Big Data and Augmented Intelligence: Understanding Possible Harms for Research Subjects

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Conflicts of interests / interests

- No salaries from the medicinal industry
- No bank accounts abroad
- Work for the Finnish Government and Public sector → 2022
- Activities: CoE (Chair DH-BIO/ CDBIO 2021-2022, member since 1999
- EU: ERC-Ethics panel 2021-2022, EGE 2011-2016
- Member of research ethics committees

Medical Doctor, Ph.D., Pediatrician

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AI and Big Data

- Artificial intelligence:
- the theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages (Wikipedia)
- simulation of human intelligence processes by machines (Techtarget.com)

- Big Data (Wikipedia)
- refers to data sets that are too large or complex to be dealt with by traditional data-processing application software.
- Data with many fields and from many sources
- Volume, velocity, variety, veracity

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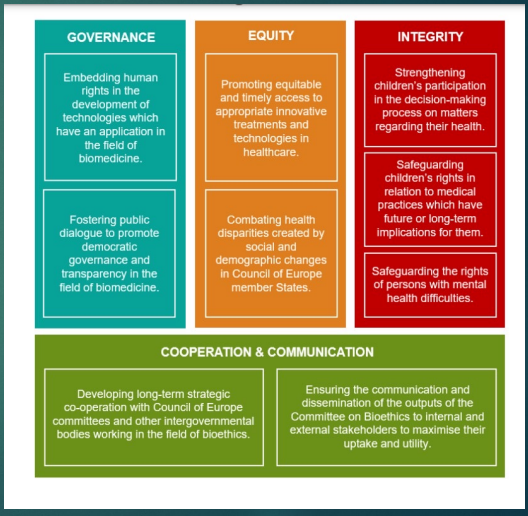
Strategic Action Plan on human rights and technologies in biomedicine

- the governance of technologies and the strategic objective of "Embedding human rights in the development of technologies which have an application in the field of biomedicine

AI:

- Expert report 2022
- Establishment of a working group 2022
- Report on human rights and AI end 2024



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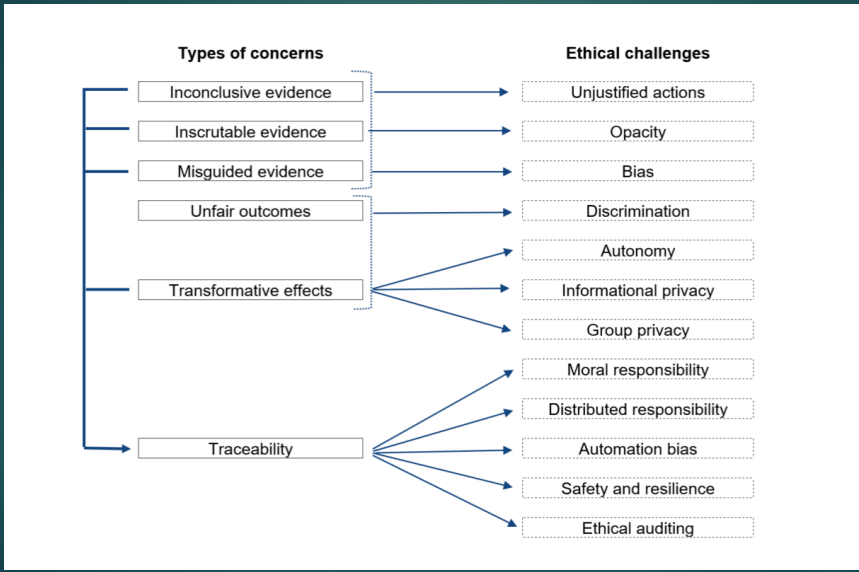
Ethical challenges of AI



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Ethical challenges of Big Data

- data with higher complexity may lead to a higher false discovery rate
- capturing data
- Data storage, Data analysis, search, sharing, updating, sampling
- Information privacy
- Analysis needs expertise; may produce risks that exceed an organization´s capacity to create and capture value from big data (Wikipedia)

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Report on AI in doctor-patient relationship

- AI systems /doctor-patient relationship /human rights principles.
- AI according to six themes:
  - (1) Inequality in access to high quality healthcare;
  - (2) Transparency to health professionals and patients;
  - (3) Risk of social bias in AI systems;
  - (4) Dilution of the patient's account of well-being;
  - (5) Risk of automation bias, de-skilling, and displaced liability; and
  - (6) Impact on the right to privacy
- https://www.coe.int/en/web/bioethics/developing-a-report-on-the-application-of-ai-in-healthcare-in-particular-regarding-its-impact-on-the-doctor-patient-relationship

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Inequality in health care

- not immediate or universal across healthcare systems
- Impact on the doctor-patient relationship in areas suffering from shortages
- geographical bias and inequalities in access to high quality care will be created
- may be more efficient, but also provide lower quality care featuring fewer face-to-face interactions
- depends largely on the role given to the AI

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Article 4 of the Oviedo Convention

Article 4 – Professional standards:
Any intervention in the health field, including research, must be carried out in accordance with relevant professional obligations and standards.

- Any reduction in oversight or clinical could potentially be viewed as a violation of Article 4.
- Careful consideration must be given to the role played by healthcare professions bound by professional standards when incorporating AI systems that interact directly with patients.

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Transparency to health professionals and patients

- Easily understandable information is necesssary for decision making
- Decision making and interpretations of AI systems are not transparent and understandable to those who use them
- A doctor as a mediator – or not (i.e, chatbox) both have challenges
- How to guarantee Interpretability, traceability, transparency?

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Risk of social bias in AI systems;

- Technical reasons
  - Mismatch between training and testing environments
    - Systems developed reflect values and regulations of manufacturers
- Reflect underlying social biases and inequalities
  - Datasets do not represent the targeted population
  - Limitations on resources, access or motivation
  - Clinical trials as examples: done on white males
  - social biases can lead to unequal distribution of outcomes across populations or protected demographic groups
- Not easy to detect biases and impairments
  - requires careful examination steps to improvements
  - Combatting social bias is a multifaceted challenge

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Dilution of the patient's account of well-being

- clinical assessments of patients based on data (i.e. health apps), not collected face-to-face?
- How about patient itself having to say about his/her health and well-being and his/her view and context
- Reliance upon data collected by monitoring technologies as a primary source of information about a patient's health, for example, can result in ignorance of aspects of the patient's health that cannot easily be monitored.

https://toplistbrands.com/top-10-health-apps/

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Dilution of the patient's account of well-being

https://www.itnonline.com/article/ai-medicine-way-growth

- Care providers may be less able to demonstrate understanding, compassion, and other desirable traits found within 'good' medical interactions in addition to applying their knowledge of medicine to the patient
- AI systems change the dependencies between clinicians and patients increasing the distance between health professionals and patients thereby suggesting a loss of opportunities to develop tacit understanding of the patient's health and well-being

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Risk of automation bias, de-skilling, and displaced liability

- clinicians may trust the outputs or recommendations of AI systems not due to proven clinical efficacy, but rather on the basis of their perceived objectivity, accuracy, or complexity
- CoE: "AI-driven health applications do not replace human judgement completely and that thus enabled decisions in professional health care are always validated by adequately trained health professionals.

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Impact on the right to privacy

- the usage of patient data for training and testing AI systems
- greater development, deployment, and reliance on AI systems in care may create a greater need to create or curate high-quality real-world patient datasets to train and test systems
- Innovation can threaten privacy and confidentiality in two ways:
  - third party access to (deidentified) patient data and electronic health records to test and develop AI systems.
  - clinicians may be encouraged to prescribe additional tests and analysis not for their clinical value but rather due to their utility for training or testing AI systems.
- Risks for rising costs for healthcare
- exposure of patients to unnecessary risks of data leakage or other breaches of privacy
- Undermines trust between patients and care providers

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The Oviedo Convention and human rights principles regarding health

- The Oviedo Convention is designed to "protect the dignity and identity of all human beings and guarantee everyone, without discrimination, respect for their integrity and other rights and fundamental freedoms with regard to the application of biology and medicine"
- the concept of dignity, identity and integrity of human beings/individuals should be both the basis and the umbrella for all other principles and notions that were to be included in the Convention
- rights to life, physical integrity and privacy, prohibition of discrimination
- Primacy of the patient over the science and the society

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- *Thank You all*

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