Mapping core characteristics of internet-based tools to maintain and improve population health: A scoping review

Laura Maaß[1,2], Konstantinos Angoumis[3,4], Merle Freye[2,5], Chen−Chia Pan[2,4,6]

[1]Research Center on Inequality and Social Policy University of Bremen, [2]Leibniz ScienceCampus Digital Public Health Bremen, [3]University of Bielefeld, [4]Leibniz Institute for Prevention Research and Epidemiology − BIPS, [5]Institute for Information, Health and Medical Law University of Bremen, [6]Institute for Public Health and Nursing Research University of Bremen

Background and Study Aim

Various disciplines are involved in digital (public) health technologies [1]. We require an inter-disciplinary terminology to develop, implement, integrate, and evaluate needs-based digital public health interventions (DiPHI).
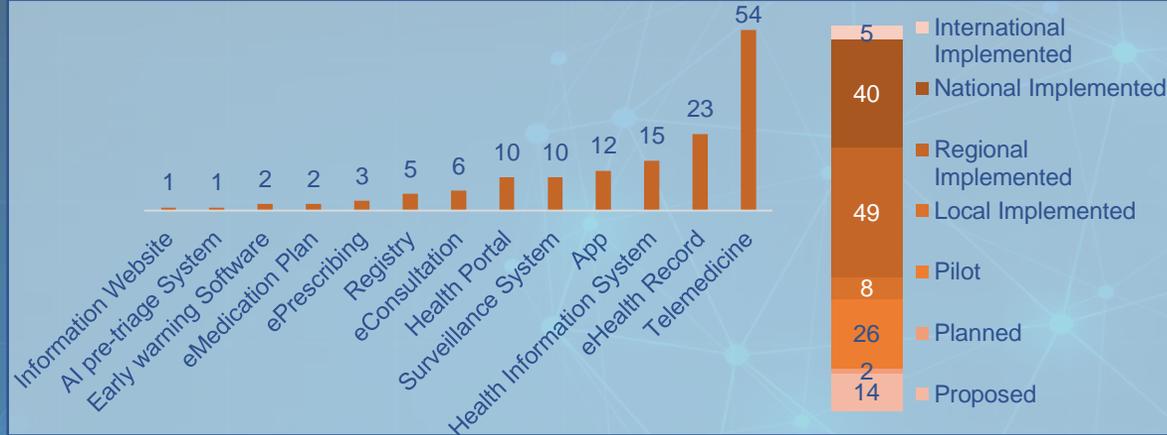
This study aims to:
- Outline characteristics of DiPHI following the NICE framework [2] and WHO essential public health (PH) functions [3]
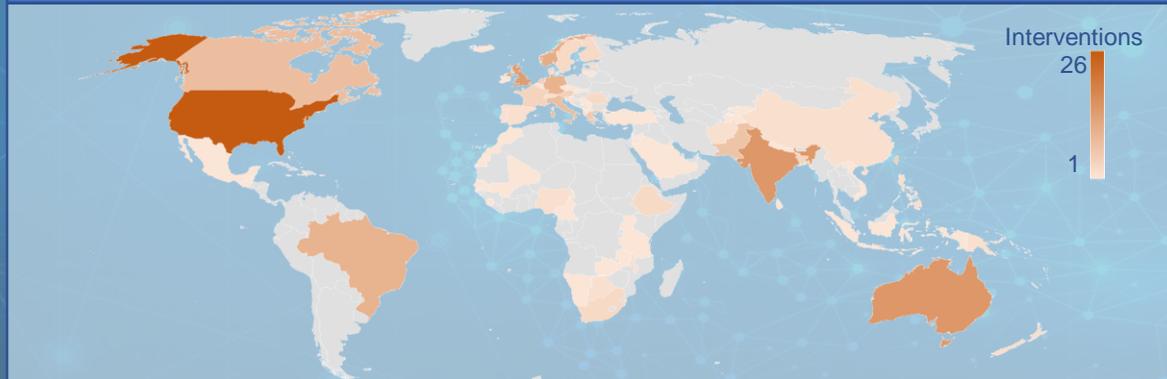
Definitions and Methods

- DiPH: Addresses PH aims [4] through applying information-communication tools [5]
- DiPHI: Tools that target at least one essential public health function through digital means [6]

- Databases searched: PubMed, CENTRAL, Web of Science, IEEE Xplore, ACM Full-Text Collection
- Inclusion criteria:
  - detailed description of a DiPHI that uses the internet or Bluetooth
  - government/health insurance pays for DiPHI
  - DiPHI targets general population at the community level or above

- Of 22 287 identified records, 213 studies were included through screening according to PRISMA

Intervention Types (left) and Reported Implementation Status (right)

Intervention Types:
- Information Website: 1
- AI pre-triage System: 1
- Early warning Software: 2
- eMedication Plan: 2
- ePrescribing: 3
- Registry: 5
- eConsultation: 6
- Health Portal: 10
- Surveillance System: 10
- App: 12
- Health Information System: 15
- eHealth Record: 23
- Telemedicine: 54

Reported Implementation Status:
- International Implemented: 5
- National Implemented: 40
- Regional Implemented: 49
- Local Implemented: 8
- Pilot: 26
- Planned: 2
- Proposed: 14

Included Interventions per Country

Interventions
26
1

Primary Intervention Characteristics

Public Health Area by WHO[3] \ Digital Function by NICE[2]	System Service	Information	Communication	Behavior Change	Treatment	Monitoring	Self-management	Health Diary	Diagnostic
Governance	5					1			
Financing	1								
Human Resources	1	4	1		1				
Health Information Systems	3	5	1						
Research	1								
Social Participation & Health Communication	3	5					2	1	
Health Protection						1			
Health Promotion				3		2			
Disease Prevention		1							3
Health Care	11	1	14		4	4	4		12
Preparedness for PH Emergencies	1		2						

Conclusion

When comparing interventions internationally, it's best to compare based on the characteristics of the intervention rather than on the name.

1. Taj F, Klein MCA, Van Halteren A. Digital Health Behavior Change Technology: Bibliometric and Scoping Review of Two Decades of Research. JMIR mHealth and uHealth. 2019;7(12):e1331114.
2. Evidence standards framework for digital health technologies. National Institute for Health and Care Excellence (NICE). 2022. URL: https://www.nice.org.uk/corporate/ecd7
3. World Health Organization (WHO). Essential public health functions, health systems and health security. Developing conceptual clarity and a WHO roadmap for action. Geneva: WHO; 2018.
4. Winslow CE. The untilled fields of public health. Science. 1920 9th January;51(1306):23-33.
5. Odone A, Buttigieg S, Ricciardi W, Azzopardi-Muscat N, Staines A. Public health digitalization in Europe: EUPHA vision, action and role in digital public health European Journal of Public Health. 2019;29(Supplement_3):28-35.
6. Wienert J, Jahnel T, Maaß L. What are Digital Public Health Interventions? First Steps Towards a Definition and an Intervention Classification J Med Internet Res 2022;24(6):e31921

Contact: Laura Maaß | laura.maass@uni-bremen.de | +49 171 9202 704   Web: http://www.lsc-diph.de | Twitter: @LSCDiPH   @laura_goes_DiPH

Leibniz ScienceCampus
Digital Public Health
Bremen