

Global strategy on Digital Health &

AI for health

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The timeline

WHA58.28 on eHealth

Consider drawing up a long-term strategic plan for developing and implementing eHealth services promote equitable, affordable and universal access to their benefits



WHA71.7 Digital health

Develop... in close consultation with Member States and with inputs from relevant stakeholders... a global strategy on digital health, identifying priority areas including where WHO should focus its efforts”.



Triple billion targets

2030 SDGs

2005

05

2013

05

2018

05

11

NOW

2023

2025

2030



WHA66.24 on eHealth standardization and interoperability

Consider developing... policies and legislative mechanisms linked to an overall national eHealth strategy

IMPLEMENTATION



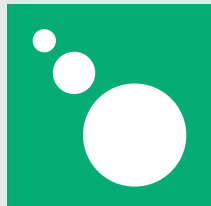
Global strategy on digital health

Improve health for everyone...affordable, scalable digital health and wellbeing...support equitable access to quality health services...implication for access, cost, quality of digital solutions

4 Strategic Objectives



SO1. Promote **global collaboration** and advance the **transfer of knowledge** on digital health



SO2. Advance the **implementation** of national digital health strategies

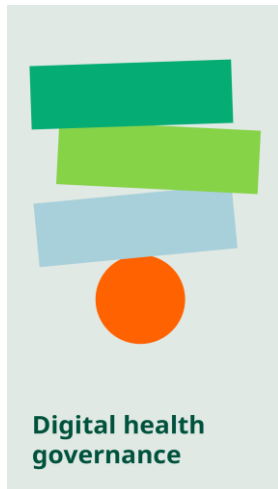


SO3. Strengthen **governance** for digital health at global, regional and national levels



SO4. Advocate **people-centred health systems** that are enabled by digital health

SO3 Strengthen **governance** for digital health at global, regional and national levels



Short term

- Dynamic Digital Maturity Model
- Evidence-based technical documents

Medium term

- Regulatory framework
- Country level governance structure

Long term

- Policy actions in the digital health ecosystem
- Knowledge transfer for decision making
- Regulatory framework for AI

Output highlight

- Governance established
- Guidance on digital hospitals , digital clinical trials and digital therapeutics developed
- Global interoperability guidelines developed
- Guidance on health data security

Future policy....agenda setting...

...Evidence-based interventions

Required skills

...Governance....

Inclusive culture...

SO4 Advocate people-centred health systems that are enabled by digital health



Short term

- Global minimum standards for electronic health records
- Ethic frameworks
- Data security and governance

Medium term

- Promote digital health interventions
- Health data and interoperability

Long term

- Personalized medicine
- Research synthesis

Output highlight

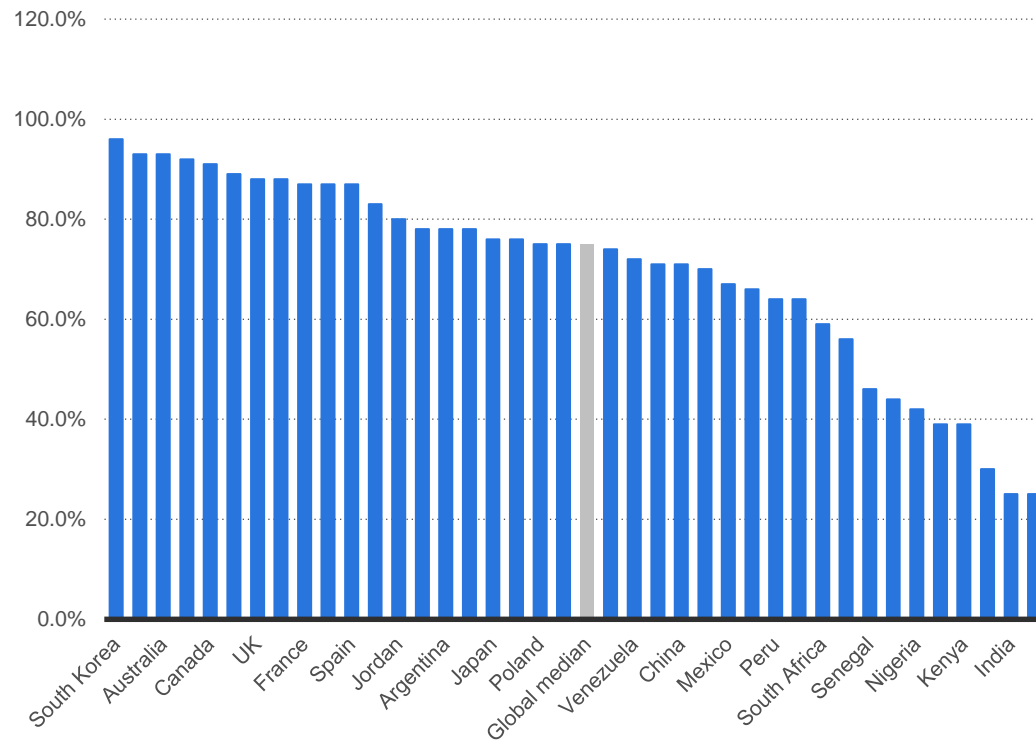
- Improved digital health literacy
- Prioritized digital health technologies and programs
- Framework on digital health tools
- Guidance on personalised medicine developed

Develop and validate digital interventions....
...equitable access to service, products and information
...Digital health literacy
Digital divide
Equality....

- Opportunities and Challenges
- What is Ai4H
- Who is in Ai4H
- How
 - Deliverables
 - Working Groups
 - Topic Groups

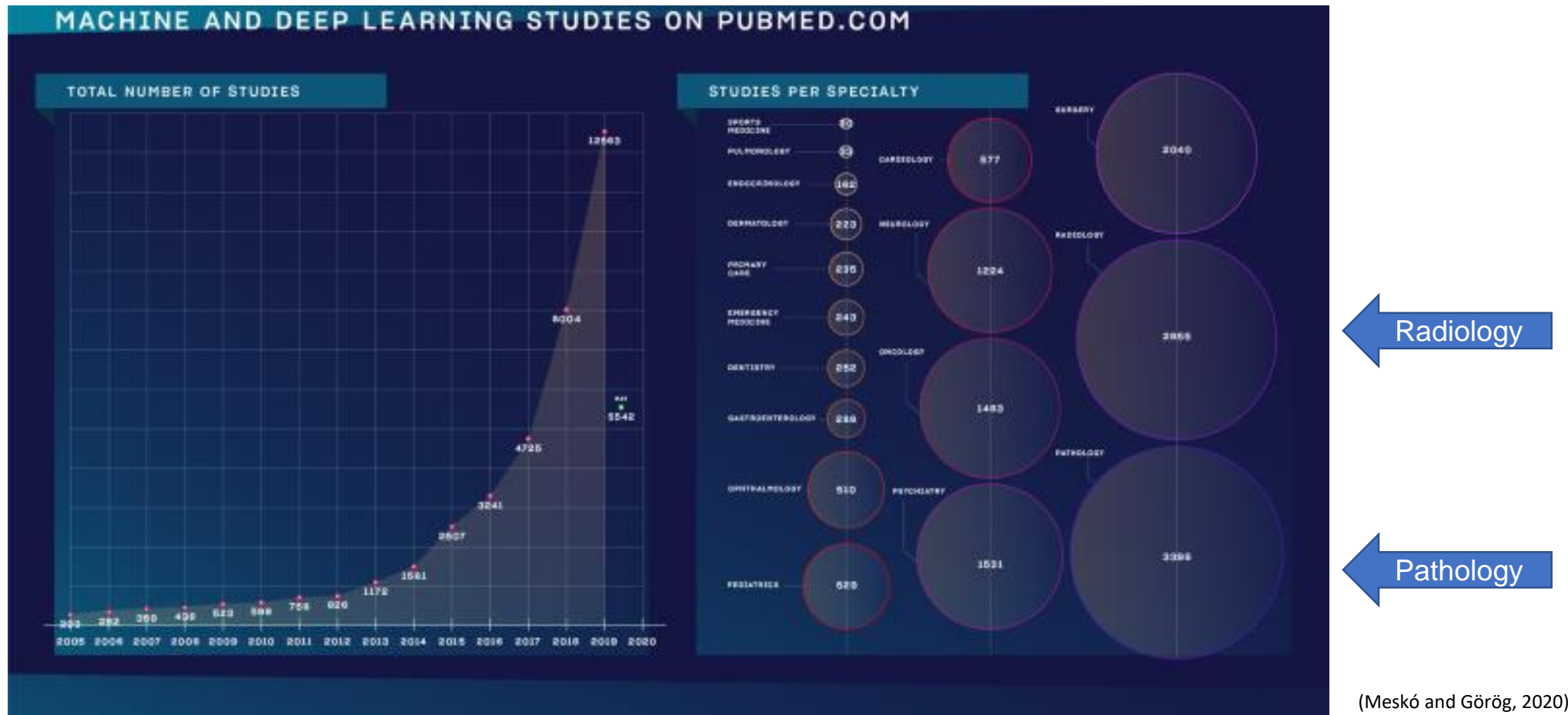
Opportunities: Leverage Digital Technologies!

- Access to **internet** (left) and growing number of **smartphones** (right)



Leverage Digital Technologies!

- **Research** and **publications** on AI for health are also increasing



But there are challenges...

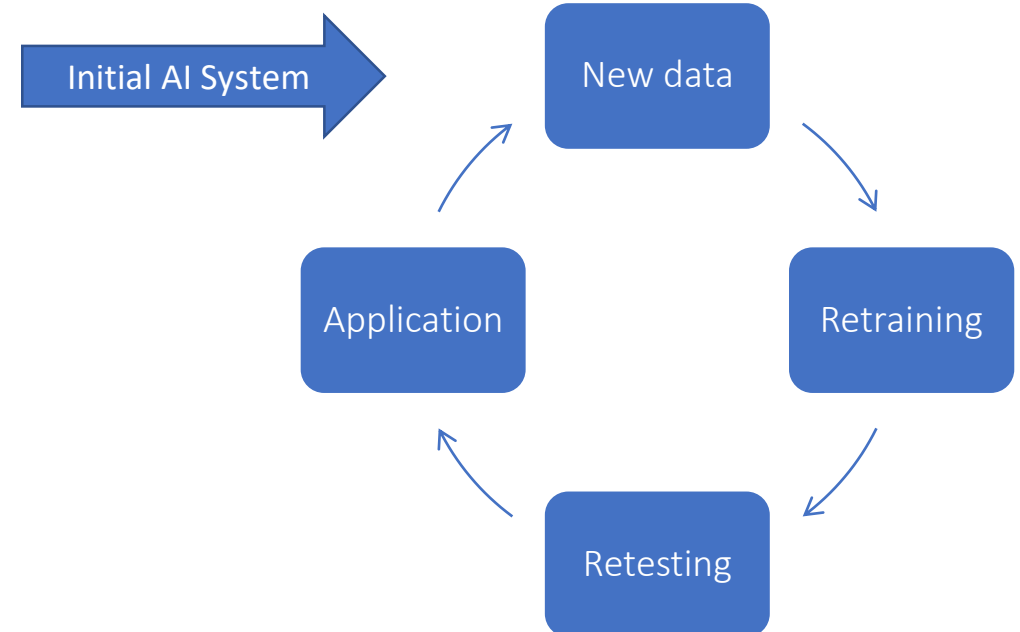
- **Preliminaries of AI:**

- Train once and use (linear deployment)
- Fixed input-output relationship (stationarity assumption)



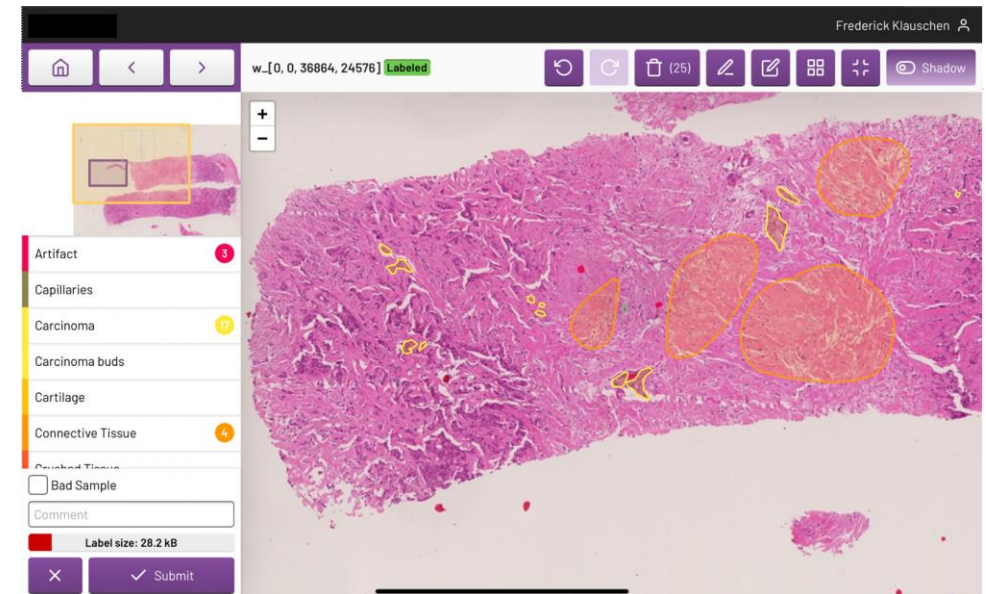
- **Reality of AI:**

- Cyclical with updates
- Non-stationarity (data nor input-output)



Challenges...

- Training data must be **representative** and **generalizable** to avoid bias
 - Reflect population characteristics (regional, gender, and age variations)
 - Reflect differences in equipment and hospitals, etc.
- Training data must be of sufficient **quantity**
 - Putting the bottleneck on annotated data



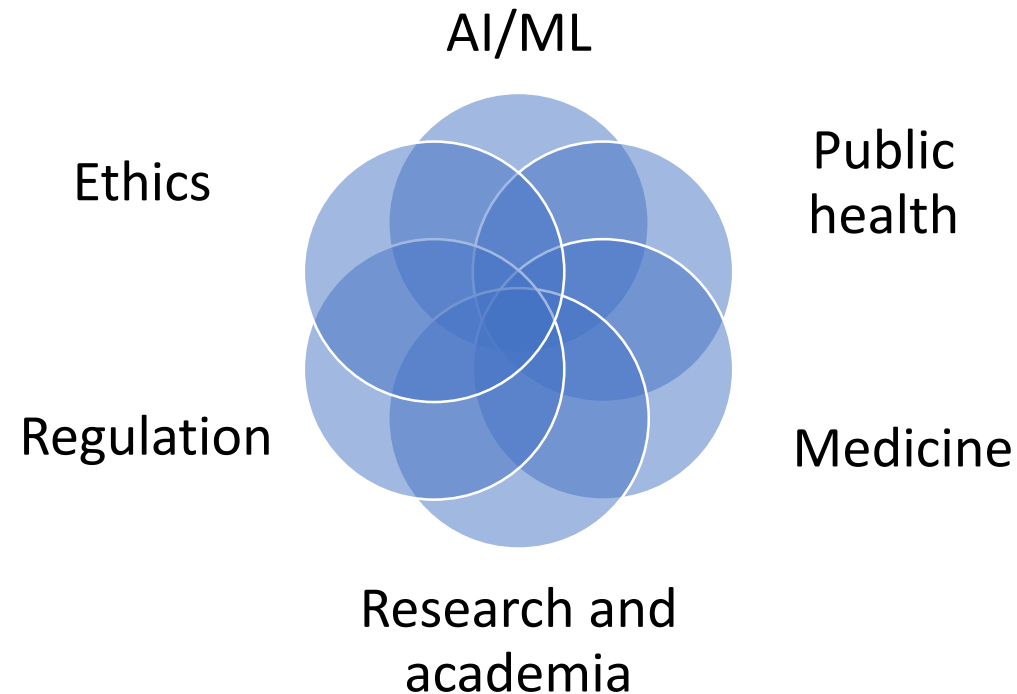
Demonstration of web-based annotations tool
Prof. Klauschen (Charité)

Challenges...

- **Evaluating models must address:**
 - **Inconsistencies** (differences in benchmarking criteria, metrics, and test data)
 - Lack of **transparency** (e.g., in-house evaluations)
 - **Complexity** of models (e.g., “black box” phenomenon)
 - **Test data** characteristics (e.g., reproducibility of test data collection, statistical properties of test data, and annotation procedures)

... that need to be addressed

- Requires a **joint effort** from experts in **diverse** fields including:



HOW CAN AI BE USED : CASE IN EXAMPLES

- Cervical Cancer
- Diabetic Retinopathy

BUILDING EVIDENCE FOR THE USE OF AI IN CANCER SCREENING

Endoscopy

<https://academic.oup.com/>

JNCI J Natl Cancer Inst (2019) 0(0): djy225

doi: 10.1093/jnci/djy225
Article



ORIGINAL ARTICLE

Real-time automatic detection system increases colonoscopic polyp and adenoma detection rates: a prospective randomised controlled study

Pu Wang,¹ Tyler M Berzin,² Jeremy Romek Glissen Brown,² Shishira Bharadwaj,² Aymeric Becq,² Xun Xiao,¹ Peixi Liu,¹ Liangping Li,¹ Yan Song,¹ Di Zhang,¹ Yi Li,¹ Guangre Xu,¹ Mengtian Tu,¹ Xiaogang Liu¹



ARTICLE

An Observational Study of Deep Learning and Automated Evaluation of Cervical Images for Cancer Screening

Liming Hu, David Bell, Sameer Antani, Zhiyun Xue, Kai Yu, Matthew P. Horning, Noni Gachuhi, Benjamin Wilson, Mayoore S. Jaiswal, Brian Befano, L. Rodney Long, Rolando Herrero, Mark H. Einstein, Robert D. Burk, Maria Demarco, Julia C. Gage, Ana Cecilia Rodriguez, Nicolas Wentzensen, Mark Schiffman



Interim guidance for those wishing to incorporate artificial intelligence into the National Breast Screening Programme

This interim document has been developed to help facilitate the discussion about the use of artificial intelligence within the National Breast Screening Programme.

Article

International evaluation of an AI system for breast cancer screening

<https://doi.org/10.1038/s41586-019-1799-6>

Received: 27 July 2019

Accepted: 5 November 2019

Published online: 1 January 2020

Scott Mayer McKinney^{1,14*}, Marcin Sieniek^{1,14}, Varun Godbole^{1,14}, Jonathan Godwin^{2,14}, Natasha Antropova², Hutan Ashrafian^{3,4}, Trevor Back², Mary Chesus², Greg C. Corrado¹, Ara Darzi^{3,4,5}, Moziyar Etemadi⁶, Florencia Garcia-Vicente⁶, Fiona J. Gilbert⁷, Mark Halling-Brown⁸, Demis Hassabis², Sunny Jansen⁹, Alan Karthikesalingam¹⁰, Christopher J. Kelly¹⁰, Dominic King¹⁰, Joseph R. Ledsam², David Melnick⁶, Hormuz Mostofi¹, Lily Peng¹, Joshua Jay Reicher¹¹, Bernardino Romera-Paredes², Richard Sidebottom^{12,13}, Mustafa Suleyman², Daniel Tse^{1*}, Kenneth C. Young⁹, Jeffrey De Fauw^{2,15} & Shravya Shetty^{1,15*}

AVE CONSORTIUM AND WHO COLLABORATION

Aim: WHO Cervical Cancer Elimination Global Strategy – to meet one of the three ‘90–70–90’ targets for countries to be on the path towards cervical cancer elimination by 2030:

*‘70% of women are screened with a **high-performance test** by 35 and 45 years of age’*

- WHO is working to develop a framework for evidence generation and essential requirements for the use of AI in Cervical Cancer Screening
- The AVE Consortium is developing an Automated Visual Evaluation (AVE) algorithm and accompanying tools for in-country introduction and sustainable continued use

EvaCOLPO™ – Portable, Internet-Connected, FDA cleared Colposcope – (Advanced Hardware + Integrated Software for image storage)

AI FOR DIABETIC RETINOPATHY SCREENING

The Need: There is a global shortage of trained specialists to detect diabetic retinopathy and thereby prevent early vision loss.

The Solution: WHO and ITU are working with the Senegal Ministry of Health to pilot an early detection program for diabetic retinopathy using artificial intelligence.

Details: Three AI algorithms will be deployed in six NCD clinics in the country, their results will be validated by trained specialists, and the algorithms will in turn be strengthened by their deployment in the field.



What is FG-AI4H?

- Established in 2018 as a **joint focus group** between **ITU** and **WHO**
- Initial mandate to **deliver a framework for guiding** AI for health development and implementation
- Exists at the **interface** between multiple fields and stakeholders
(machine learning/AI, medicine, public health, government, regulation, statistics, ethics, etc.)



Who is FG-AI4H?

- **Management Team:**

- Thomas Wiegand, Fraunhofer HHI and TU Berlin, Germany
- Sameer Pujari, WHO
- Manjula Singh, ICMR, India
- Naomi Lee, The Lancet, UK
- Shan Xu, CAICT, China
- Stephen Ibaraki, ACM, Canada
- Ramesh Krishnamurthy, WHO

- **Members:**

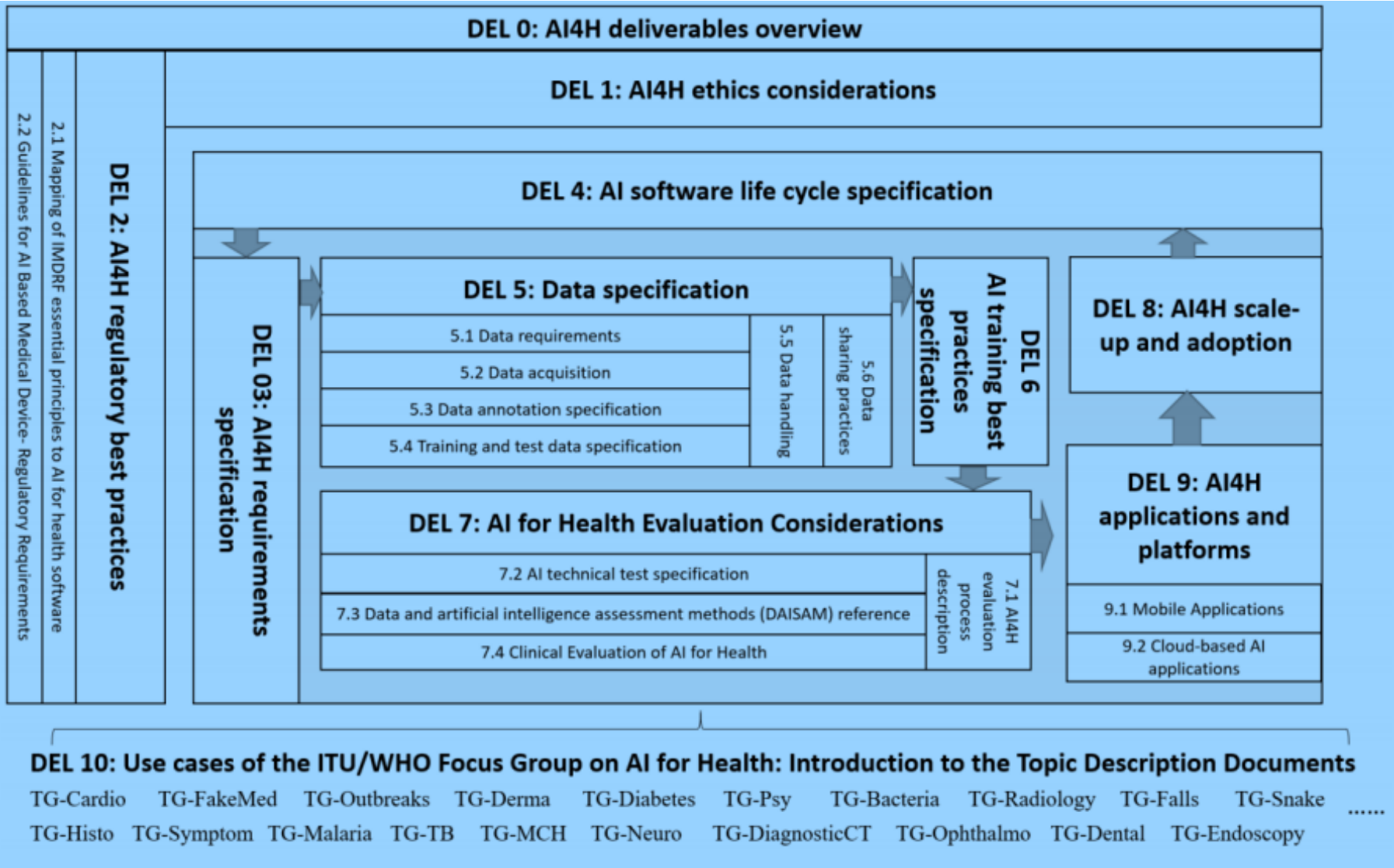
- 100+ Experts from around the globe

- **Stakeholders and supporters include:**

- WHO, ITU, IANPHI, IAP, IHF, AI4Good, WHS, philanthropists (Fondation Botnar), and IMDRF



Structure



Combining features from both groups is the “Ad Hoc Group on Digital Technologies for COVID Health Emergencies” (AHG-DT4HE)

Working Groups

- Dedicated to **overarching themes** that affect all topic groups in a specific aspect of AI for health
- Create **best practices**, establish **processes** and related policies, define ways to successfully **benchmark** AI for health algorithms, and create **reference documents**
- 5 Working groups:
 1. **Ethical Considerations on AI4H (WG-Ethics)**
 2. **Regulatory Considerations on AI4H (WG-RC)**
 3. **Clinical Evaluation of AI4H (WG-CE)**
 4. **Data and AI Solution Assessment Methods (WG-DAISAM)**
 5. **Data and AI Solution Handling (WG-DASH)**

Ethical Considerations on AI4H (WG-Ethics)



- **Coordinator:**
 - Andreas Reis, WHO
 - Sameer Pujari, WHO
- **Technical Leadership:**
 - WHO Expert group established with 2 co-chairs
- **Objectives:**
 - Develop harmonized **ethics guidance** for design and implementation of AI in global health
 - Address **equitable access, privacy, appropriate uses and users, liability, bias, and inclusiveness**, among others

Regulatory Considerations on AI4H (WG-RC)



World Health
Organization

- **Objectives:**

- Assist FG-AI4H to **navigate** the **regulatory landscape**
- Outline **key regulatory considerations** with relevance for regulatory agencies for AI development
- Define ways to successfully benchmark AI for health algorithms.

- **Regulatory consideration topics:**

- Documentation and Transparency
- Risk Management and Lifecycle Approach
- Data Quality
- Analytical and Clinical Validation
- Engagement and Collaboration
- Privacy and Data Protection

Clinical Evaluation of AI4H (WG-CE)

Objectives:

- Build a community of collaboration around **clinical evaluation** of AI for health
- Produce **guidelines** for evaluation of AI for health intended for use by researchers, clinicians/patients, developers, and policy-makers
- Consider **phases of evaluation, efficacy** and **comparative efficacy, safety, reporting** of evaluation, and **post-deployment surveillance** (etc.), **special attention to needs of LMICs**



Data and AI Solution Assessment Methods (WG-DAISAM)



- **Objectives:**
 - Identify and define **methods** for **data and AI solution assessment** through close collaboration with topic groups (e.g., in selecting task-specific assessment methods)

Data and AI Solution Handling (WG-DASH)

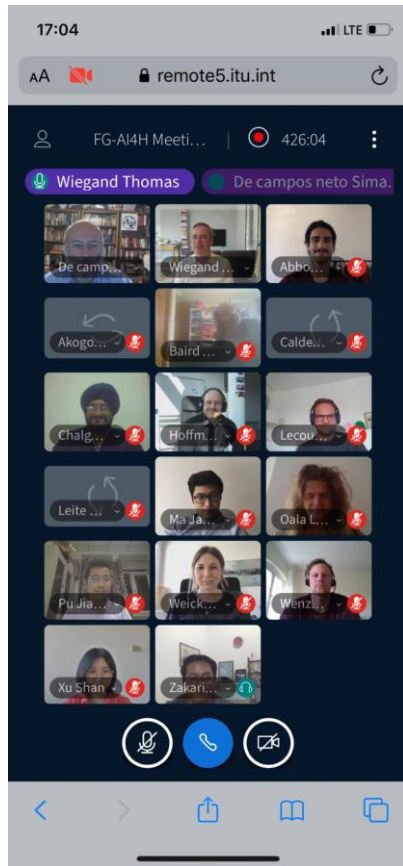
- **Objectives:**
 - Consider **operational** aspects of **data processing** throughout the data lifecycle (e.g., dataset submission and algorithm benchmarking)
 - Define **best practices**, establish **processes**, and create **reference** documents
 - Specify **“how”** FG-AI4H should perform operations involving data
 - Address aspects including third-party assessment, data transfer, data assessment, data maintenance, and data publishing

Topic Groups

- Cardiovascular disease management (TG-Cardio)
- Dermatology (TG-Derma)
- Dental diagnostics and digital dentistry (TG-Dental)
- Primary/secondary diabetes prediction (TG-Diabetes)
- Endoscopy (TG-Endoscopy)
- Falsified medicine (TG-FakeMed)
- Falls among the elderly (TG-Falls)
- Histopathology (TG-Histo)
- Malaria detection (TG-Malaria)
- Neurological disorders (TG-Neuro)
- Ophthalmology (TG-Ophthalmology)
- Outbreak detection (TG-Outbreaks)
- Psychiatry (TG-Psy)
- Radiology (TG-Radiology)
- Snakebite and snake identification (TG-Snake)
- Symptom assessment (TG-Symptom)
- Tuberculosis (TG-TB)
- Volumetric chest computed tomography (TG-DiagnosticCT)
- Bacterial infection and anti-microbial resistance (TG-Bacteria)
- Maternal and child health (TG-MCH)
- Musculoskeletal medicine (TG-MSK)

FG-AI4H Operations

- Communications are online and through on-site workshops and meetings



WHO, Geneva
Jul. 2018

Columbia, NY
Nov. 2018

EPFL, Lausanne
Jan. 2019

CAICT, Shanghai
Mar. 2019

ITU, Geneva
May 2019

UCSAF, Zanzibar
Sep. 2019

ICMR, New Delhi
Nov. 2019

PAHO, Brasilia
Jan. 2020

Online
May 2020

Online
Sep./Oct. 2020

Get involved!

- To learn more about FG-AI4H, please:
 - Visit FG-AI4H [website](#)
 - Read the [Whitepaper](#)
 - Read the commentary in [The Lancet](#)



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Focus Group on AI for autonomous and assisted driving

Focus Group on Quantum Information Technology for Networks

Focus Group on Environmental Efficiency for Artificial Intelligence and other Emerging Technologies

Focus Group on Artificial Intelligence for Health

Focus Group on Vehicular Multimedia

Focus Group on Machine Learning for Future Networks including 5G

Concluded Focus Groups

Meetings and Related Events Focus Group News Focus Group Videos

Next specialized meeting

WG-Clinical Evaluations Workshop New
14 October 2020, 14:00-18:00 CEST
Learn more and register here

Next general meeting

11th Meeting, January 2021
Exact dates TBC

Meeting K will be held as a virtual meeting using ITU's MyMeetings platform.

Register (required to attend) coming soon
Instructions for help.

Attend:

- Announcement (login required)
- Register, then login to <https://remote.itu.int> with your free ITU user account (same as for registration above) to attend the meeting.

Terms of reference > Parent group > ITU-T Study Group 16

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WHO and ITU establish benchmarking process for artificial intelligence in health

Thomas Wiegand • Ramesh Krishnamurthy • Monique Kuglitsch • Naomi Lee • Sameer Pujari • Marcel Salathé et al. [Show all authors](#)

Published: March 29, 2019 • DOI: [https://doi.org/10.1016/S0140-6736\(19\)30762-7](https://doi.org/10.1016/S0140-6736(19)30762-7) • [Check for updates](#)



*We must ensure that the
Digital Health
transformation is safe,
sustainable and leaves no
one behind.*

Thank you.



[sameer_pujari](#)

