



Quo vadis? Results of the systematic scoping review for digital health terms in the literature

**Anita Burrell
Zsombor Zrubka**

ISPOR Forum, May 17th 2021

What is the ISPOR Digital Health SIG?

- Mission
 - To address new opportunities in the healthcare sector emerging from the increasing use of digital technologies, specifically telemedicine and mobile devices (mHealth), and to evaluate the impact of information and communication technology on health outcomes.
- Goal
 - Establish a forum to address the opportunities and challenges emerging in the field of digital health
 - Understand the role of health economics and outcomes research (HEOR) in the value assessment of digital health solutions
 - Investigate the ways in which the validity and reliability of digital health technologies can be evaluated
 - Promote the effective use of digital technologies to improve patient outcomes and efficiency of healthcare systems

Presenters



Anita Burrell, MA, MBA
Founder
Anita Burrell Consulting LLC



Zsombor Zrubka MD, MBA, PhD
Associate Professor, head
Health Economics Research Center, Óbuda University

Special Thanks to:

- Over 30 members of the Digital Health SIG who contributed to this project
- Marie McWhirter and Emily Johnson- Barlow, University of Illinois at Chicago
- MBA students from Kozminski University
- Barbara Tóth, University of Óbuda
- Hossein Motahari-Nezhad, Corvinus University of Budapest
- ISPOR Staff

Ice Breaker Poll

- When do you think that you will feel comfortable to take an international flight
 - Right away, let's go!
 - Within the next couple of months
 - Between 3 and 6 months time
 - Not until next year

Poll #2

- What is your experience in understanding digital health terms when trying to undertake health outcomes research?
 - Never worked in this area
 - It was easy to understand terms
 - It was difficult to understand terms
 - It was nearly impossible to understand terms

Objectives of the Key Project

- Perform a literature review to produce an inventory of different definitions used in literature and in practice for digital health and allied terms e,g,
 - Digital health
 - E-health
 - mHealth
 - Telehealth / medicine
- Identify definitions which are aligned with the ISPOR mission of outcomes research vs other

Our methodology

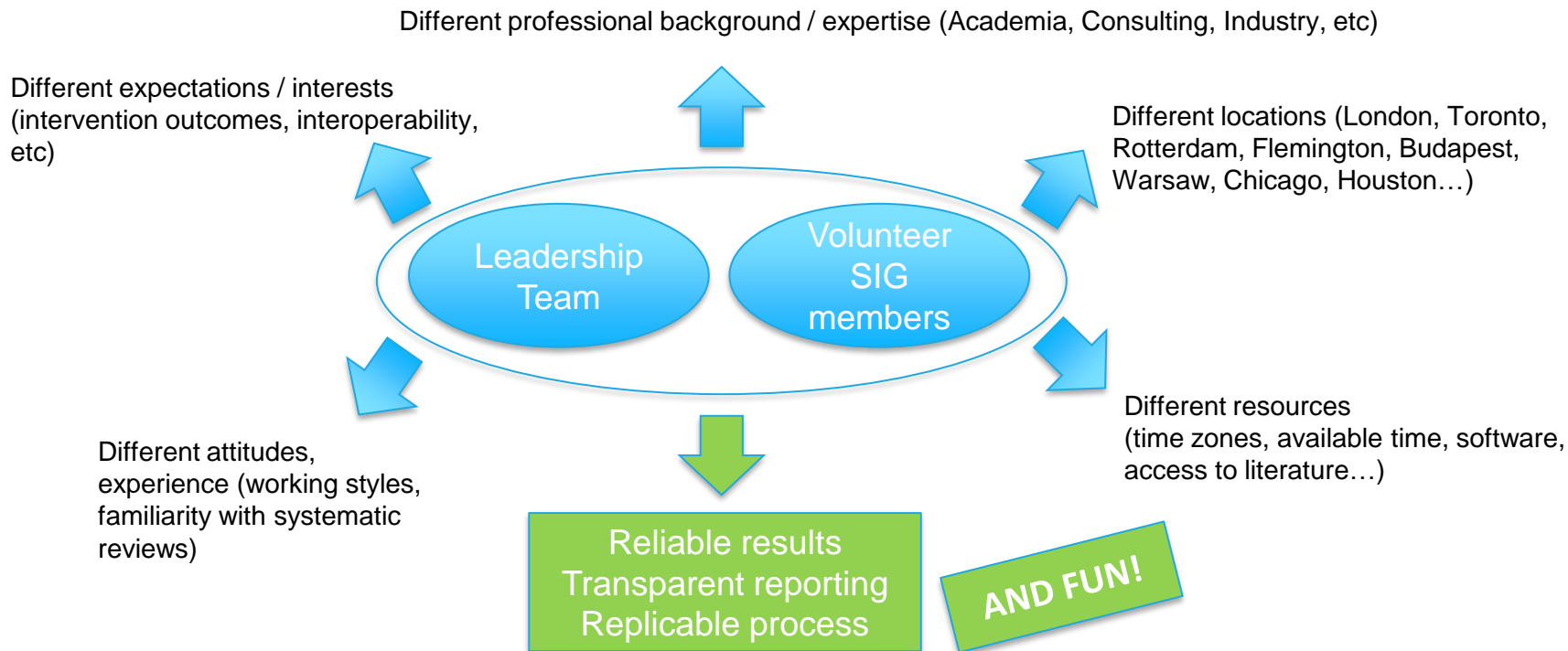
- A scoping review of
- Systematic reviews
- Between 2015 and 2020
- That contain a definition
- Related to digital health (n=38 terms)



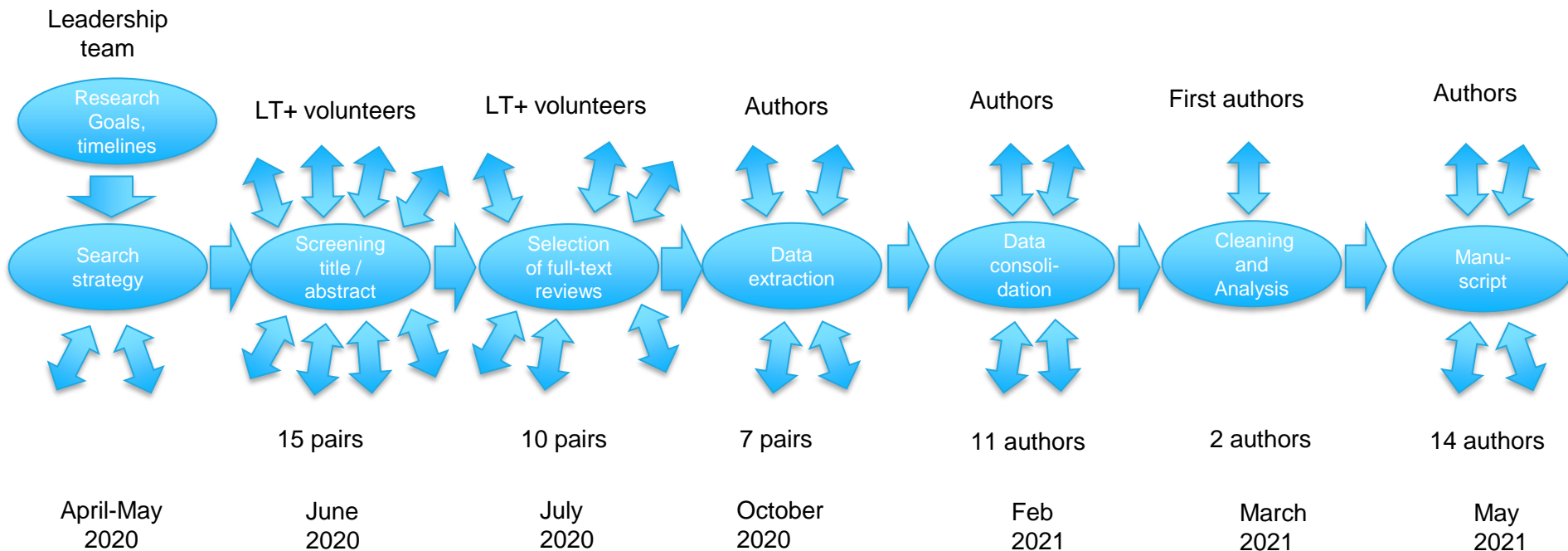
FUN FACT

From 535 overviews of sytematic reviews
188 provided a definition of a systematic review
188 elements in 14 categories...

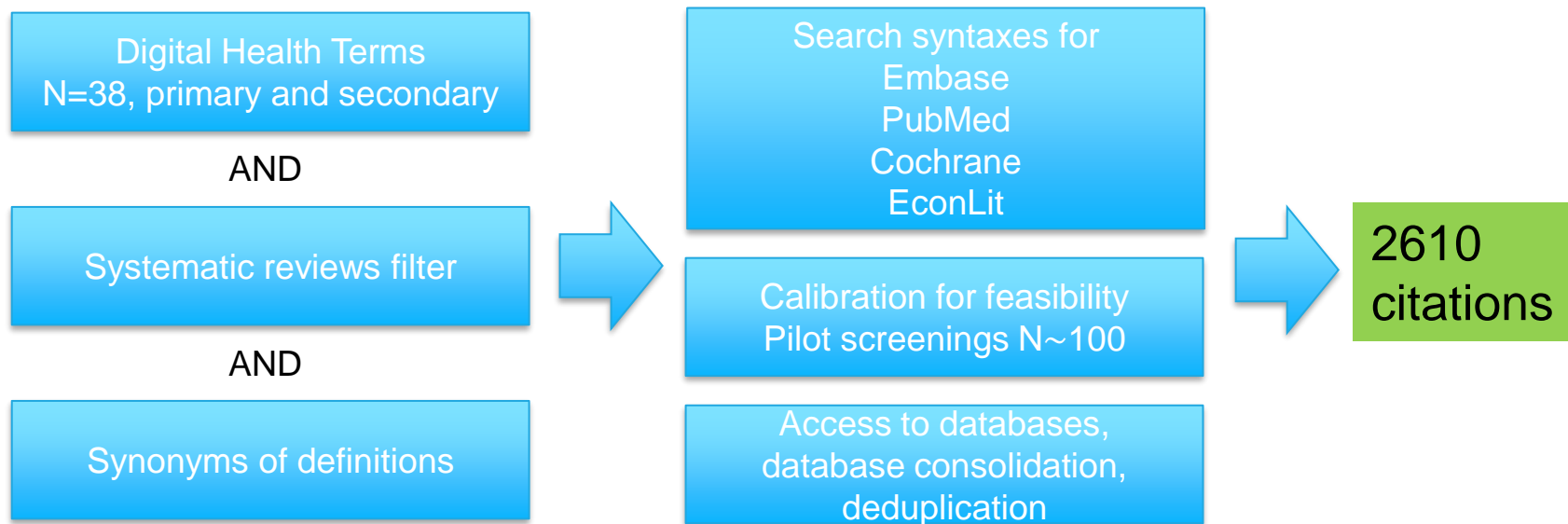
Huge collaborative effort across the SIG!



The white literature review process, following PRISMA



Search strategy



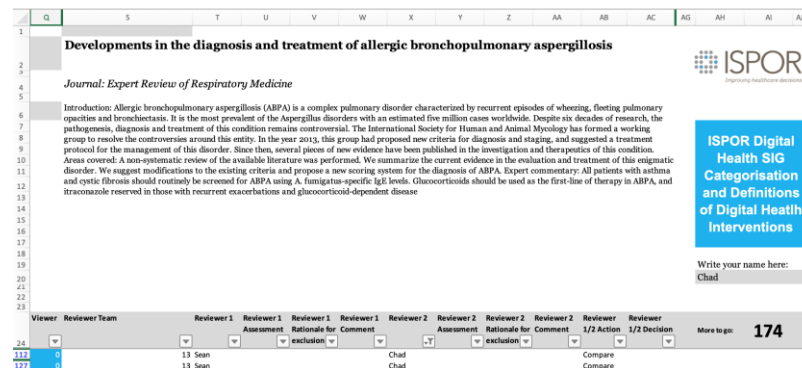
Screening of titles / abstracts

Recruitment of
volunteers

Uncertain task size
Coordination
Chance of authorship

Ensuring
consistency

User-friendly spreadsheet
Training
Decision rules
Explicit evaluation criteria
Helpdesk
Noncompleters
3rd reviewers



Q	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AH	AI	AJ
1	Developments in the diagnosis and treatment of allergic bronchopulmonary aspergillosis														
2	<i>Journal: Expert Review of Respiratory Medicine</i>														
3	Introduction: Allergic bronchopulmonary aspergillosis (ABPA) is a complex pulmonary disorder characterised by recurrent episodes of wheezing, fleeting pulmonary opacities and bronchiectasis. It is the most prevalent of the Aspergillus disorders with an estimated five million cases worldwide. Despite six decades of research, the pathogenesis, diagnosis and treatment of this condition remains controversial. The International Society for Human and Animal Mycology has formed a working group to resolve the controversies around this entity. In the year 2013, this group had proposed new criteria for diagnosis and staging, and suggested a treatment protocol for the management of this disorder. Since then, several pieces of new evidence have been published in the investigation and therapeutics of this condition.														
4	Areas covered: A non-systematic review of the available literature was performed. We summarize the current evidence in the evaluation and treatment of this enigmatic disorder. We suggest modifications to the existing criteria and propose a new scoring system for the diagnosis of ABPA. Expert commentary: All patients with asthma and cystic fibrosis should routinely be screened for ABPA using A. fumigatus-specific IgE levels. Glucocorticoids should be used as the first-line of therapy in ABPA, and itraconazole reserved in those with recurrent exacerbations and glucocorticoid-dependent disease														
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															
36															
37															
38															
39															
40															
41															
42															
43															
44															
45															
46															
47															
48															
49															
50															
51															
52															
53															
54															
55															
56															
57															
58															
59															
60															
61															
62															
63															
64															
65															
66															
67															
68															
69															
70															
71															
72															
73															
74															
75															
76															
77															
78															
79															
80															
81															
82															
83															
84															
85															
86															
87															
88															
89															
90															
91															
92															
93															
94															
95															
96															
97															
98															
99															
100															

Mean % agreement: 79% (range 36-97%)

545 full-text articles selected

Selection of full-text articles

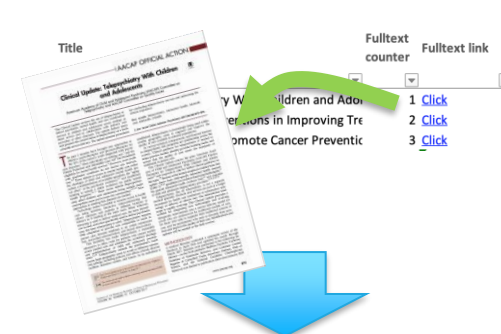
Access to literature

Checking access to papers
Obtaining not open-access papers
Dropbox database of papers

Explicit selection criteria

Multiple evaluation criteria
Multiple patterns of disagreement
Decision rules
Reporting reasons for exclusion

User convenience

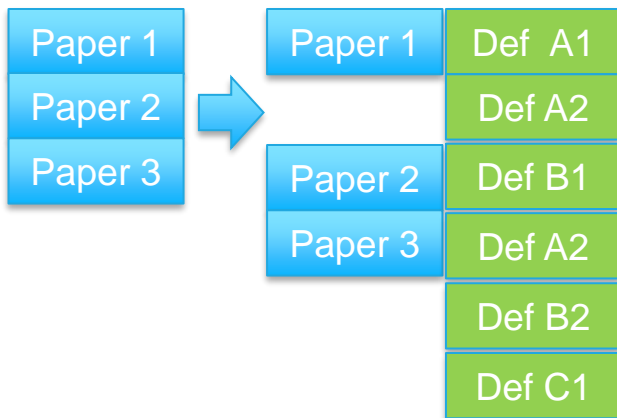


Mean % agreement 62.8% (14%-96%)

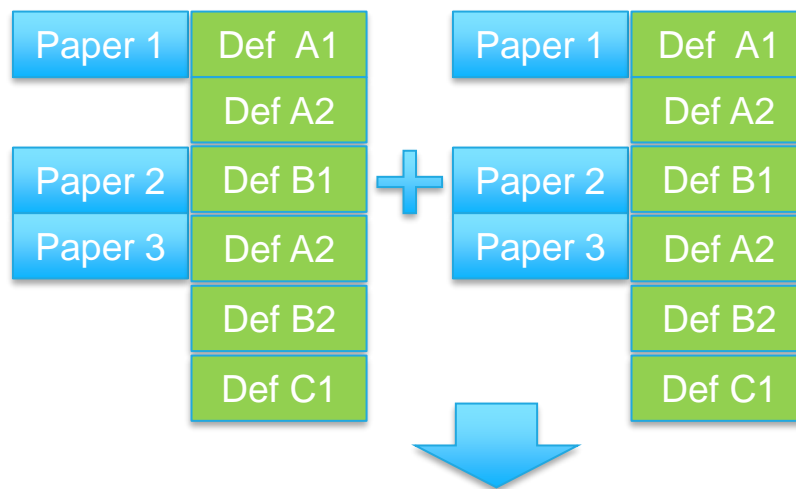
236 papers selected

Data extraction

Database extension:
multiple definitions of multiple
terms per paper



Data extraction in duplicate:
consolidation of paper-level and definition-
level variables between reviewer pairs



337 definitions from 214 papers

A key focus of data extraction: identifying the source of definitions

Paper	Term	Definition	Type	Source
Aardom, 2020	eHealth	intervention was delivered via information and communication technology, such as telephone calls, telemedicine (eg, videoconferencing), websites, smartphone applications, SMS and the intervention was delivered independently of time and place, making distance a critical factor (eg, videos delivered in face-to-face sessions were not considered eHealth interventions)	Original	Aardom, 2020
Slev, 2016	eHealth	information provision about illness or health care and/or support for patients and/or informal caregivers, using the computer or related technologies	Adapted	Eysenbach, 2011
Badawy, 2018	eHealth	eHealth has been defined as “an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the internet and related technologies	Adopted	Eysenbach, 2011

Data consolidation: changing the database structure

From papers by reviewer

Reviewer 1	Paper 1	Def A1
		Def A2
Reviewer 2	Paper 2	Def B1
Reviewer 3	Paper 3	Def A2
		Def B2
		Def C1

To term by reviewer

Reviewer 1	Def A1	Paper 1
	Def A2	
	Def A2	Paper 3
Reviewer 2	Def B1	Paper 2
	Def B2	Paper 3
Reviewer 3	Def C1	Paper 3

Examples for data consolidation

Terms	Definitions	Source
EHR (Electronic Health Record)	refers to a structure in digital format...	Eysenbach G. 2001
electronic health record	EHR refers to a structure in digital format...	[1.] Eysenbach, 2001
electronic health records (EHRs)	EHR is a structure in digital format...	Eysenbach, 2001
	structure in digital format...	Eysenbach G. What is e-health? J Med Internet Res 2001;3:E20.



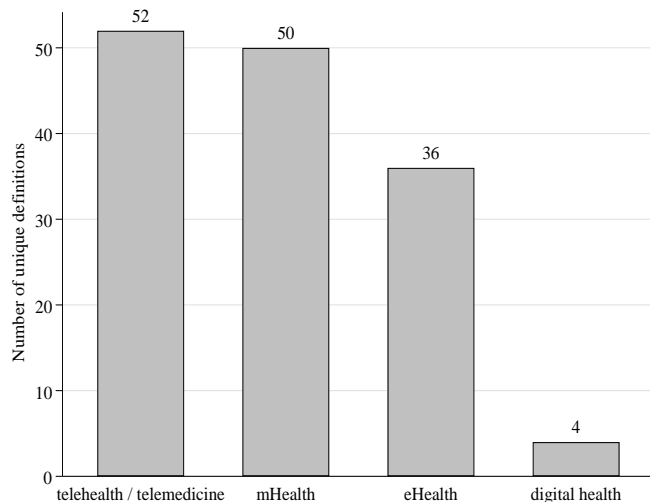
Electronic health record	structure in digital format...	Eysenbach G. What is e-health? J Med Internet Res. 2001;3(2):e20.
--------------------------	--------------------------------	---

Poll #3

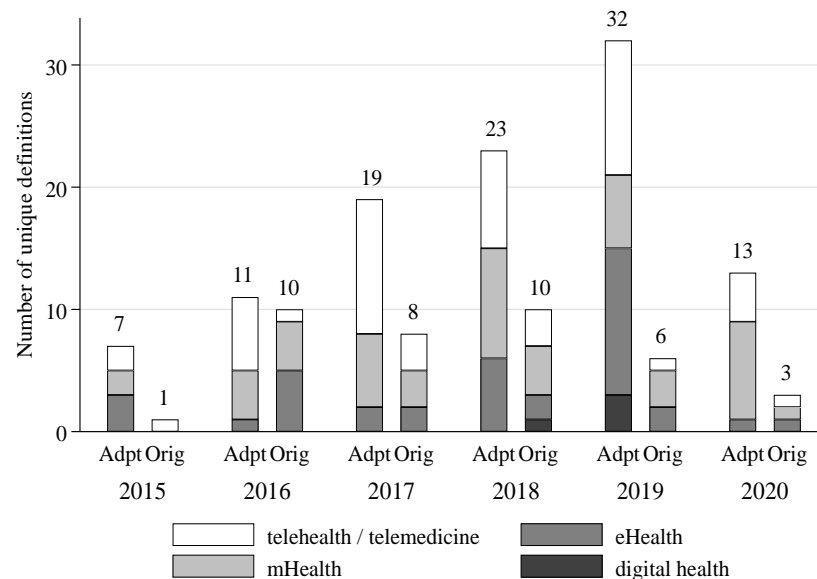
- Which do you think would be the term with the most definitions from our research?
 - Digital health
 - mHealth
 - eHealth
 - Telehealth/telemedicine

Analysis of 134 articles containing unique definitions for umbrella terms

Unique definitions of digital health-related terms



Unique definitions umbrella terms over time



Adpt: adapted / adopted; Orig: original

Unique definitions of Digital Health

N	Definition	Type	Author	Reference
#1	the convergence of science and technology with health, health care, living, and society	Adopted	Academia	Bhavnani SP, 2016
#2	a wide range of subsectors: mobile health, telemedicine, telehealth, wearable devices, and personalized medicine	Adopted	Expert groups	FDA, 2018
#3	used synonymously with e-health, mHealth, and mobile health in this article	Original	Academia	Long L, 2018
#4	use of information technology and electronic communication tools within the delivery of healthcare services	Adopted	NGO	Canada Health Infoway, 2018

Word cloud for digital health unique definitions



Word cloud for eHealth unique definitions



Word cloud for mHealth unique definitions



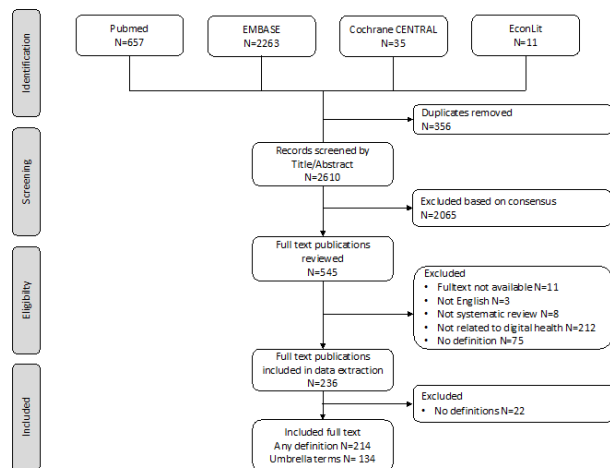


Poll # 4

- Which term do you think is defined in the clearest way from the word clouds?
 - Digital health
 - eHealth
 - mHealth
 - Telemedicine/telehealth
 - None!

Reporting

Following PRISMA guidelines



Milestones



ISPOR Europe 2020



ISPOR 2021
HTAi 2021
ISPOR Europe (planned)



Value in Health (planned)

Coordination with authors



Discussion from the draft manuscript

- A large degree of **overlap** for the overarching terms: in particular for telehealth and telemedicine, which are often used as substitutes for each other
- **eHealth, mHealth and telehealth/telemedicine** introduce technical communication components into the domain of health and medicine
- **mHealth** is more often constrained to **mobile technologies** whereas the other two incorporate wider elements such as electronic and information technologies
- The number of **adaptations** of seminal definitions (e.g, WHO 1998) increased over time perhaps related to the authors' need for increased specificity to the topic of interest
- Most definitions are **too general and do not specify the outcomes they deliver** to a specific patient population – the basis of evaluating their value against alternative interventions.

Conclusions from current draft manuscript

- The overlap between the definitions for overarching terms **produces confusion** and may be the reason for the increasing number of sub terms which were found in research (e.g. telesurgery, teleradiology etc).
- To enhance future health outcomes research **more specific information needs should be provided in the Medical Subject Headings (MeSH)**
- This include the **healthcare setting, the specifics of the technology used, patient population and outcomes under consideration as well as the comparison used** (in the same way as the PICO was employed to focus clinical questions)

Poll #5

- What is your impression of the project and the current draft manuscript?
 - Very positive
 - Positive
 - Neutral
 - Negative
 - Very negative

Please feel free to write suggestions or comments in the Q&A

What else would you do if you had this database to analyze?

Please write your suggestions in the Q&A box as we very much want to get your input

Thank you for your attention
Any other questions?

anitaburrellconsulting@gmail.com
zrubka.zsombor@uni-obuda.hu

Digital health SIG webpage:
<https://www.ispor.org/member-groups/special-interest-groups/digital-health>