



WE ARE ALL IN THIS TOGETHER:  
**ADVANCING**  
**eHEALTH INTEROPERABILITY** **MAY 2017**





---

# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b>	<b>4</b>
<b>1 / INTRODUCTION</b>	<b>5</b>
<b>2 / eHEALTH INTEROPERABILITY ACROSS THE CARE CONTINUUM</b>	<b>7</b>
2.1 / IHE-PCHalliance partnership: BREAKING THE SILOS	7
2.2 / IHE-PCHalliance partnership in action: AUSTRIA AND SWITZERLAND	10
Austria	10
Switzerland	11
<b>3 / JOINT COCIR - IHE - PCHalliance RECOMMENDATIONS TO CAPTURE THE VALUE OF INTEROPERABILITY</b>	<b>15</b>
<b>REFERENCES</b>	<b>18</b>

## EXECUTIVE SUMMARY

Digital health services will play a critical role in the delivery of integrated care. These include Electronic Medical Records, information sharing and care team collaboration tools, personal connected services and tools for citizens, risk stratification systems as well as decision support systems. However, if services are to genuinely support integrated care models, they must be truly interoperable. The slow deployment of interoperable digital health solutions across European countries remains a barrier for scaling-up integrated care. At the same time, the uptake of connected health and Internet of Things technologies within the health, social and wellness sectors is increasing rapidly. While the information and knowledge this provides can empower individuals, making them actors and agents in their own health, it poses further challenges for open interoperability and for seamlessly incorporating this information to deliver integrated care.

This paper provides health policy makers with the tools to build a productive partnership with their IT teams to jointly develop a successful integrated care model. It will also help develop a common understanding of the digital health approach to support that model.

### COCIR - IHE - PCHalliance JOINT RECOMMENDATIONS

#### USERS OF eHEALTH TECHNOLOGIES: CITIZENS, PATIENTS, AND HEALTHCARE PROFESSIONALS:

1. **Act** as an agent in the transition to integrated care; contributing to defining the technology requirements supporting changes to workflows and practices to make the best use of new technologies and sharing health and care data.

#### HEALTHCARE PROVIDERS:

1. **Engage** in interoperability initiatives and train their in-house IT teams on relevant international standards

#### HEALTH ICT VENDORS:

1. **Embrace** international standards, building them into digital health products and solutions
2. **Educate** clients and customers on the benefits of interoperability

#### MINISTRIES OF HEALTH, REGIONAL HEALTH AUTHORITIES AND SICKNESS FUNDS:

1. **Develop** and implement eHealth strategies, guidelines, and action plans and provide guidance on interoperability
2. **Reference** international standards, Profiles and guidelines in procurement documents, as relevant, preferred or mandatory.
3. **Build** an eHealth infrastructure based on international standards, including electronic health record systems.
4. **Prioritise** ways to connect platforms, rather than creating a single ecosystem platform or trying to connect all stakeholders on a one-to-one basis
5. **Take into account** application programming interface (API<sup>1</sup>) standards and Profiles when implementing mobile and web-based interoperability solutions
6. **Evaluate** the potential of the emerging API standard 'HL7 FHIR' for trial use in mobile and web-based solutions
7. **Adopt** recognised Europe-wide standards and Profiles when deploying regional and national digital health solutions. Ideally, this approach should extend to mHealth APIs.
8. **Work** further to achieve semantically rich standards. Using coding systems (taxonomies, terminologies) is a good start, but these do not formally describe the greater clinical and operational context.
9. **Apply** a consistent, proven, end-to-end interoperability strategy that spans all aspects of digital health, including mHealth
10. **Apply** the following interoperability approach to mHealth-centric use cases:

##### I. INTEROPERABILITY NEED AND SPECIFICATION SPRINT<sup>2</sup> APPROACH

1. **Identify** use cases
2. **Select** Profiles and standards
3. **Refine** data content
4. **Write** the interoperability specifications

##### II. IMPLEMENTATION SPRINT APPROACH

5. **Organise** testing
6. **Educate** end-users on interoperability

1. An Application Programming Interface, or API, is a set of software instructions and standards that allows machine to machine communication-like when a website uses a widget to share a link on Twitter or Facebook (source: [www.digitalgov.gov/category/code/api/](http://www.digitalgov.gov/category/code/api/)).

2. In software product development, a sprint is a set period of time during which specific work has to be completed and made ready for review ([www.searchsoftwarequality.techtarget.com](http://www.searchsoftwarequality.techtarget.com)).



# INTRODUCTION

Integrated care means managing and delivering health services in a way that allows people to benefit from a continuum of health promotion, disease prevention, diagnosis, treatment, disease-management, rehabilitation and palliative care services. This should traverse the different levels and sites of care within a health system, according to people's need, throughout the life course [1]. From a process perspective, integrated care consists of multi-agency and multi-disciplinary collaboration, focused on meeting the medical, social and practical needs of each individual in a coordinated way [2].

Digital health services play a critical role in the delivery of integrated care. These include Electronic Medical Records (EMR), information sharing and care team collaboration tools, personal connected services and tools for citizens, risk stratification systems and decision support systems. However, if these services are to genuinely support integrated care models, they must be truly interoperable. Interoperability, coupled with a regional or national health IT platform for exchanging data, is the only way that digital health solutions can streamline and improve information-sharing and care team collaboration.

The slow deployment of interoperable digital health solutions across European countries remains a barrier for the scaling-up of integrated care. At the same time, the uptake of connected health and Internet of Things technologies within the health, social and wellness sectors is increasing rapidly. Through mHealth or telehealth applications and services, consumer and medical devices enable citizens and patients to gather health data and share it with both health and care professionals and their families. While the information and knowledge trend can empower individuals, making them actors and agents in their own health, it poses further challenges both for open interoperability and for seamlessly incorporating this information to help deliver integrated care [3].

In an attempt to advance the European Single eHealth market, the European Commission has referenced standards (including a selection of Continua Design Guidelines and IHE Profiles) in its eHealth European Interoperability Framework<sup>1</sup> (2013, refined 2015). However, national and regional governments have the prerogative of choosing to endorse open international standards, by referencing them when directly procuring digital health solutions via tenders, or by encouraging procurers to do so.

The digital health strategy of the integrated care models may vary, but interoperability will be a constant element. Our goal is to provide health policy makers with the tools to build a productive partnership with their IT teams to jointly develop a successful integrated care model. It will also help develop a common understanding of the digital health approach to support that model.

---

1. [http://ec.europa.eu/health/sites/health/files/ehealth/docs/ev\\_20151123\\_co03\\_en.pdf](http://ec.europa.eu/health/sites/health/files/ehealth/docs/ev_20151123_co03_en.pdf)





## eHEALTH INTEROPERABILITY ACROSS THE CARE CONTINUUM

This section provides an overview of the tools available for implementing interoperable digital health solutions. Then we examine two models in detail, Austria and Switzerland, which have been developing the technical requirements and frameworks for integrated care.

Finally, the paper offers a set of practical recommendations for adopting interoperable solutions throughout the care continuum.

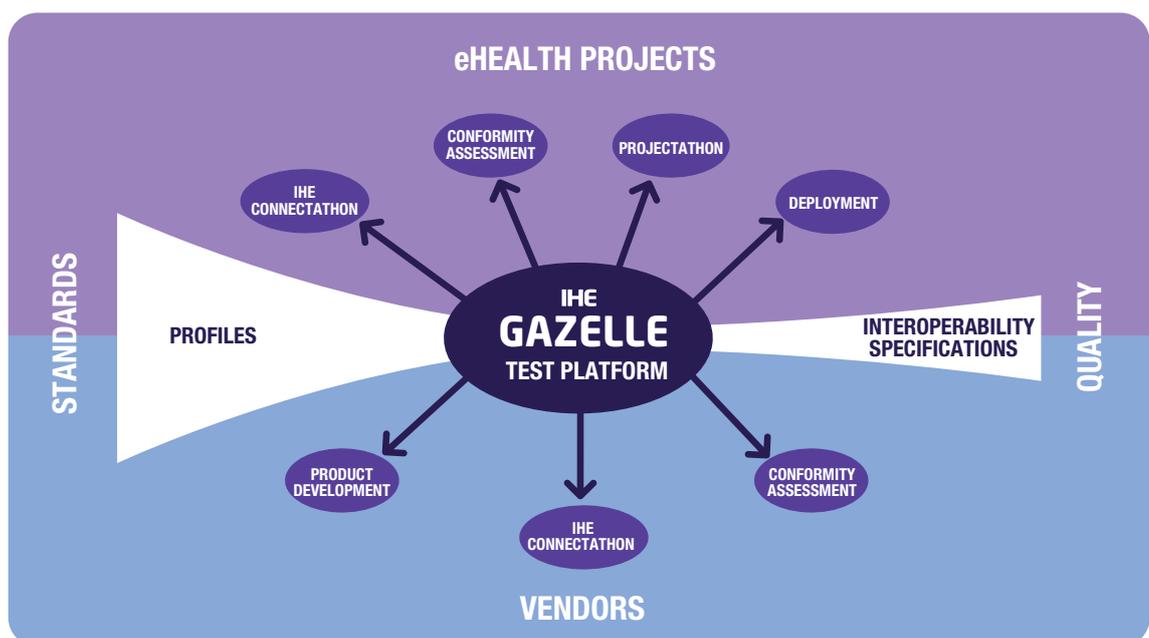


### 2.1 IHE - PCHAlliance partnership: BREAKING THE SILOS



**INTEGRATING THE HEALTHCARE ENTERPRISE (IHE)**, founded in 1998, is an initiative by healthcare professionals and industry for improving how computer systems share health information. IHE promotes the coordinated use of established standards to address specific clinical needs in support of optimal patient care. Systems using IHE Profiles ([www.ihe.net/profiles](http://www.ihe.net/profiles)) communicate better, are easier to implement and allow care providers to use information more effectively. IHE processes and Profiles have been recognized by ISO, the European Commission and the US Interoperability Standards Advisory among others world-wide.

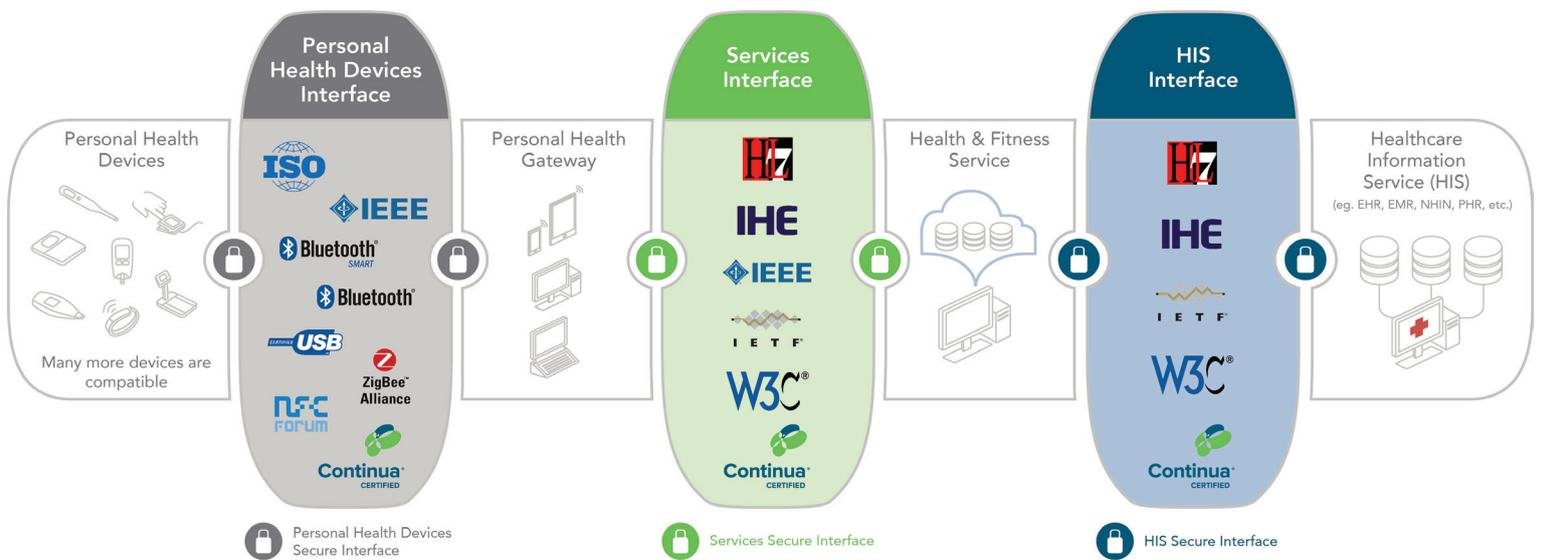
The IHE testing discipline includes developers' test tools, Connectathons (a yearly marathon of connectivity, spanning five days where vendors test their systems against IHE profile specifications) and product Conformity Assessment. When combined, they provide a testing continuum that delivers mature interoperability ([www.IHE-Europe.net](http://www.IHE-Europe.net)). IHE Profiles underpin the interoperability of several national projects, including Australia, Austria, France, Japan, Italy, Luxembourg, Slovenia, South Africa, Switzerland and the USA (ehealthExchange, Commonwealth, CareEquality) as well as regions in Italy, Denmark and Germany.



1. The IHE logo and the IHE Conformity Assessment logo are registered trademarks of IHE-Europe. <https://www.ihe-europe.net/about-us/trademark-acknowledgement-statement>



**THE PERSONAL CONNECTED HEALTH ALLIANCE (PCHAlliance)**, the successor organisation to the Continua Health Alliance (founded in 2006), publishes, and promotes adoption of, the Continua Design Guidelines for interoperability of personal health systems.

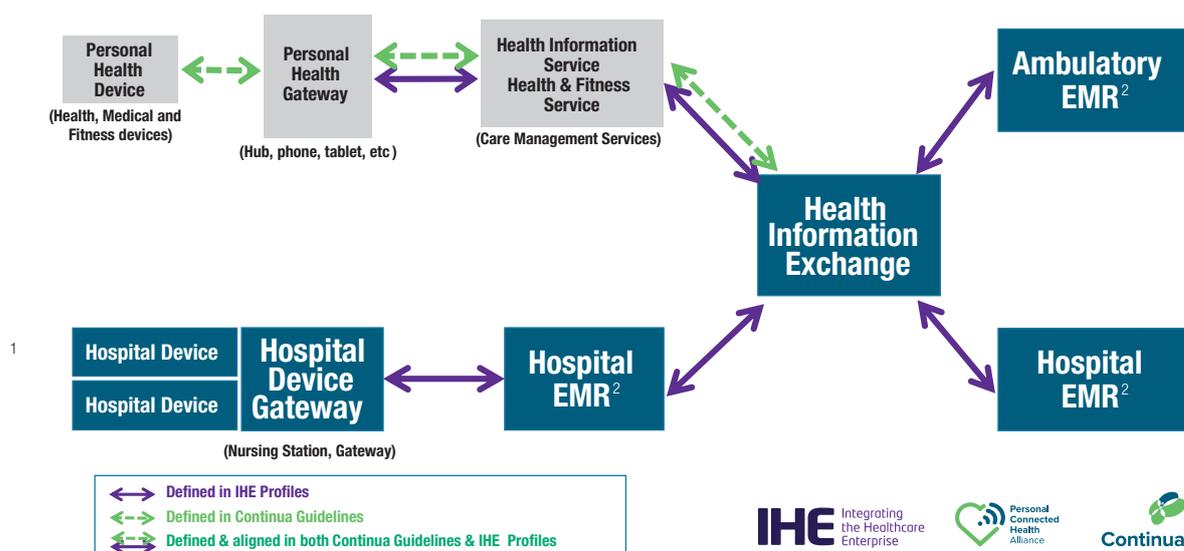


### CONTINUA SYSTEM ARCHITECTURE

The increasing proliferation of individual sensors and devices, often from consumer technology companies new to the medical and healthcare field, is promising for patient engagement and integrated care. However, this presents its own difficulties.

The Continua Design Guidelines, developed in an open collaboration of industry and providers and revised annually, addresses these challenges, while the Continua certification confirms device and systems Conformity. Continua Design Guidelines are recognised by the International Telecommunication Union (ITU) as the international standard for safe, secure, and reliable exchange of data to and from personal health devices. The Guidelines have been referenced by the European Commission's eHealth European Interoperability Framework and by the Interoperability Standards Advisory of the US Office of the National Coordinator.

## WHERE TO DEPLOY IHE PROFILES AND PCHA'S CONTINUA GUIDELINES



As the newest entrant, throughout its history, Continua has reached out to many healthcare standards organisations, forging liaison agreements for mutual recognition, ensuring that Continua-certified devices use data formats for patient information that health IT systems can work with. Arguably, the most important liaison agreement has been with IHE. In 2016, this relationship was renewed and strengthened to address persistent confusion in the eHealth field and to clarify the complementary role of Continua Guidelines and IHE Profiles in the healthcare domain. A key outcome of this collaboration is the elaboration of the graphic above depicting “Where to deploy IHE Profiles and PCHA’s Continua Guidelines”. In the context of the Continua-IHE cooperation, both organisations have pledged to align their Profiles and Guidelines in those areas where they overlap [4].

### ADDITIONAL ELEMENTS OF THE IHE - PCHAlliance COLLABORATION INCLUDE:

- 1. Future Profiles and Guidelines development**, enabling seamless integration between products using IHE Profiles and the Continua Design Guidelines and ensuring the combined deployment of fully interoperable systems;
- 2. IHE’s and PCHAlliance’s testing and certification programmes**, aiming to align tools and processes;
- 3. Communication, education, and product interoperability demonstrations**, responding to confusion among providers, vendors, and standards bodies on both organisations’ standards and tools.

Since 2010, IHE and PCHAlliance have been engaged in EU-funded projects to increase the awareness, recognition, deployment and adoption of international standards advanced by IHE and PCHAlliance/Continua. In 2016, COCIR, IHE and PCHAlliance joined the EURO-CAS<sup>1</sup> consortium. EURO-CAS is developing a set of guidelines and documentation for eHealth products and solutions, the eHealth Conformity Assessment Scheme for Europe, to help health systems assess with international standards, including Continua Guidelines and IHE Profiles. This will improve eHealth interoperability, help advance the European Digital Single Market in the health and care domain and accelerate information sharing to improve person-centric healthcare.

1. <https://www.euro-cas.eu>

2. Electronic Medical Record

## 2.2 IHE - PCHAlliance partnership in action: AUSTRIA and SWITZERLAND

The leading examples in Europe of eHealth deployments along international standards can be found in Austria and Switzerland. Both countries have been implementing long-term strategies to build national, interoperable eHealth infrastructures that can enable integrated care services. Critical factors include involving patients as actors as “co-producers” in their healthcare, and providing care at distance through telehealth or mHealth applications. In both countries, the core component, and the most ambitious, is an electronic health record system (EHR) for storing patient data. These large-scale deployments in Austria and Switzerland emphasise a number of critical success factors, including the need for a vision and long-term strategy, for political leadership and stakeholder involvement and for patience and persistence.

### AUSTRIA

#### OVERVIEW

The key driver of the eHealth infrastructure in Austria, a republic in Central Europe with a population of 8.7 million, made up of nine states, has been the national government, through its Federal Ministry for Women and Health.

The electronic health record system, ELGA (“Elektronische GesundheitsAkte”), dates back to 2006, when the Ministry for Women and Health, in collaboration with the Austrian states and key social insurance organisations, initiated working groups to design the system, with detailed planning starting in 2008. The ELGA law of January 2013 provided the legal and regulatory basis, defining a number of key components including the patient portal, the master patient index, the registry of healthcare professionals and others. ELGA has been operational since December 2015, initially in the states of Vienna and Styria. Full coverage, including resident doctors, is expected by the end of 2017.

ELGA builds on the internationally harmonised IHE architecture and interoperability Profiles. The XDS (Cross-Enterprise Document Sharing) profile, as a core element, connects the medical source systems (repositories) to regional document registries in a consistent way using other Profiles for security (ATNA for audit trail and node authentication) or patient identifier cross-referencing (IHE PIX). Other Profiles for cross-community sharing (XCA, XCPD, XUA ...) are also used to federate the repositories, according to the legal requirements for privacy and access control. The IHE Profiles allowed for a successful rollout, even with numerous diverse local legacy systems needing to connect.<sup>1</sup> This infrastructure is used for exchanging medical documents such as Patient Summaries and ePrescriptions, based on IHE content Profiles.

In 2012, the Ministry convened an expert commission to explore the feasibility and potential for telehealth services. In 2015, this commission recommended implementing services for patients with diabetes and chronic heart disease, as well as for patients with recent cardiac implants. The Ministry contracted the University of Applied Sciences Technikum Wien to develop the technical guidelines and a reference architecture, in consultations with all relevant stakeholders including providers, users, industry, and others. The technical guidelines are expected to be formally issued in 2017.

1. Detailed documents on the ELGA structure and specifications are available on the ELGA portal: <https://www.elga.gv.at/technischer-hintergrund/technischer-aufbau-im-ueberblick/index.html> (accessed 7 March 2017).

---

## CHALLENGES

The nationwide sharing of health records has been in production roll-out since 2016, with most Austrian regions now interconnected. In the coming years, the next major steps will be telehealth services and integrating personal patient devices with ELGA. A key challenge is the availability of Continua compliant devices at reasonable cost. Stakeholders have repeatedly voiced this concern during consultations on the feasibility of mandating Continua compliance. As a result, the drafts for the telehealth architecture, presented in 2016, do not make Continua compliance mandatory from the outset [5]. As specifications evolve over time and customers specifically procure compliant devices, Continua specifications are expected to become mandatory, as is the case with IHE Profiles currently.

Further challenges are privacy and safety; telemonitoring involves patients generating and submitting data to professional healthcare IT systems. New types of risks may arise e.g. from potential loopholes in mobile platforms or shortcomings in clinical or IT skills. These issues need to be addressed, by further improving interoperability and security and by careful management of quality and risk.

## BENEFITS

Using international standards and Profiles such as IHE and Continua for interoperability provides specific benefits, particularly for a smaller country such as Austria. Re-using the knowledge built into the standards permits more rapid and more efficient implementation than designing from scratch. International harmonisation extends the knowledge within the global community, maximising valuable implementation experience from the limited numbers of experts available.

Standards also lower barriers to entry, enable competition and build markets. Thus, Austria's standards-based eHealth infrastructure, which is ready to upscale and to add further applications, will benefit both patients and the healthcare system. As one of the first countries to roll out and deploy such a system, Austria will attract innovation from global vendors and will provide export opportunities for products proven in real-life applications.

The expected benefits of Continua Guidelines include an open ecosystem of end-to-end interoperable personal health systems that can seamlessly integrate with IHE compliant health IT systems.

# SWITZERLAND

## OVERVIEW

Switzerland is a federal republic with a population of 8.5 million people in 26 Cantons. Healthcare delivery is a prerogative of the Cantons, whose local control is fiercely exercised. Navigating this delicate policy environment is *eHealth Suisse*, which operates from a small office in Bern set up in 2008 to coordinate the actions of the national and regional governments. The principal tool of *eHealth Suisse* are recommendations; these are not legally binding, but provide orientation to guide the actions of regional and national policymakers and all relevant actors. In 2011, the regional and national governments agreed an eHealth framework agreement (“eHealth-Rahmenvereinbarung”), working towards a national EHR system called “elektronisches Patientendossier” (EPD) or “Dossier électronique du patient” (DEP).

The initial work towards the EHR culminated in a proposal for a federal law (Bundesgesetz über das elektronische Patientendossier, EPDG) that was initially presented to the parliament in 2015 and adopted in March 2017. The law requires all hospitals in Switzerland to become integrated in IHE XDS based communities over the coming three years<sup>1</sup>. Care organisations should be integrated in the next five years; GPs and other entities may also join this infrastructure<sup>2</sup>.

The national policies, the IHE profile-based interoperability specifications and the testing platform needed for efficient integration of a distributed network of networks are largely in place, with a large-scale integration planned for the second part of 2017. Several Cantons, including Geneva, have deployed their own regional electronic health record<sup>3</sup>. eHealth Suisse will create a national backbone that interlinks these Canton-level networks.

The EPDG included a mandate that allows patients to enter data into their EHR. This set in motion eHealth Suisse's work in exploring the requirements to make this work. It contracted St. Gallen University to explore the potential of apps and personal devices, subsumed under the category "mHealth". In its 2015 report, *mHealth and the electronic health record* [6], St. Gallen discussed Continua Guidelines as the leading relevant standard and noted their recognition by the ITU. Based on this Assessment and following a stakeholder consultation in 2016, eHealth Suisse released its *Mobile health recommendations* in March 2017. This included as action recommendation 7 [7]:

*"eHealth Suisse recommends technical and semantic standards for the communication of information between mHealth applications and the electronic health record, with an emphasis on those standards that are established internationally (for example the IHE Patient Care Device Framework (PCD), Continua Design Guidelines, or FHIR from HL7 International)."*

Next steps in the build-up of an interoperable eHealth infrastructure include the EPD Projectathon in September 2017. Modelled after the IHE Connectathon, this event will allow interested parties to test their products and solutions against the eHealth Swiss EHR reference architecture and between each other.

## CHALLENGES

2017 will be a critical year for nationwide interoperability in Switzerland. It will see the release of a reference test platform over the summer of 2017, while most Cantons and their vendors being invited to the EPD Projectathon, to test the systems deployed or about to be deployed in most of the Cantons. This will prepare the foundation for Federal Certification of the Cantons' gateways as they become interconnected.

It is worth noting that Switzerland will be building upon the testing experience of IHE in various countries around the world, the IHE Conformity Assessment programme and the lessons learnt in epSOS for large scale deployments, that have contributed to create a robust testing continuum. This begins with profile testing at IHE Connectathon, progressing to Conformity Assessment with quality-controlled test tools and processes, reaching maturity and addressing Swiss specificities in a Projectathon. All these activities will lead to as a Swiss Certification, which should be a mere formality.

1. In 2012 Switzerland hosted the IHE Europe Connectathon, which many observers credit as sparking the interest among the relevant Swiss actors in IHE.

2. Suisse Health Record Legislation: <https://goo.gl/Ln2p1E>

3. For further details see: <http://www.ehealthmap.ch>

---

## **BENEFITS**

Switzerland is not only using international standards and Profiles for interoperability, through IHE and Continua, but it is also expecting a return on its investment, namely a robust deployment strategy.

It is widely accepted that re-using the knowledge built in the standards allows more rapid and more efficient implementation than designing from scratch. International harmonisation extends the knowledge within the global community, maximising valuable implementation experience from the limited number of experts available.

The Swiss market and its Cantons, despite their relatively small size, have already benefitted from lower barriers to entry and enhanced competition. Deciding its national architecture along with the selection of proven Profiles allowed the Cantons to deploy several years ahead of the Federal backbone, with the confidence that they will be able to integrate when the backbone is rolled out in early 2018.

The maturity of the governance process, as coordinated by eHealth Suisse, has been built upon strong engagement and commitment from the health authorities and all stakeholders. It has also demonstrated that, despite highly decentralised political and health systems, the secure and easy flow of health information is not only achievable nation-wide but may also enable strategic governance. Developing this culture of national interoperability has been used as a foundation for developing care coordination among health system actors, thus increasing the quality of therapeutic processes, efficiency of the health system and improving patient safety.





## JOINT COCIR - IHE - PCHAlliance RECOMMENDATIONS TO CAPTURE THE VALUE OF INTEROPERABILITY

COCIR, IHE and PCHAlliance support the vision of applying a consistent, proven end-to-end strategy for interoperability spanning the digital health domain and encompassing personal connected health. COCIR recommendations on interoperability issued in 2015 [2] [8] remain pertinent, particularly given the emergence of personal connected health. IHE and PCHAlliance share COCIR's end-to-end interoperability approach (from use cases to testing) to ensure the orderly deployment and adoption of existing and new IHE Profiles and Continua guidelines based on emerging standards such as HL7 FHIR.

COCIR, IHE and PCHAlliance believe that the following recommendations would accelerate the successful application of interoperability in the health and care domain:

### USERS OF eHEALTH TECHNOLOGIES: CITIZENS, PATIENTS, AND HEALTHCARE PROFESSIONALS

1. **Act** as an agent in the transition to integrated care by:
  - Helping define the technology, security and interoperability requirements;
  - Supporting changes to workflows and practices to make best use of new technologies;
  - Sharing health and care data and information among professionals, patients and their families;

### HEALTHCARE PROVIDERS

1. **Engaging** in interoperability initiatives and train their in-house IT teams on relevant international standards, Profiles and guidelines;

### HEALTH ICT VENDORS

1. **Embracing** international standards, Profiles and guidelines, building them into digital health products and solutions;
2. **Educating** clients and customers on the benefits of interoperability;

### MINISTRIES OF HEALTH, REGIONAL HEALTH AUTHORITIES AND SICKNESS FUNDS

1. **Developing** and implementing eHealth strategies, guidelines, and action plans, and providing guidance on interoperability;
2. **Referencing** international standards Profiles and guidelines within procurement documents, as relevant, preferred or mandatory;
3. **Building** an eHealth infrastructure based on international standards, including electronic health record systems;
4. **Prioritising** efforts to connect platforms, rather than trying create one single ecosystem platform or to connect all stakeholders on a one-to-one basis. Given the large number of stakeholders involved in delivering integrated care, including the biomedical research, public health, social care and long-term care communities, it will not be possible to define a single ecosystem platform used by all stakeholders;
5. **Taking into account** application programming interface (API) standards and Profiles when implementing mobile and web-based interoperability solutions to complement existing web services infrastructures;

6. **Evaluating** the potential of the emerging standard 'HL7 FHIR' for trial use in mobile and web-based solutions.<sup>1</sup>IHE and PCHAlliance are actively contributing to developing the FHIR standard, including participation in the Devices on FHIR initiative, and adopting FHIR in new IHE Profiles<sup>2</sup> and new Continua Design Guidelines<sup>3</sup>. This is necessary to guarantee in the mid-term interoperability among FHIR implementations from different vendors while ensuring overall consistency with other, widely-adopted IHE Profiles and Continua Guidelines. This will facilitate the consistent adoption and integration of FHIR-based implementations especially for vendors who have deployed widely-adopted IHE Profiles and Continua Guidelines;
7. **Adopting** recognised European-wide standard Profiles [9] when deploying regional and national digital health solutions. Ideally, this approach should extend to mHealth APIs. Indeed, mHealth apps should implement platform API standards as defined by the mobile-centric IHE Profiles<sup>4</sup>; this will guarantee the free and secure flow of health data between mobile apps used by both citizens and health and care providers;
8. **Working** further to achieve semantically rich standards. Using coding systems (taxonomies, terminologies) is a good start, but doesn't formally describe the greater clinical and operational context;
9. **Applying** a consistent and proven end-to-end interoperability strategy for that spans all aspects of digital health, including mHealth. Adopting standard Profiles, which has enabled progress in the deployment of traditional digital health solutions such as Medical Health Records or ePrescription, should also extend to encompass mHealth;
10. **Applying** the following interoperability approach to use cases that include mHealth solutions – mHealth-centric uses cases- [3];
  - I. INTEROPERABILITY NEED AND SPECIFICATION SPRINT APPROACH
    1. **Identifying** use cases
    2. **Selecting** Profiles and standards
    3. **Refining** data content
    4. **Writing** the interoperability specifications
  - II. IMPLEMENTATION SPRINT APPROACH
    5. **Organising** testing
    6. **Educating** end-users on interoperability

This approach has already demonstrated its effectiveness and to a large extent has been used in a number of national eHealth programs, including those of Austria and Switzerland.

These steps should also be applied when deploying mHealth apps, although they will need a specific execution strategy. When creating a national infrastructure, it is critical, given the scale and number of IT systems to be adapted or deployed, to adopt a linear approach to the six steps set out above.

To ensure that mHealth solutions are fully integrated with other, more traditional, digital health solutions, we suggest to encapsulate steps 1, 2, 3 and 4, (for example, adopting the Sprint methodology used in Agile software product development) by offering mHealth applications developers the relevant extract needed to interface on the "edge" of the national (or regional) health information sharing infrastructure deployed for eHealth. Then Steps 5 and 6 should happen as fast iterations where applications development, testing, user engagement (patients or health professionals) should again happen as a series of iterations or Sprints.

1. The FHIR standard is in its trial implementation phase, encouraging vendors to start pilots on adopting the standard and to gain experience. Unfortunately, there is no guarantee that future implementations will be compatible as yearly versions of FHIR have not reached stability to maintain backward compatibility.  
 2. Further details on what are IHE profiles is available here: <http://wiki.ihe.net/index.php/Profiles>  
 3. Further details on what are Continua Design Guidelines is available here: <http://www.pchalliance.org/continua-design-guidelines>  
 4. Available here: [http://www.ihe.net/uploadedFiles/Documents/ITI/IHE\\_ITI\\_Suppl\\_MHD.pdf](http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_Suppl_MHD.pdf); [http://www.ihe.net/uploadedFiles/Documents/ITI/IHE\\_ITI\\_Suppl\\_mACM.pdf](http://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_Suppl_mACM.pdf)

---

To support such a process, IHE has introduced an “mHealth Plugathon”, a specific testing event for mHealth applications. It also accelerates dissemination of international standards and Profiles to newcomers in the field.

In addition, it is important to account for the security and privacy of patient or citizen-centric mHealth applications [10]. When health data is accessed and stored by an mHealth application owned and managed by the citizen, the health data security and privacy becomes a responsibility of the mHealth application developer and that of the citizen who chose to use the application; the information has 'left' the realm of an eHealth shared platform. This will require complementing the eHealth information exchange policies with a mobile citizen health information access and contribution policy.

## REFERENCES

- [1] World Health Organisation,  
**“Roadmap to Developing a Framework for Action Toward Coordinated/Integrated Health Services Delivery in the WHO European Region: An overview”** 2013.  
[Online]. Available: <https://goo.gl/2kx9fp>. [Accessed 28 April 2017].
- [2] COCIR,  
**“COCIR eHealth Toolkit - Integrated Care: breaking the Silos”** 2015.  
[Online]. Available: <https://goo.gl/2xrJ5e>. [Accessed 27 March 2017].
- [3] COCIR,  
**“Why Interoperability is critical to support Integrated Care in Europe? Impulse Paper”** 2016.  
[Online]. Available: <https://goo.gl/w2fq5J>. [Accessed 24 April 2017].
- [4] PCHAlliance and IHE,  
**“Personal Connected Health Alliance and Integrating the Healthcare Enterprise Collaboration Supports Open Health Information Exchange”** 27 February 2017.  
[Online]. Available: <https://goo.gl/fhG9XI>.
- [5] S. Sauer mann and I. Weik,  
**“eHealth Applications in Austria: Telemonitoring”** DGTelemed: Nationaler Fachkongress Telemedizin, vol. 7, pp. 3-4, November 2016.
- [6] R. Endl, T. Jäschke, C. Thiel and D. V. Wickinghoff,  
**“mHealth im Kontext des elektronischen Patientendossiers. Eine Studie im Auftrag von eHealth Suisse”** 2015.
- [7] eHealth Suisse,  
**“mobile Health (mHealth) Empfehlungen I - Ausgangslage und erste Schritte”** 2017.  
[Online]. Available: <https://goo.gl/LHGXCm>. [Accessed 27 March 2017].
- [8] eHealth Stakeholder Group,  
**“Recommendations and Perspectives on Interoperability”** 2014.  
[Online]. Available: <https://goo.gl/rMmkmx>. [Accessed 28 April 2017].
- [9] European Commission,  
**“Commission Decision (EU) 2015/1302 of 28 July 2015 on the identification of ‘Integrating the Healthcare Enterprise’ profiles for referencing in public procurement (Text with EEA relevance)”** 2015.  
[Online]. Available: <https://goo.gl/FSGKdJ>. [Accessed 27 March 2017].
- [10] **“Draft Code of Conduct on privacy for mobile health applications”** 2016.  
[Online]. Available: <https://goo.gl/mVQZIL>. [Accessed 27 March 2017].





Digital health services will play a critical role in the delivery of integrated care. These include Electronic Medical Records, information sharing and care team collaboration tools, personal connected services and tools for citizens, risk stratification systems as well as decision support systems.

However, if services are to genuinely support integrated care models, they must be truly interoperable. The slow deployment of interoperable digital health solutions across European countries remains a barrier for scaling-up integrated care. At the same time, the uptake of connected health and Internet of Things technologies within the health, social and wellness sectors is increasing rapidly.

While the information and knowledge this provides can empower individuals, making them actors and agents in their own health, it poses further challenges for open interoperability and for seamlessly incorporating this information to deliver integrated care.

This paper provides health policy makers with the tools to build a productive partnership with their IT teams to jointly develop a successful integrated care model. It will also help develop a common understanding of the digital health approach to support that model.

## ABOUT COCIR



COCIR is the European Trade Association representing the medical imaging, radiotherapy, health ICT and electromedical industries. Founded in 1959, COCIR is a non-profit association headquartered in Brussels (Belgium) with a China Desk based in Beijing since 2007. COCIR is unique as it brings together the healthcare, IT and telecommunications industries. Our focus is

to open markets for COCIR members in Europe and beyond. We provide a range of services in the areas of regulatory, technical, market intelligence, environmental, standardisation, international and legal affairs. COCIR is also a founding member of DITTA, the Global Diagnostic Imaging, Healthcare IT and Radiation Therapy Trade Association ([www.globalditta.org](http://www.globalditta.org)). [www.cocir.org](http://www.cocir.org)

## ABOUT IHE-EUROPE



The mission of IHE-Europe is to improve patient care by advancing the interoperability of healthcare IT systems and the appropriate sharing of relevant information. Towards that end, IHE-Europe conducts education, testing, demonstrations and other activities promoting the deployment within Europe of systems compliant with the IHE Technical Frameworks developed by IHE International.

IHE-Europe also recruits healthcare professionals and solution developers to participate in the development of these specifications and promote their appropriate use in Europe. IHE-Europe interacts with relevant governmental and non-governmental organisations in Europe. It also maintains close contacts with similar initiatives around the world. [www.ihe-europe.net](http://www.ihe-europe.net)

## ABOUT THE PERSONAL HEALTH CONNECTED ALLIANCE



The Personal Connected Health Alliance (PCHAlliance) aims to make health and wellness an effortless part of daily life. The PCHAlliance, a non-profit organization formed by HIMSS, believes that health is personal and extends beyond healthcare. The Alliance mobilizes a coalition of stakeholders to realize the full potential of

personal connected health. PCHAlliance members are a vibrant ecosystem of technology and life sciences industry icons and innovative, early stage companies along with governments, academic institutions, and associations from around the world. [www.pchalliance.org](http://www.pchalliance.org)