



BSI Standards Publication

Health informatics — Personalized digital health framework

National foreword

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Introduction

Developments in information and communication technology (ICT) have enabled data to be collected from individuals in a variety of ways. Various health-related data not only facilitate finding effective treatment strategies but also establishing personalized healthcare services, as [Figure 1](#) depicts. Therefore, the concept of digital healthcare has emerged. Digital healthcare can be defined as comprehensive medical services that utilize an individual's health-related data, including personal health data that may be collected from devices, platforms and applications.

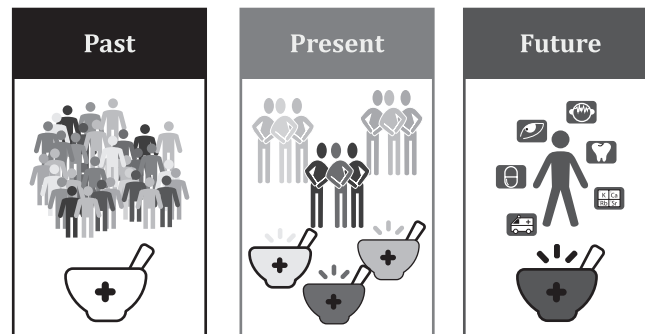


Figure 1 — Evolution in personalized digital health

Tremendous amounts of information can be produced by individuals, such as eating habits, exercise, hours of sleep, and also health records. This information is considered along with physical, social, and mental characteristics of individuals and can result in different treatment options and prescriptions. Accordingly, personalized digital health (PDH) refers to electronic services that support the health of individuals when they can add to and handle their own health information.

Existing medical care procedures focus on suggesting medical solutions when a disease occurs. Digital health goes beyond that scope and supports an individual's decision-making process by providing the most appropriate advice based on their continuously generated health-related data. Personalized digital health aims to go one step further, enabling an individual to identify and eliminate the potential causes of disease before they occur.

Another goal of digital healthcare is to effectively monitor and manage personal health by using platforms and applications that can provide personalized healthcare services. The personalized services are based on an individual's health information, including biometric information and family medical history, which are stored in large databases.

Personalized digital services based on a combination of medical knowledge and IT solutions can improve healthcare. If personalized digital health becomes the norm, a PDH service could utilize a patient's genomic information to help find the most appropriate drugs and treatment methods. This can be significantly enabled by collecting, categorizing or "tagging", and storing patients' biometric information, medical documentation, genetic analysis, smart or wearable device information, family history, and clinical examination information.

Medical data, previously managed by hospitals and institutions, are now being transformed and integrated into PDH platforms, a concept that empowers individuals to be the decision-makers of their own health information and data use. Therefore, PDH data comprises both health records from hospitals and health professionals, and personal health data generated by smart devices.

When individuals are given the right to decide how their health data is handled or managed, a consent system for their personal information is necessary. A consent system is a system in which individuals can actively manage their consent at any time. Many people have given permission to use their personal information to medical care institutions and other organizations. Traditionally, a paper-based agreement was widely used. Nowadays, the number of medical institutions using digital contracts is rising because of the wide usage of smartphones and PCs. However, since these methods are conducted on a one-off basis, it is difficult to modify or withdraw the consent once it is given.

Dynamic consent is a form of consent that allows people to decide whether to provide specific information via interactive digital interfaces. This agreement method was first implemented in biomedical and genomic studies that required continuous contact with participants. Dynamic consent gives individuals more autonomy by giving them the power to control their own data. A customized interface that enables two-way communication between healthcare providers and users is important for dynamic consent to work effectively.

Various stakeholders, such as researchers, healthcare providers, institutions and governments, can access individuals' health data through an efficient and dynamic consent system. To reach the full potential of PDH services, quickly establishing standards for systems, infrastructure, platforms and frameworks is imperative. Supporting personalized knowledge representation and related ontologies is mandatory when seeking to transform how individuals manage their healthcare, and it can only be realized with PDH technology. Otherwise, data integration is almost impossible, and failure of data management can hold back the development of a successful digital health system.