Schlieren	CHF 493'350.–
SwissPKcdw: Optimising paediatric dosing regimens based on a clinical data warehouse[§] Prof. Christoph Berger, Zürich	CHF 493'350.–
Swiss BioRef: Personalized reference values for precision medicine[§] PD Dr. Alexander Leichtle, Bern	CHF 493'350.–
MedCo: Enabling the Secure and Privacy-Preserving Exploration of Distributed Clinical and -Omics Cohorts in the SPHN* Nicolas Rosat, Lausanne	CHF 323'638.–
QA4IQI: Quality Assessment for Interoperable Quantitative CT-Imaging* Dr. Bram Stieltjes, Basel	CHF 461'467.–

[§]These projects were submitted as Driver projects but are funded as Infrastructure development projects.

*Co-financed by SPHN and PHRT (ETH-Domain). The figures indicate the amount received from SPHN only.

Table 2: Driver projects awarded in 2018

Project title	Amount awarded
SACR: The Swiss Ageing Citizen Reference Prof. Nicole Probst-Hensch, Basel	CHF 1.48 Mio.
CREATE PRIMA: Clinical Research from multi-modality big data sources without proprietary interfaces in a multicenter approach Prof. Jörg Leuppi, Basel	CHF 1.48 Mio.
IMAGINE: Radiomics for comprehensive patient and disease phenotyping in personalized health Prof. Matthias Guckeberger, Zürich	CHF 1.48 Mio.
SOIN: Swiss Ophthalmic Imaging Network Prof. Thomas Wolfensberger, Lausanne	CHF 1.46 Mio.
SHFN: SWISSHEART Failure Network Prof. Christian Matter, Zürich	CHF 1.48 Mio.*

*Co-financed by SPHN and PHRT (ETH-Domain). The figures indicate the amount received from SPHN only.

A lay-summary of each project is available on the SPHN website: www.sphn.ch/en/projects.html

2.2 Data Coordination Center & BioMedIT

Within SPHN, the SIB Swiss Institute of Bioinformatics is responsible for two assignments: the management of the SPHN Data Coordination Center (DCC) and the BioMedIT project. The SIB Group, who is in charge of these two assignments, is the “Personalized Health Informatics” (PHI) Group, based in Basel.

The mandate of the DCC is to promote the development and implementation of nationwide standards for data semantics and exchange mechanisms in order to meet the interoperability goals of the SPHN initiative. Within this scope, the DCC is responsible for the coordination of the SPHN-Driver projects. In addition, the DCC is responsible for the technical implementation (on a national level) of milestones B (Definition of data interoperability standards), C (Clinical research data management at hospitals) and D (Biobanking interoperability) of the collaboration agreements between SAMS/SPHN and the University Hospitals. Further, the DCC has the mandate to assess, if work products of the collaboration agreements meet the relevant criteria.

In parallel of the elaboration of the SPHN initiative, the BioMedIT project was funded as part of the Swiss Roadmap for Research Infrastructures, aiming to provide researchers in Switzerland with a protected and secured IT environment, where they can process sensitive human data in a secure and lawful way. This network, currently composed of three BioMedIT nodes in Basel (sciCORE operated by the University of Basel), in Lausanne (Core-IT, operated by SIB) and in Zürich (SIS, operated by ETH) is centered between the University Hospitals and research institutions, facilitating the transfer of large sets of sensitive data in a secure way. The BioMedIT nodes provide compute capacity that can be used locally at each site or through federated computing, which aims to take the computation to the data. The project utilizes cloud computing, virtualization, compute accelerators (GPUs), big data storage, state of the art security techniques and federation technologies to lower computational boundaries for researchers anywhere in Switzerland, thus enabling authorized project members with access to this network to access and analyze the data.

2.2.1 DCC activities and achievements in 2018

While in 2017, the DCC was mainly supporting the set-up and logistics of the SPHN (e.g. preparation of the collaboration agreements, strategic outline of the core areas, etc.) as well as focusing on the establishment of the DCC itself (e.g. hiring personnel, office set up, etc.), the DCC commenced operations in 2018. In accordance with the business plan for the DCC for 2018, the PHI Group focused on the three key areas: technical interoperability standards, semantic interoperability standards and communication and training.

In 2018, five DCC-operated working groups (WG) were formed, in which various experts of the respective fields and topics are represented; the DCC supports these working groups and ensures coordination and alignment between the groups:

- The Clinical Data Semantic Interoperability WG advises on clinical data interoperability standards, data formats and exchange formalisms to be adopted within SPHN. In 2018, the WG elaborated and adopted their working group strategy and published the first release of the core clinical dataset, which is the one that is considered by the mandate to the Swiss University Hospitals and mainly covering demographics and administrative data such as encounters, basic

- clinical elements such as weight, simple information about medication, routine and emergency laboratory, procedure and diagnosis;
- The Bioinformatics and Data Analytics WG provides recommendations on bioinformatics and data analytics related SPHN infrastructures, such as software tools, research data management, reference datasets, and interaction with international stakeholders. The group was formed late 2018 and is composed of members covering various scientific fields (from bioinformatics, modelling, machine learning, genomics, proteomics to clinical research);
 - The BioMedIT Interoperability WG develops and implements interoperability between BioMedIT nodes to enable sharing of data and analysis workflows within SPHN. The working group will develop the necessary infrastructure to provide researchers with the ability to run analyses on biomedical data from multiple sites. The activities of the working group are to develop and deploy solutions which abstract the underlying IT infrastructure and enable researchers to focus on the development of novel analyses;
 - The SIB IT Security WG advises on security measures for IT infrastructure and for the BioMedIT nodes in SPHN, mitigate security risks through training and awareness;
 - The Hospital IT WG provides recommendations and guidelines regarding the implementation and adoption of technical solutions and standards necessary for the harmonization and development of the Swiss-wide IT infrastructure. The group was formed at the end of 2018 and elaborated and adopted their working group strategy early 2019.

Concerning the technical implementation projects, in 2018 work was mainly carried out on two projects: The Distributed federated query system allows research teams from SPHN partners to design, formulate and execute queries across data, which the five University Hospitals provide. The result of a query is a patient count. Receiving information about the approximate number of patients is important for researchers with regard to the feasibility of a future study. The DCC identified Clinerion, a Swiss-based company with experience in building networks for querying patient data, as a project partner to help building a Swiss Private Personal Health Research Cloud (the “SPHN Cloud”). In June 2018, the environment was deployed and made available to IT leads in all five University Hospitals for illustration and testing purposes. A collaboration agreement was drafted detailing the conditions of software use between Clinerion, University Hospitals and SIB and a joint meeting with all contract partners was held. In addition, an SPHN Access and Use Policy for a distributed federated query system on clinical research data was drafted according to the requirements of the National Steering Board discussed on 12 December 2018. Regarding the Metadata catalogue and request portal requirements the DCC has been exploring and aligning partners needs for the SPHN data infrastructure, specifically in the area of cataloguing availability of data/samples for biomedical research, and facilitating access requests. A number of technical advice sessions were held with the key stakeholders, with the aim to assess the needs for SPHN infrastructure in the area of cataloguing data and samples, as well as the intended use of such infrastructure, and to get an overview of relevant existing tools and processes. The stakeholders then participated in a workshop where the needs of the partners were verified and consolidated. The outcome of the project was a report containing a recommendation for solution directions.

Within the mandate of coordinating the Driver projects, the DCC arranged and conducted technical meetings with individual Driver projects that were funded within the 2017 call, elaborating on the anticipated data flow within a project consortium, and identifying interfaces with corresponding BioMedIT nodes, as well as evaluating computational and storage support needs. Throughout 2018,

the DCC committed to establishing good working relationships and collaborations in the SPHN community by facilitating and setting up processes for efficient work with the geographically and institutionally distributed experts, including establishing convenient meeting schedules facilitating the actual meeting discussions.

Within the focus area of communication and training, the DCC website was setup providing relevant information and documentation for the general public; Confluence, a confined web based platform, was established as shared workspace granting authorized access to SPHN community members to collaboratively work on project plans and documentation concerning the entire portfolio of SPHN projects and tasks. To inform the community about achievements of SPHN-funded projects, a DCC Seminar and Training series was introduced. This is a platform for project leaders to talk about the goals and the milestones of their projects, and how they contributed to the development of the SPHN infrastructure. They also have the opportunity to address achievements, challenges and emerging research opportunities. Starting from Infrastructure development projects (in January 2019), the series is streamed online to engage the stakeholders across the country, and recordings of the seminars can be watched on demand through the SwitchTube channel.

2.2.2 BioMedIT activities and achievements in 2018

Within the BioMedIT project, the three BioMedIT nodes continued to build and operate high-performance computing infrastructures (storage, calculation) to support biomedical research projects with increased requirements for data protection and IT security. A key component of the BioMedIT project is the provision of an interoperable environment for the development and execution of bioinformatics workflows in order to enable reproducibility of computational research, computation on distributed infrastructures, and easy collaboration and exchange of workflows between sites. In March 2018, an international workshop on workflow interoperability was organized and hosted. The outputs served to formulate a strategy for the development of an interoperable abstracted computing environment where biomedical researchers can perform seamless multi-site biomedical research. To implement the strategy, the BioMedIT interoperability working group was formed (see above). The first successful steps towards a coordinated workflow execution were made in September 2018, and included a computational analysis workflow in the form of a container to demonstrate the feasibility of robust distributed data analysis between two University Hospitals and BioMedIT nodes.

For the development of security measures for the BioMedIT nodes and mitigation of security risks through training and awareness, the SIB IT Security Group was formed (see above). Building up on the outcomes of a national workshop, a joint effort by subject matter experts across the SPHN led to a published policy addressing [Information Security for the SPHN](#). This policy clarifies the roles and responsibilities of various parties relative to information security. It also defines the technical and organizational measures necessary to operate IT infrastructures that support SPHN projects. In addition, the development of a Security Awareness training course was elaborated together with the nodes, and first sessions were held.

To ensure interoperability between platforms of the PHRT and SPHN projects, BioMedIT funds have been provided to the PHRT Mass Spectrometric platform. The BioMedIT node in Zurich is responsible for the technical integration of PHRT MS data with BioMedIT/SPHN databases and systems and to establish minimal metadata interoperability with SPHN standards. BioMedIT also supports the Swiss Variants Interpretation Platform (SVIP) project infrastructure by building a

harmonized variant interpretation platform for SPHN. Moreover, a collaboration with the Swiss Data Science Center (SDSC) has been established, and the BioMedIT Interoperability working group provides input, use cases, and requirements to help with the development of biomedical components of the SDSC-RENU platform.

2.3 National and international collaborations

2.3.1 National collaboration

At the national level, SPHN has been collaborating with the ETH-Domain program PHRT in the frame of the second call for proposals and the organisation of the 1st Joint Personalized Health Day Switzerland, as well as with the Swiss Biobanking Platform (SBP) regarding the ethical framework, semantics and standard, and the harmonisation of the Data Transfer and Use Agreement and Material Transfer Agreement templates. Coordination with the Swiss National Science Foundation (SNSF) continues to be important, as evidenced by the representation of SNSF members in the National Steering Board of SPHN.

SPHN has also worked with CLINAM and the Swiss Academy of Engineering Sciences (SATW) for the organisation of events.

2.3.2 International collaboration

SPHN is a member of the International Consortium for Personalized Medicine (ICPerMed) since July 2017 and attends the Executive Committee meetings that take place twice per year.

In addition, SPHN participated in international coordination meetings, namely the Global Alliance for Genomics and Health (GA4GH). Late 2018, the DCC and academic SPHN members collaborated to write a Driver project application to GA4GH, which would allow to formalize the official partnership between SPHN and the Global Alliance. Involvement in international initiatives is important, since Switzerland can strongly profit from the global development of standards and promote their adoption throughout the Swiss Personalized Health environment. The proposal was accepted by the Global Alliance at the beginning of 2019.

Representatives from the Korean Precision Medicine Initiative on Hospital Information Systems were met in Bern (14.11.2018).

2.4 Events & Communications

In 2018, SPHN organized and co-organized the following events:

- 1st Joint Personalized Health Day Switzerland, Bern, 23.3.2018;
- Information workshop about the second call for proposals coordinated with PHRT, Bern, 13.4.2018;
- 4th ESPT Summer School supported by SPHN, Geneva, 24-27.9.2018;
- FEAM Conference 2018, Geneva, 28.9.2018;
- “Comment l’intelligence artificielle va-t-elle bouleverser la médecine ?” Planète Santé, Geneva, 7.10.2018.

In addition, SPHN communicates continuously via its website (www.sphn.ch; available in English, French, and German), Twitter, LinkedIn, and punctual newsletters.

3. Finance

The first payments for projects awarded in the frame of the call 2017 and for the collaboration agreements were made in the first semester 2018. The projects selected during the call 2018 will start in 2019, meaning that the first transfers of funds will also take place in 2019.

During the past year, the initial business plan of 2 June 2017, from which all the activities of SPHN are derived, was slightly modified. As the Management Office's operating costs are lower than initially planned (1 million per year), the resulting surplus was used to increase the funds allocated to the call 2018 and to absorb budget cuts on SERI contributions. The main costs of the Management Office were salaries, working groups (travel expenses, remuneration of group leaders), communication and events. The majority of the provisions set aside during 2017 were used according to the established plan.

The burden resulting from the banks' passing on the costs of negative interest rates adopted by the Swiss National Bank to customers could be minimized as compared to 2017. Indeed, coordination of payments with SERI and SIB as well as an agreement with the UBS bank made it possible to limit costs to CHF 20.7k for the year 2018 compared to CHF 25.1k for the period August to December 2017.

Table 3: Balance sheet (2018)

BALANCE SHEET	31.12.2018 in CHF	31.12.2017 in CHF
ASSETS		
Cash	9'559'202	4'964'122
Kontokorrent SPHN zu SAMW Allgemein	0	6'978'096
Accounts receivable	920	0
Total Assets	9'560'122	11'942'218
Liabilities		
Grants payable, accrued and other liabilities	9'470'831	11'909'044
Accounts payable	89'291	33'174
Total Liabilities	9'560'122	11'942'218

Table 4: Cash flow statement 2018

Cash flow statement (direct method)	2018 in CHF	2017 in CHF
+ Cash received from SERI contribution - SAMS	7'453'600	7'500'000
+ Cash received from SERI contribution - SIB	4'850'000	5'000'000
Total cash received from SERI contributions	12'303'600	12'500'000
- Cash paid for Collaboration agreements	-5'000'000	0
- Cash paid to Data Coordination Center	-2'313'000	0
- Cash paid to Infrastructure dev. & Driver projects	-6'664'904	0
- Cash paid for ELSI support staff	-80'000	-40'000
Total cash paid for funding activities	-14'057'904	-40'000
- Cash paid for personnel expenses	-301'102	-295'393
- Cash paid for operating expenses	-199'010	-168'788
- Cash paid related to activities of bodies	-128'600	-53'601
Total cash paid related to management expenses	-628'712	-517'782
Cash flow from operating activities	-2'383'016	11'942'218
Variation of SAMS current account	6'978'096	-6'978'096
Cash flow from financing activities	6'978'096	-6'978'096
Net increase/decrease in cash	4'595'080	4'964'122
Cash on 1.1	4'964'122	0
Cash on 31.12	9'559'202	4'964'122

4. Board Members

National Steering Board

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Imprint

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