



SYMPHONY

The right health data at the right time

By combining artificial intelligence (AI) tools and algorithms with interoperability standards and clinical pathway modelling, the ITEA project SYMPHONY (Eco-system for disease-specific clinical workflow and data integration) has created open, disease-specific healthcare IT ecosystems that optimise diagnosis, treatment and follow-up.

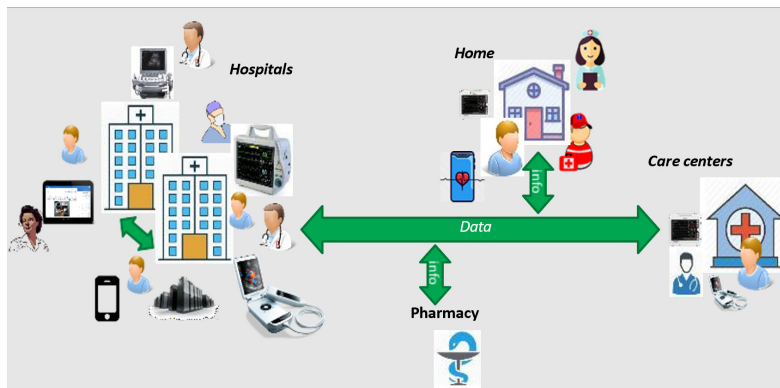
reporting from various sources. By combining these developments in AI, interoperability and pathway modelling in a unified reference architecture across the use cases, SYMPHONY has achieved its ultimate result: open, disease-specific

Healthcare processes are becoming increasingly complex: a growing number of medical disciplines are involved in each patient's journey, while resources are strained by rising populations, longer life expectancies and staff shortages. These issues are compounded by the sheer amount of data from heterogeneous sources, leading to fragmentation, vendor lock-in, and missing interoperability. Given that 80%* of serious medical errors involve miscommunication between care teams, there is an urgent need for clinical decision-making based on the right information at the right time and place.

To address this challenge, SYMPHONY focused on strong collaboration between hospitals and solution providers across four use cases: prostate cancer, aortic aneurysm, atrial fibrillation, and multiple sclerosis. What unites these diseases is that their data comes from different sources and relies on manual integration, which is time-consuming and requires assumptions when data is missing or secondary data is poorly calculated. Treatment typically involves multidisciplinary team reviews in which different experts from the clinical context come together to make decisions, allocating only a few minutes per patient. If the data is missing or inadequate, that time is wasted.

Project developments

To empower clinicians to make faster, data-supported decisions in such complex cases, SYMPHONY targeted several innovations. First, the project demonstrated comprehensive adoption



Open, disease-specific healthcare IT ecosystems

of interoperability standards needed to connect tools, focusing in particular on standardising clinical AI while considering regulatory aspects. The white paper ['Building the Foundations for Standardized Clinical AI: The SYMPHONY Contributions'](#) consolidates these contributions by identifying and addressing current standardisation gaps, serving as a broad foundation for clinical AI. The white paper is complemented by SYMPHONY's work on the modelling of disease-specific guidelines, through which use case-specific clinical pathway models have been created from established clinical guidelines.

Thanks to these innovations, SYMPHONY was able to apply clinical AI across the use cases: 16 algorithms and 23 tools have been developed to support decision-making and select appropriate pathways within the workflows for each disease. For multiple sclerosis, for example, AI modules offer improved analysis of radiology images and reports, while the aortic aneurysm use case includes automatic, consolidated

healthcare IT ecosystems that offer comprehensive, real-time insights into a patient's status and integrate all relevant information for diagnosis, treatment selection and follow-up.

Results so far

With 44 prototypes developed against an initial target of 18, SYMPHONY has more than delivered on its aims. Most important, however, is that the effectiveness of these prototypes has been demonstrated in selected non-clinical samples, with clinical validation to follow. For practitioners, improved clinical workflow has reduced duplicate clinical events (such as unnecessary examinations or data entry) by 15%, while secondary use of source data (such as for internal quality work or registry reporting) has risen by at least 15%. They now have access to an automatically calculated risk score per patient, allowing better prioritisation of their time. SYMPHONY also evaluated the AI's interpretability for >50 patients per use case for selected applications and

found that 80% of the clinical experts involved have trust in the system – meaningful early evidence of acceptance in the context of early-stage clinical AI evaluation, especially given the use case heterogeneity and limited exposure time.

Exploitation is now ongoing. For instance, Karolinska University Hospital will soon integrate SYMPHONY's results into its equipment to remove the need for paper-based reporting on prostate cancer, thereby reducing manual work. New functionalities for Philips' AV Vascular software, used to process radiological images, have already received FDA clearance and CE marking and will therefore be commercialised in 2026 via software license sales and platform-level service agreements. Software-as-a-Service (SaaS) is an especially viable route for commercialisation: AICRUM's CareMe at Home – a telemedicine platform for resource optimisation – will be offered via recurring SaaS subscriptions for healthcare providers, complemented by optional paid modules and enterprise licensing for hospitals and care networks. Likewise, Cuviva's Remote Patient Monitoring and Hospital-at-Home platform business model will be SaaS licensing-based, aiming to establish a scalable presence in South Africa and expand into additional African markets. INNOVA, meanwhile,

will exploit the platform and multiple sclerosis/sarcopenia assets through its own InnHealth marketplace and will use a public mobile app to support visibility and adoption. These are just a few examples, but SYMPHONY's open, interoperable and vendor-neutral approach positions all partners competitively against proprietary systems.

Future outlook

These results are only the beginning: over the next four years, the clinical use case partners are expected to achieve at least 5% penetration of the new technologies compared to their current client bases and the commercial partners are expected to see a 5% increase in new market deployment. Standardisation will also continue, with Karolinska having received an international mandate from openEHR International to conduct openEHR modelling of prostate radiology information. SYMPHONY is thus expected to make a lasting improvement to the quality and efficiency of patient care and a significant reduction to clinical burden and hospital costs, all while accelerating research through greater access to high-quality, interoperable real-world data.

*Source: <https://medxdrg.com/which-cause-is-the-most-common-reason-for-medical-error-unpacking-the-communication-breakdown>

Major project outcomes

Dissemination

- > 6 publications and 6 presentations at conferences/fairs

Exploitation (so far)

New products

- > Successful clinical validation of vascular analysis application
- > Data visualisation tool for 3D brain MRI images and 2D brain cross-section images
- > Positive feedback from multiple vascular surgeons (international)
- > MS lesion segmentation with deep learning approaches

New services

- > Android-based Critical Flicker Fusion test for early diagnosis of optic neuritis
- > Dynamic DICOM SSO module for MS lesion segmentation results
- > Dynamic DICOM SR module for MS lesion segmentation results

New systems

- > Clinical Workflow Orchestrator for MS Diagnosis and Progression Monitoring
- > Android-based visual acuity test for early diagnosis of optic neuritis
- > Privacy-preserving Gateway for AI Workflow Management
- > Agreements on overall data exchange approach
- > Agreement on homogeneous data backbones and data storage standards

Standardisation

- > 6 contributions to standardisation bodies

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Partners

Canada

- > iClinic Systems Inc.

Spain

- > AICRUM IT

Netherlands

- > Amsterdam UMC
- > Leiden University Medical Center
- > MEDrecord BV
- > Philips Electronics Nederland BV
- > Philips Medical Systems Nederland BV
- > Sopheon N.V.
- > Thunderbyte.AI

Sweden

- > Cambio Healthcare Systems
- > Cuviva AB
- > Karolinska Institutet
- > Karolinska University Hospital

Türkiye

- > ARD GROUP
- > ForteArGe Informatics, Engineering Consultancy Ltd.
- > Innova
- > Tazi Bilisim Teknolojileri A.S.

Project start

November 2021

Project end

January 2025

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