Reflections from the Digital Tools and AI in Oncology drug development CDDF workshop, 27-28 Sept. 2021

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Disclaimer

- Roche Employee

Overview

- Brief overview of the CDDF workshop in September 2021
- Supporting the patient journey; towards a more coordinated ecosystem that:
  - Addresses the patient needs
  - Considers key considerations related to the various components
  - Enables a learning loop and fit-for-future adaptation
- Reflections on how we can address some of the gaps
- Closing remarks

Digital Tools and AI CDDF workshop agenda, 27-28 Sept. 2021

An intellectually stimulating program and discussions

14:00 - 14:05	Welcome note Ruth Plummer (CDDF, UK)
SESSION 1: APPLYING AI IN CLINICAL DRUG DEVELOPMENT – KEY CHALLENGES	
Session Chair: Ruth Plummer (CDDF, UK)	
14:05 - 14:35	Keynote lecture Dónal Landers (Digital Experimental Cancer Medicine Team, CRUK Manchester Institute, UK)
14:35 - 14:50	Questions and Answers
14:50 - 15:00	Coffee Break

SESSION 2: DIGITAL TOOLS IN CLINICAL TRIALS	
Session Chairs: Ruth Plummer (CDDF, UK) , Donna Graham (The Christie / Digital Experimental Cancer Medicine Team, UK)	
15:00 - 15:05	Session opening
15:05 - 15:20	Digital tools in trials for monitoring Larsson Omberg (Sage Bionetworks, USA)
15:20 - 15:35	Endpoints using digital tools Donna Graham (The Christie / Digital ECMT UK)
15:35 - 15:50	Digital tools for recruitment Chris Plummer (Newcastle Hospitals NHS Foundation Trust, UK)
15:50 - 16:05	Regulatory aspects Ib Alstrup (Danish Medicines Agency, DK)
16:05 - 16:25	Panel Discussion

SESSION 3: CLINICAL DECISION SUPPORT TOOLS AND CLINICAL PRACTICE	
Session Chairs: Nafsika Kronidou (Roche, CH) , Torsten Haferlach (Munich Leukemia Laboratory, DE)	
16:40 - 16:45	Session opening
16:45 - 17:00	Regulatory considerations on EU trustworthy AI Gabriele Mazzini (European Commission, IT)
17:00 - 17:15	Digital diagnosis Joachim H. Schmid (Roche Tissue Diagnostic, USA)
17:15 - 17:30	How AI can support best diagnostic approaches in hematology Torsten Haferlach (Munich Leukemia Laboratory, DE)
17:30 - 17:50	Panel Discussion

SESSION 4: DIGITAL TOOLS SUPPORTING INNOVATIVE PATIENT CARE	
Session Chairs: Denis Costello (CML Advocates Network, ES) & Jan Geissler (Patvocates, DE)	
14:05 - 14:20	Patient perspective Hans Schlürer (WECAN, MPE , NL)
14:20 - 14:35	Clinician perspective Sanna Iivanainen (Oulu University Hospital, FI)
14:35 - 14:50	Regulatory aspects Bleddyn Rees (European Connected Health Alliance, IE)
14:50 - 15:35	Panel Discussion

SESSION 5: INTEGRATION OF PATIENTS IN DIGITAL TOOL TRIAL DESIGN AND DEVELOPMENT	
Session Chairs: Nathalie Bere (EMA, NL) ; Donal Landers (Digital Experimental Cancer Medicine Team, CRUK Manchester Institute, UK)	
15:55 - 16:00	Session Opening
16:00 - 16:15	Patient engagement in designing the clinical studies Leanna Goodwin (Digital Experimental Cancer Medicine Team, CRUK Manchester Institute, UK)
16:15 - 16:30	Design and delivery of the In-home study Leanne Philps (Manchester Foundation Trust / Digital ECMT UK)
16:30 - 16:40	Data security and regulation Petra Wilson (Health Connect Partners, BE)
16:40 - 17:15	Panel Discussion and closing remarks

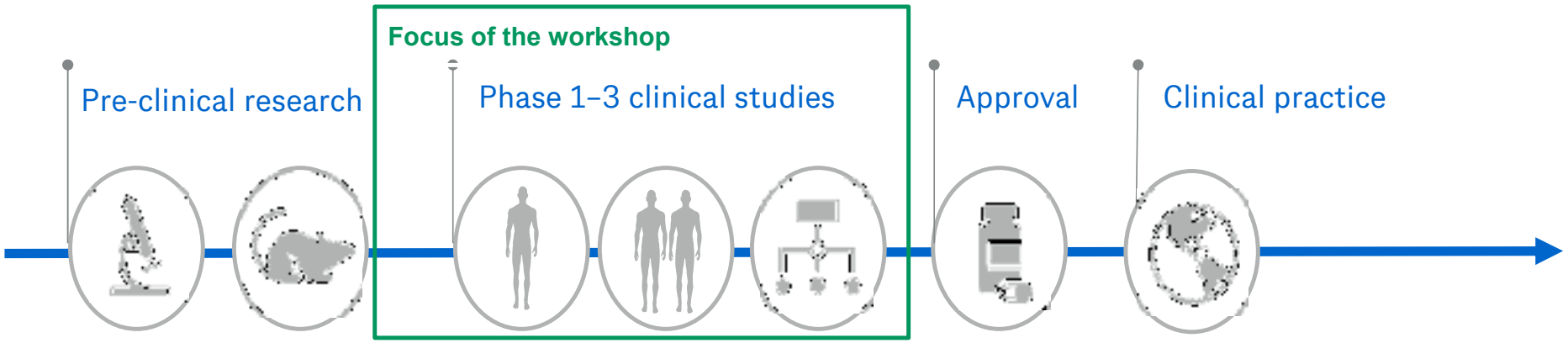
Please see workshop material at the CDDF website for more details!

Acknowledgements

- I would like to thank all speakers, panelists and participants of the CDDF workshop on digital tools and AI in Sept 2021. Their contributions led to interesting and thought provoking discussions

Digital health technologies (DHTs) employed throughout product lifecycle

Opportunity to improve patient outcomes and accelerate the development of new treatments



DHTs in R&D		DHTs as Clinical Solutions
Digital technologies in pre-clinical research	Digital health technology (DHT) in drug trials	Software as a Medical Device (SaMD)
	Digital Data Capture (incl Remote)	Digital Data Capture[1] (incl Remote)
	DHT for patient management	Clinical decision support systems (CDSS)
	Digital measures/endpoints	Digital therapeutics (DTx)

Artificial Intelligence/Machine-Learning

Generation and Use of Data/ RWD

[1] Assuming a medical purpose

Supporting the patient journey

Moving towards a more coordinated ecosystem

Multiple considerations and components...

...which need to operate in an ecosystem(s)

The patient journey and their needs:

Early detection & intervention
Screening
Diagnosis
Treatment
Monitoring

The drug plus:

Digital Health Tools
Digital measures/ endpoints
AI/ML
RWD/RWE
Diagnostics

Successful implementation requires a coordinated ecosystem:

Collaboration and alignment between stakeholders to reduce costs and enable efficiencies in service to patients

Examples:

Wearables e.g. monitor cough or heart rate

Digital pathology, ePRO tools
Clinical Decision Support tools

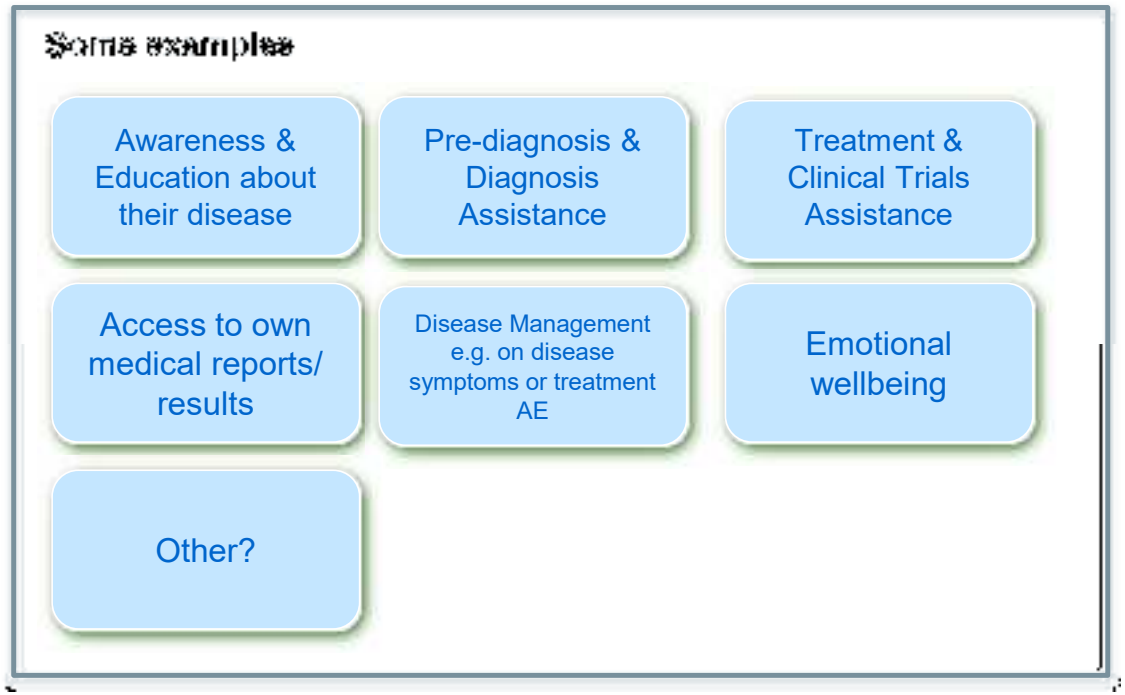
Additional considerations related to DHT/Ai

Ethical	Data standards/ security/ interoperability	Evidence on the use of the technology	Operational, compliance and regulatory

ePRO : electronic Patient Reported Outcome

Supporting the patient journey

Understanding the patient needs as a priority



Our aim should be:

- Involve the patient when designing the DH tools and study
- Build trust and partnership with patients, patient groups and therefore society
- In order to facilitate and add value to the patient experience

Considerations related to the use of DHT and AI

Related to data and AI

Multiple ongoing global initiatives to address some of these considerations. Do we need more convergence?

Generating high quality data to support the objective of the study

Data: standards, quality, privacy and interoperativity

How do we collect **reliable, consistent** and **complete** data so that they can be analysed or **linked** in a meaningful way and without posing **risks on the integrity of the study**?

How can we ensure **data privacy and security** i.e. prevent data access and **unauthorised use** of clinical study data and consistent with relevant regulations?

Enabling the use of ethical AI while ensuring human rights and safety in a rapidly evolving field

How can we ensure that humans **remain in control of their medical decisions**?

How can we ensure that **human logic and intelligence** is involved in the interpretation of the results and decisions?

To what extent can we **trust** the technology to capture/ generate reliable information? What are the potential **risks** for patients?

How can we drive for **globally accepted evidentiary standards** related to training, testing and validation of AI systems?

Could the introduction of the technology increase **health disparity** if not all patients have the ability to use or to have access to the technology?

Multiple initiatives and regulations (proposed or released) to address some of these considerations. Examples include: EU initiative on *The European Health Data Space*: ttps://ec.europa.eu/health/ehealth-digital-health-and-care/european-health-data-space_en, Global Data Protection Regulation (GDPR), 2018, the EU Commission proposed AI regulation, 2021, WHO global report on Artificial Intelligence (AI) in health and six guiding principles for its design and use, 28 June 2021.

Considerations related to the use of DHT and AI

Related to feasibility, technical validation and regulatory

Multiple ongoing global initiatives to address some of these considerations. Do we need more convergence?

Feasibility, operational and compliance

Can the technology be **easily and sustainably deployed** at a specific site, across sites? e.g. without burdening the system or the patient?

How do we avoid **burdening the end user** if multiple independent DHT w.g. Apps are being within a clinical study?

Is the technology compliant with **key international principles** (e.g. GCP) and how do we approach the situation **when such principles** a**re not yet available** e.g. Good Machine Learning Practice (GMLP) Currently under discussion

Evidence requirements related to the technology:

Are the **data relevant** and of adequate quality **in this patient population** and disease setting?

What are the **technical and clinical validation** requirements within a clinical study and will these be **globally acceptable**?

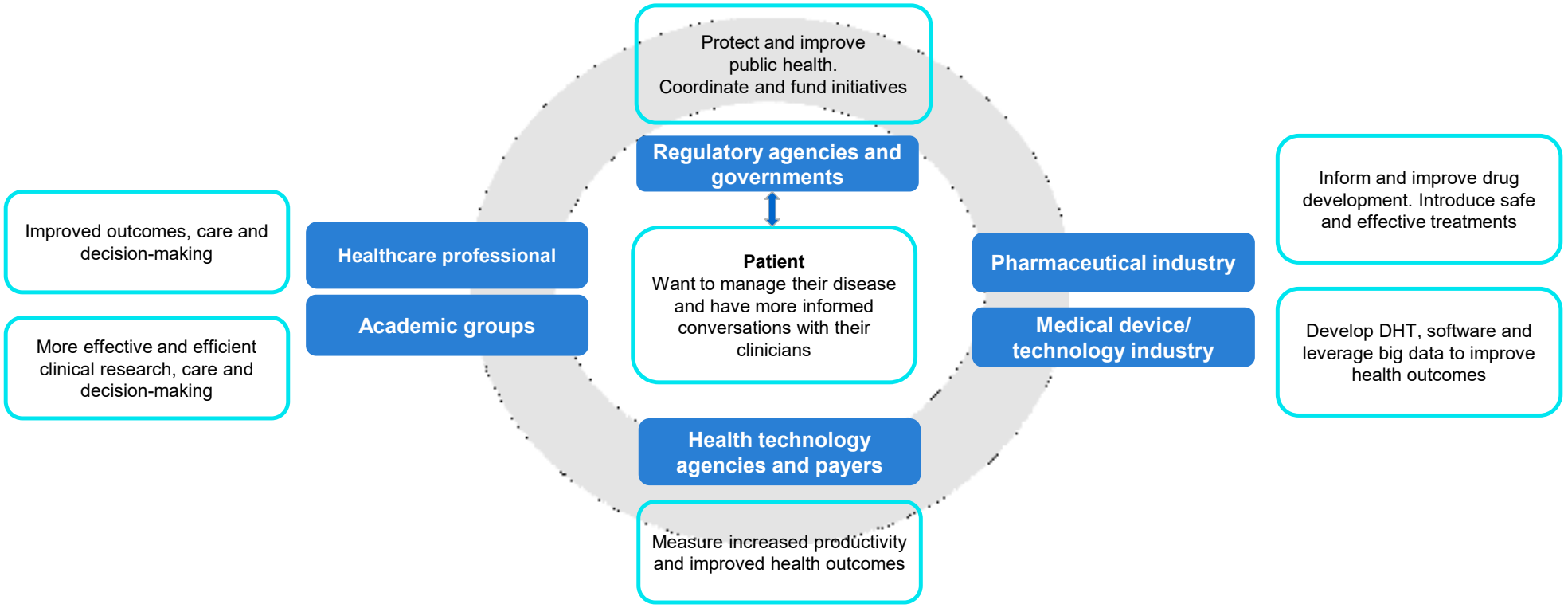
Regulatory

Do we need more convergence between international regulators on some of these topics?

Could we build a flexible system which **avoids constant revisions**?

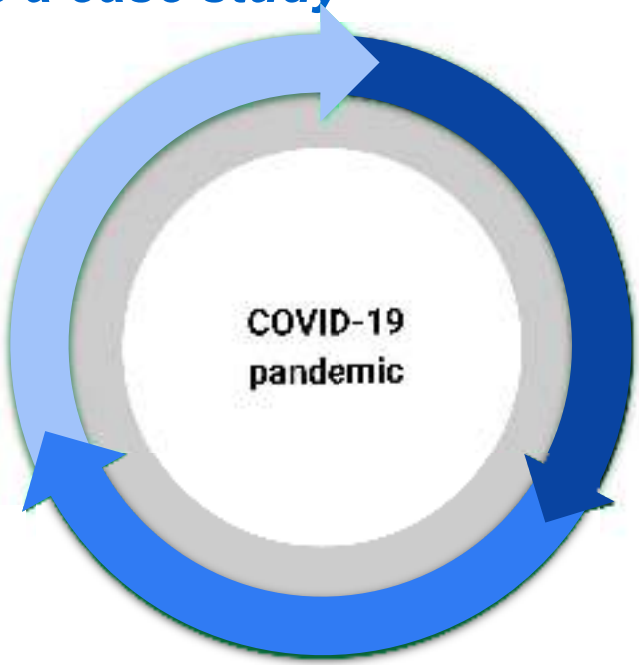
Leveraging DHT and AI to improve healthcare

Multiple stakeholders interested and involved in the development of DHT



Building an ecosystem which allows a learning loop and fit-for-future adaptation

The COVID-19 experience as a case study



Acceptability of new vaccines by society; addressing lack of societal trust

Digital tools e.g. Telemedicine to maintain contact with patients and capture safety or efficacy data

Regulatory reliance pathways; leverage expertise across regulatory agencies

Enable home administration or care through mobile nursing

Rolling reviews to facilitate and accelerate approvals

Use of local facilities/ labs

Increasing interest on decentralised studies; allowing patients to participate in CT from home

Multiple publications on this topics; some examples include: Vintura, 2021. Every day counts – The impact of COVID-19 on patient access to cancer care in Europe. This report was commissioned and financed by EFPIA. https://www.efpia.eu/media/602636/every-day-counts-covid19-addendum.pdf. Steward J. et al. COVID-19: A Catalyst to Accelerate Global Regulatory Transformation. Clin Pharmacol Ther 2021: 109 (6); 1390-1392

Reflections on how to generate a more coordinated health ecosystem and address some of the gaps

Build flexible "learning" environments

- Allows continuous learning, innovation and unlock opportunities to support patients
- **Expertise based set-up** and **culture of mutual trust in scientific work**

Build trust with society and patients

- Earlier **dialogue with patients**; understand their needs and concerns
- **Design studies** which address their need and enable more **inclusive** participation in CTs through the use of DHT with **equitable access to innovation**

Reduce fragmentation through strategic partnership

- **Enhance awareness** of ongoing activities
  - e.g. an across discipline oversight body consolidating global efforts
- More frequent **publications** of important advancements in technology and methods
- Aim for **consolidation of opinions** when it makes sense
  - e.g. co-authoring or commenting (vs preparing new papers or publications)

Early engagement and communication by regulators

- More **open and early dialogue** and **flexible interactions** with regulators with **dynamic regulatory processes** to inform the development of regulatory practice/ guidelines. For example:
  - Regulators to sponsor **pilots** and **collaborate** in identifying solutions
  - More open dialogue with **scientific committees and expert groups**
  - **Less burdensome procedures** e.g. qualification procedure

Modernize regulatory frameworks to 'fit-for-future''

- Regulatory systems that **enable global regulatory convergence** while supporting the timely delivery of safe, effective, and innovative solutions

Closing remarks

Digital health technologies and AI offer **opportunities to further support a patient's journey**

Successful implementation will require a **more coordinated healthcare ecosystem**

CDDF plays an important role in enhancing awareness of ongoing efforts and therefore reducing fragmentation

We hope to continue these discussions, **also in face to face meetings** in the future!

Doing now what patients need next