Special theme: Digital Health
The volume of data, the variety of data types, the increasing wealth of knowledge, and the ability to track disease and co-morbidities from start to finish already overpower the ability of humans to make informed decision about health and healthcare [1]. Single, personalised, user-friendly electronic health records for individuals are important enablers in achieving better health services and better patient outcomes. However, one of the greatest challenges in the digital era is providing people with seamless access to their health data within and across different health systems. Digital solutions for healthcare are still not as interoperable as expected and the secure sharing of information is limited. Even though the involved stakeholders have implemented a big number of digital projects in the past twenty years in the EU, most information is still in healthcare provider silos, rendering digital transformation for citizen empowerment difficult to realise.

In 2017, in an open consultation conducted by the Commission, the majority of respondents (93 %) either agreed (29 %) or strongly agreed (64 %) with the statement that “Citizens should be able to manage their own health data.” More than 80 % of respondents believed that sharing data could improve treatment, diagnosis and prevention of diseases across the EU. A large majority of respondents (almost 60 %) identified the heterogeneity of electronic health records as one of the main barriers for exchange of health data in Europe [L1]. There is evident public demand for secure access to health data across the EU.

Although individuals have the right to, and desire for, access their personal data, including health data, most cannot yet access or securely share their health data seamlessly across the units of their national healthcare system.

In an effort to guarantee the secure and free flow of data within the EU for public administrations, businesses and citizens, the new European Interoperability Framework (EIF) was announced in 2017 [L2]. The new EIF provides guidance to public administrations, through a set of recommendations on interoperability governance, streamline processes for end-to-end digital services, cross-organisational relationships, and new legislation in support of interoperability. The new EIF can be adapted to support the eHealth domain in Europe, as a common framework for managing interoperability in the context of the eHealth digital services transformation at national level.

Within national health systems, interoperability should occur at all four levels: legal, organisational, semantic and technical. Legal interoperability ensures that organisations operating under different policies, legal frameworks and strategies can work together. Organisational interoperability refers to the way in which public administrations align their responsibilities, business processes and expectations to achieve mutually beneficial goals. Semantic interoperability refers to both the meaning of data and the exact format of the information specified for exchange. Technical interoperability covers the applications and infrastructures linking systems and services, including interface specifications [2], data presentation and secure communication protocols.

In order to secure citizens’ access to and sharing of health data, the EU is moving towards the development of specifications for a European exchange format, based on open standards, taking into consideration the potential use of data for research and other purposes. The recommendation on a European EHR exchange format sets out a framework to achieve secure, interoperable, cross-border access to, and exchange of, electronic health data in the EU [L3]. The aim is to deliver the right data, at the right time, for citizens and healthcare providers, and allow for the secure access, sharing and exchange of EHRs. The baseline includes electronic patient summaries, prescriptions and dispensa-
tions, laboratory reports, medical images and reports, and hospital discharge reports, in alignment with established priorities at a European level.

By making the citizens as patients the point-of-care, digital health solutions, on the one hand, target clinician empowerment with actionable insights for faster and accurate diagnoses and prognoses for patient-tailored treatments, follow-ups and assistance, and, on the other hand, they assist individuals to be active players in their health management, with timely and targeted prevention and assistance strategies. The comprehensive vision focuses on making diseases, such as cancer [3], more preventable and treatment outcome more predictable, effective and personalised.

In order to achieve this vision, within national health systems, a roadmap for the development and maintenance of national specifications needs to be in place. National, reusable interoperability specifications, compatible with the corresponding European ones, developed through open and transparent processes also need to be in place, together with mechanisms and tools for compliance control, testing and certification. Prerequisites for enabling data reuse and workflow automation include well-defined use cases, agreed terminology, and reliable clinical content.

Appropriate governance and legislation are important to ensure the consistent application of eHealth interoperability and that all involved parties, including health organisations and solution providers, will comply with it.

**References:**


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**Towards VNUMED for Healthcare Research Activities in Vietnam**

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*Inspired by MIMIC-III [1], VNUMED is a unified intermediate database of electronic medical records that is being developed in Vietnam. Its purpose is to gather medical records from hospitals, which can be used to support medical research.*

Recent legislation mandates that every hospital in Vietnam must support electronic medical records [2]. This is also encouraged by today’s Industry 4.0. To achieve this, a digital transformation of the medical field is required. This means electronic medical records must be established, in addition to the existing information system in each hospital. This came into effect in all hospitals under the Ministry of Health on March 1st, 2019, and all hospitals in Vietnam are required to have electronic medical records by the end of 2030. As a result, a huge number of electronic medical records are being generated and will be available in every hospital very soon. Compiling them thus lays the foundations for medical case-based research both within medicine and related fields.

Although new legislation [2] requires that we apply standardised technologies across hospitals [3], existing hospital information systems in Vietnam are very diverse, owing largely to differences in long-term investments in information technology among hospitals. Consequently, the development of electronic records has been a priority for some hospitals but not others. As outlined below, this presents huge challenges when it comes to using existing electronic medical records with external processing tools with the aim of gathering data to be used in research.

Firstly, the content of an electronic medical record needs to be well defined so that all the necessary details are available for reference in current treatment procedures and future processes. Traditionally, in Vietnam, like many other countries, hospitals have relied on paper medical records. Transferring all information from paper to electronic medical records is extremely difficult because of problems associated with understanding handwriting, time pressure, computer skills, etc. In addition, records must be integrative so that not only their textual content but also their images and time series from medical tests are included.

To achieve this task, as part of our initial phase we investigated the use of the database MIMIC-III to support VNUMED. MIMIC-III is a popular database which is well processed and widely used, and we are considering both its database schema and practical applications for VNUMED. Such a choice also makes VNUMED independent of any electronic medical record type in any existing hospital information system in Vietnam. Furthermore, practical applications can then be constructed on VNUMED, hopefully like those on MIMIC-III.

**References:**

[1] https://kwz.me/hy6


[3] https://kwz.me/hy7

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**Links:**

[L1] https://kwz.me/hy6


[L3] https://kwz.me/hy7
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