CLASSIFICATION OF DIGITAL HEALTH INTERVENTIONS v1.0

A shared language to describe the uses of digital technology for health

WHAT IS IT?

The classification of digital health interventions (DHIs) categorizes the different ways in which digital and mobile technologies are being used to support health system needs. Targeted primarily at public health audiences, this Classification framework aims to promote an accessible and bridging language for health program planners to articulate functionalities of digital health implementations. Also referred to as a taxonomy, this Classification scheme is anchored on the unit of a "digital health intervention," which represents a discrete functionality of the digital technology to achieve health sector objectives.



How to use it?

The digital health interventions are organized into the following overarching groupings based on the targeted primary user:



INTERVENTIONS FOR CLIENTS: Clients are members of the public who are potential or current users of health services, including health promotion activities. Caregivers of clients receiving health services are also included in this group.



INTERVENTIONS FOR HEALTHCARE PROVIDERS: Healthcare providers are members of the health workforce who deliver health services.



INTERVENTIONS FOR HEALTH SYSTEM OR RESOURCE MANAGERS: Health system and resource managers are involved in the administration and oversight of public health systems. Interventions within this category reflect managerial functions related to supply chain management, health financing, human resource management.

INTERVENTIONS FOR DATA SERVICES: This consists of crosscutting functionality to support a wide range of activities related to data collection, management, use, and exchange.

Each digital health intervention is accompanied by associated synonyms and other commonly used terms. The framework also includes programmatic examples of these terms based on cited descriptions from project documentation.

WHY WAS IT CREATED?

The diverse communities working in digital health—including government stakeholders, technologists, clinicians, implementers, network operators, researchers, donors— have lacked a mutually understandable language with which to assess and articulate functionality. A shared and standardized vocabulary was recognized as necessary to identify gaps and duplication, evaluate effectiveness, and facilitate alignment across different digital health implementations.

In particular, four primary use cases prompted the development of this classification

- scheme: synthesizing evidence and research;
 - · conducting national inventories and landscape analyses;
 - developing guidance resources to inform planning;
 - articulating required digital functionality based on identified health system challenges and needs.

Although frameworks such as the Control Objectives for Information and Related Technologies (COBIT) [1], Health Level Seven (HL7) [2], and International Standards Organization (ISO) [3] exist, these frameworks provide highly technical terms for use by computer scientists and software developers in health. This new classification scheme offers a simplified language to help support a dialogue between public health practitioners and technology-oriented audiences.

How does this link to other classifications?

This classification of **Digital Health Interventions (DHIs)** should be used in tandem with the of list **Health System Challenges (HSC)** in order to articulate how technology is addressing identified health needs, such as lack of service utilisation. The HSC framework provides an overview of needs and challenges faced in health systems, in order to assist program planners to express what they expect to achieve through implementation of a digital health intervention. For example, one may implement a digital health intervention, such as "targeted communication to clients", in order to address a health system challenge, such as "lack of service utilisation," to achieve an overarching **eHealth outcome** of "improving clients' access to knowledge resources and support for better management of their health"[5].

The classification of DHIs also highlights functionalities that fit within various **System Categories**, such as Logistics Management Information Systems (LMIS) or Electronic Medical Records (EMR). System Categories represent the types of ICT applications and information systems designed to deliver one or more digital health interventions. A digital health intervention such as "notify stock levels of health commodities" would fit into the System Category of LMIS. Linking digital health interventions to system categories is critical as these serve as the starting point for interoperability considerations.

FIGURE 1. LINKAGES ACROSS HEALTH SYSTEM CHALLENGES, DIGITAL HEALTH INTERVENTIONS, AND SYSTEM CATEGORIES



How was it developed?

This Classification scheme reflects emerging uses of digital technologies for health. The taxonomy leverages mobile health (mHealth) categorizations from the mHealth Technical Evidence Review Group (mTERG) and Labrique et al.[4], and expands on these terms to to be inclusive of eHealth and broader capabilities that have relevance in the health sector. WHO convened a series of technical consultations to further refine these terminologies and definitions. Public feedback was solicited through the Health Data Collaborative Digital Health and Interoperability Working Group. Additionally, a desk review was conducted to align with reference frameworks [1-3], and to establish examples of DHI in current use.

How it will evolve?

This reference Classification will evolve as new digital functionalities emerge. The WHO Secretariat will periodically update and version this Classification based on technical consultations and public feedback. Subsequent releases of this Classification will be available at *http://who.int/reproductivehealth/topics/mhealth/en/*.

HEALTH SYSTEM CHALLENGES

INFORMATION
Lack of population denominator
Delayed reporting of events
Lack of quality/ reliable data
Communication roadblocks
Lack of access to information or data
Insufficient utilization of data and information
Lack of unique identifier

2	AVAILABILITY
2.1	Insufficient supply of commodities
2.2	Insufficient supply of services
2.3	Insufficient supply of equipment
2.4	Insufficient supply of qualified health workers

QUALITY

2

4

3.1	Poor patient experience
3.2	Insufficient health worker competence
3.3	Low quality health commodities
3.4	Low health worker motivation
3.5	Insufficient continuity of care
3.6	Inadequate supportive supervision
3.7	Poor adherence to guidelines

ACCEPTABILITY

.1	Lack of alignment with local norms
.2	Programs which do not address individual beliefs and practices
5	UTILIZATION
1	Low demand for services

2.1	LOW defination for services
5.2	Geographic inaccessibility
5.3	Low adherence to treatments
5.4	Loss to follow up

6 EFFICIENCY 6.1 Inadequate workflow management 6.2 Lack of or inappropriate referrals 6.3 Poor planning and coordination 6.4 Delayed provision of care 6.5 Inadequate access to transportation

7	Соѕт
7.1	High cost of manual processes
7.2	Lack of effective resource allocation
7.3	Client-side expenses
7.4	Lack of coordinated payer mechanism

8	ACCOUNTABILITY
8.1	Insufficient patient engagement
8.2	Unaware of service entitlement
8.3	Absence of community feedback mechanisms
8.4	Lack of transparency in commodity transactions
8.5	Poor accountability between the levels of the health sector
8.6	Inadequate understanding of beneficiary populations

System Categories



R	Laboratory and diagnostics information system*
S	Learning and training system
т	Logistics management information system (LMIS)
U	Pharmacy information system*
V	Public health and disease surveillance system*
W	Research information system
Х	Shared Health Record and health information respositories*
Υ	Telemedicine

*Adapted from the International Standards Organization [3]

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- 3. Health informatics -- Capacity-based eHealth architecture roadmap -- Part 2: Architectural components and maturity model ISO/TR 14639-2:2014. Geneva: International Standards Organization (ISO); 2014 (*https://www.iso.org/obp/ui/#iso:std:*54903:en, accessed 7 March 2018)
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1.1	TARGETED CLIENT COMMUNICATION	1.3	CLIENT TO CLIENT COMMUNICATION		1.6	ON-DEMAND INFORMATION SERVICES TO CLIENTS
1.1.1	Transmit health event alerts to specific population group(s)	1.3.1	Peer group for clients	ľ	1.6.1	Client look-up of health information
1.1.2	Transmit targeted health information to client(s) based on health status or	1.4	PERSONAL HEALTH TRACKING		1.7	CLIENT FINANCIAL
demographics	demographics	1.4.1	Access by client to own			TRANSACTIONS
1.1.3	Transmit targeted alerts and reminders to client(s)	1.4.2	Self monitoring of health		1.7.1	Transmit or manage out of pocket payments by
1.1.4	Transmit diagnostics result, or availability of result, to client(s)	1.4.3	Active data capture/ documentation by client		1.7.2	Transmit or manage vouchers to client(s) for
						health services
1.2	UNTARGETED CLIENT COMMUNICATION	1.5	CITIZEN BASED REPORTING		1.7.3	Transmit or manage incentives to client(s) for health services
1.2.1	Transmit untargeted health information to an	1.5.1	Reporting of health system feedback by clients			
	undefined population	1.5.2	Reporting of public health			
1.2.2	health event alerts to undefined group		events by clients			



2.0 HEALTHCARE PROVIDERS



2.5	PROVIDER COMMUNICATION
2.5.1	Communication from healthcare provider(s) to supervisor
2.5.2	Communication and performance feedback to healthcare provider(s)
2.5.3	Transmit routine news and workflow notifications to healthcare provider(s)
2.5.4	Transmit non-routine health event alerts to healthcare provider(s)
2.5.5	Peer group for healthcare providers
2.6	Referral coordination
2.6.1	Coordinate emergency response and transport
2.6.2	Manage referrals between points of service within health sector
2.6.3	Manage referrals between health and other sectors
2.7	HEALTH WORKER ACTIVITY PLANNING AND SCHEDULING
2.7.1	Identify client(s) in need of services
2.7.2	Schedule healthcare

2.8	HEALTHCARE PROVIDER TRAINING
2.8.1	Provide training content to healthcare provider(s)
2.8.2	Assess capacity of healthcare provider(s)
2.9	PRESCRIPTION AND MEDICATION MANAGEMENT
2.9.1	Transmit or track prescription orders
2.9.2	Track client's medication consumption
2.9.3	Report adverse drug events
2.10	Laboratory and Diagnostics Imaging Manangement
2.10.1	Transmit diagnostic result to healthcare provider
2.10.2	Transmit and track diagnostic orders
2.10.3	Capture diagnostic results from digital devices
2.10.4	Track biological specimens



3.0 Health System Managers



3.3	PUBLIC HEALTH EVENT NOTIFICATION
3.3.1	Notification of public health events from point of diagnosis
3.4	CIVIL REGISTRATION AND VITAL STATISTIC
3.4.1	Notify birth event
3.4.2	Register birth event
3.4.3	Certify birth event
3.4.4	Notify death event
3.4.5	Register death event
3.4.6	Certify death event
3.5	HEALTH FINANCING
3.5.1	Register and verify client insurance membership
3.5.2	Track insurance billing and claims submission

Track and manage

insurance reimbursement

3.6	EQUIPMENT AND ASSET MANAGEMENT
3.6.1	Monitor status of health equipment
3.6.2	Track regulation and licensing of medical equipment
3.7	Facility management
3.7.1	List health facilities and related information
3.7.2	Assess health facilities

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