There is a magic when medical and AI ethics are the best friends

MAPS Digital FAWG webinar 21 April 2021

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Educational Objectives

This session will provide a learning opportunity for our audience by:

- Opening the dialog on a controversial topic

- Providing some practical examples on the topic

- Unleashing opportunities for better understanding and collaboration between experts in AI and medical

Polling question 1

Do you personally consider the possibility of a resonance between AI ethics and medical ethics?

1. Yes, I do and I am actively looking to understand and exercise it
2. Yes, I do but am not clear on the specifics
3. Yes, I do but I am waiting on others to do something about it first
4. No, I do not see any connection whatsoever

Two best friends – medical and AI ethics – what, why and how

*Rahela Penovski**
Pharmacist in industry

*Conflict of Interest: The presentation is personal view of Rahela Penovski and part of her PhD work.

Aim

- Warming up
  - What is medical ethics and why it is important
  - What is AI ethics and why it is important

- Starting race
  - Why medical and AI ethics should resonate with each other

- Winning
  - How to do it effectively

Medical Ethics

"The analytical activity in which the concepts, assumptions, beliefs, attitudes, emotions, reasons and arguments underlying medico-**moral decision making** are examined critically"

Truthfulness and honesty
veritatisque commeritus et probitatis

Autonomy
voluntas aegroti suprema lex

Beneficence
salus aegroti suprema lex

Dignity
dignitate

Medical Ethics

Justice
aequum et aequalis

Non-maleficence
primum non nocere

T. Macnair, Medical ethics, BMJ 1999;319:S2-7214
Leigh, H. (2014). 10.6.2. Values in Medical Ethics. In: Leigh, H. and Streltzer, J., ed. Handbook of Consultation-Liaison Psychiatry, 2nd ed. Honolulu: Springer, pp.134
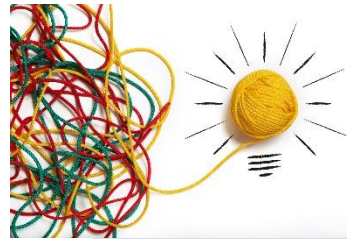
AI Ethics

"AI ethics is a set of values, principles, and techniques that employ widely accepted standards of right and wrong to guide **moral conduct** in the development and use of AI technologies"

Leslie, D. (2019). Understanding artificial intelligence ethics and safety: A guide for the responsible design and implementation of AI systems in the public sector. The Alan Turing Institute

Why resonance is needed?

Trust

Innovation

Improvement in patient outcome

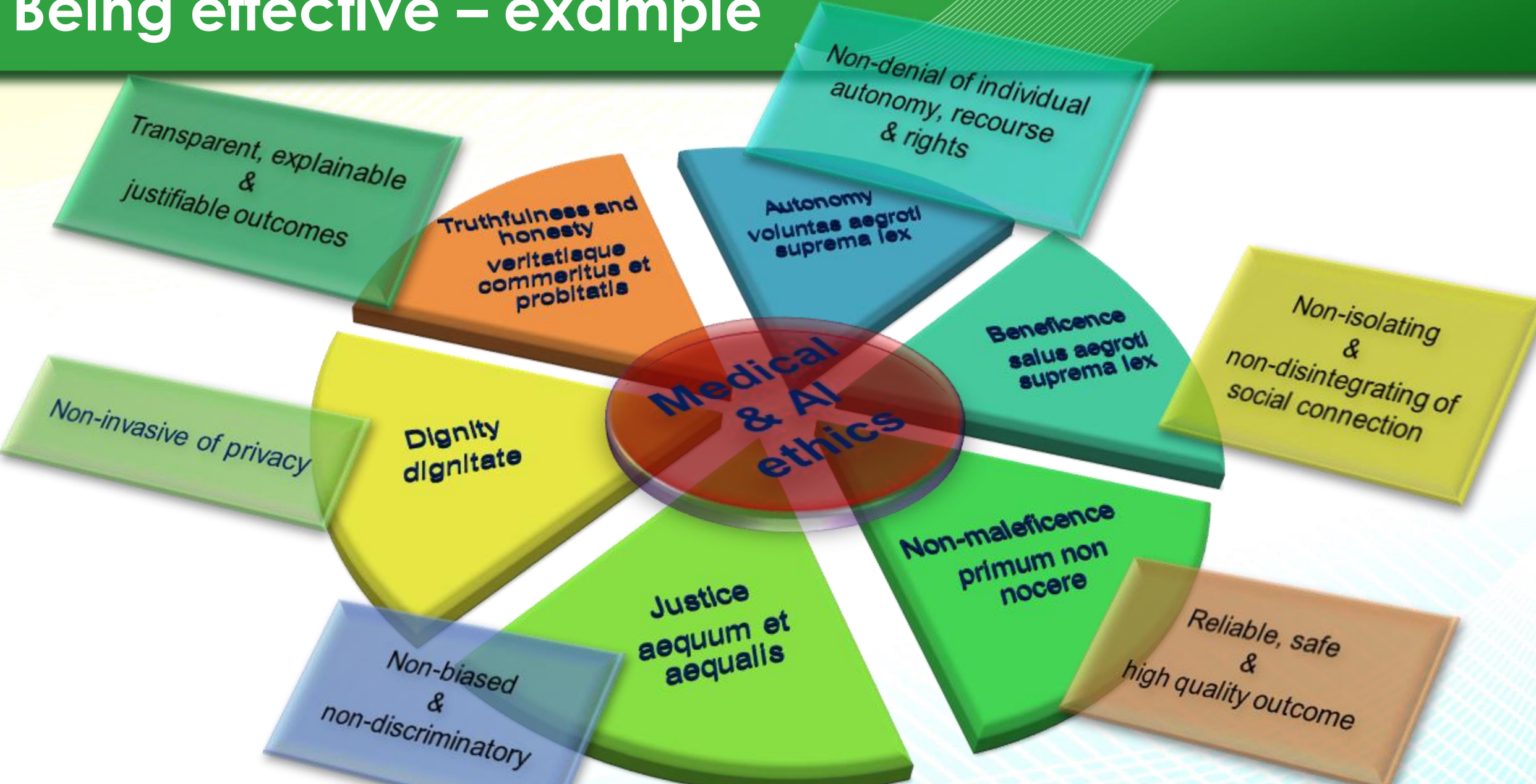# Being effective – working smart instead of hard

Step 1 Vision of AI solution
- Business need
- Customers of AI
- Desired final outcome
- Supporting culture

Step 2 Vision of Medical Ethics success when using AI solution

Step 3 Roadmap of AI Ethics principles supporting success of Medical Ethics principles

- Being global
- Forward thinking and visionary
- Open minded
- Listening & improving
- Collaborative

Being effective – example

Transparent, explainable & justifiable outcomes

Non-denial of individual autonomy, recourse & rights

Truthfulness and honesty
veritatisque commeritus et probitatis

Autonomy
voluntas aegroti suprema lex

Beneficence
salus aegroti suprema lex

Non-isolating & non-disintegrating of social connection

Non-invasive of privacy

Dignity
dignitate

Medical & AI ethics

Non-maleficence
primum non nocere

Non-biased & non-discriminatory

Justice
aequum et aequalis

Reliable, safe & high quality outcome

Key messages

Resonance
- The resonance between medical ethics and AI ethics is essential to build the trust between the two functions

Trust
- When trust is built, full potential of digital transformation will unleash

Partnership
- And the doors for friendship between AI and medical will open

Polling question 2

How likely are you to be looking for any AI technology in the next year?

1. For sure (90-100% chances it is going to happen)

2. Highly likely (50-89% chances it is going to happen)

3. Possibly (20-49% chances it is going to happen)

4. Low priority (1-19% chances it is going to happen)

5. Not at all (no chance it is going to happen)

Using AI to surface results from the literature

- Help me find the survival rates for patients with Non-Small Cell Lung Cancer and Cachexia
  - Time constraint due to in-licensing time pressures
  - Depth for landscape analysis in strategic decisions
  - Discover broader results than manual efforts

Tenet: Autonomy (human choice)

The machine never tells the human what to do!

- AI = data preparer
- Human = data user

From baseline to immediately prior to Cycle 2, 208 (32%) gained weight; 225 (34%) lost <2% of baseline weight; and 223 (34% of 656) lost 2% or more.

Result	Intervention	Outcome
208 of 650		From baseline to immediately prior to Cycle 2, gained weight
225 of 662		From baseline to immediately prior to Cycle 2, lost <2% of baseline weight
223 of 656		From baseline to immediately prior to Cycle 2, lost 2% or more

Median survival from the beginning of Cycle 2 was 13.0, 10.9, and 6.9 months for patients with weight gain, weight loss of <2%, and weight loss of 2% or more, respectively.

Result	Intervention	Outcome
13 months	patients with weight gain	Median survival from the beginning of Cycle 2
10.9 months	patients with, weight loss of <2%, weight loss of 2% or more	Median survival from the beginning of Cycle 2
6.9 months	patients with, weight loss of 2% or more	Median survival from the beginning of Cycle 2

Tenet: Beneficence (human benefit)

Unlocking more evidence for better health outcomes

Article | Cited By (0) | Tweetations (7) | Metrics

📄 **Original Paper**

Artificial Intelligence for Rapid Meta-Analysis: Case Study on Ocular Toxicity of Hydroxychloroquine

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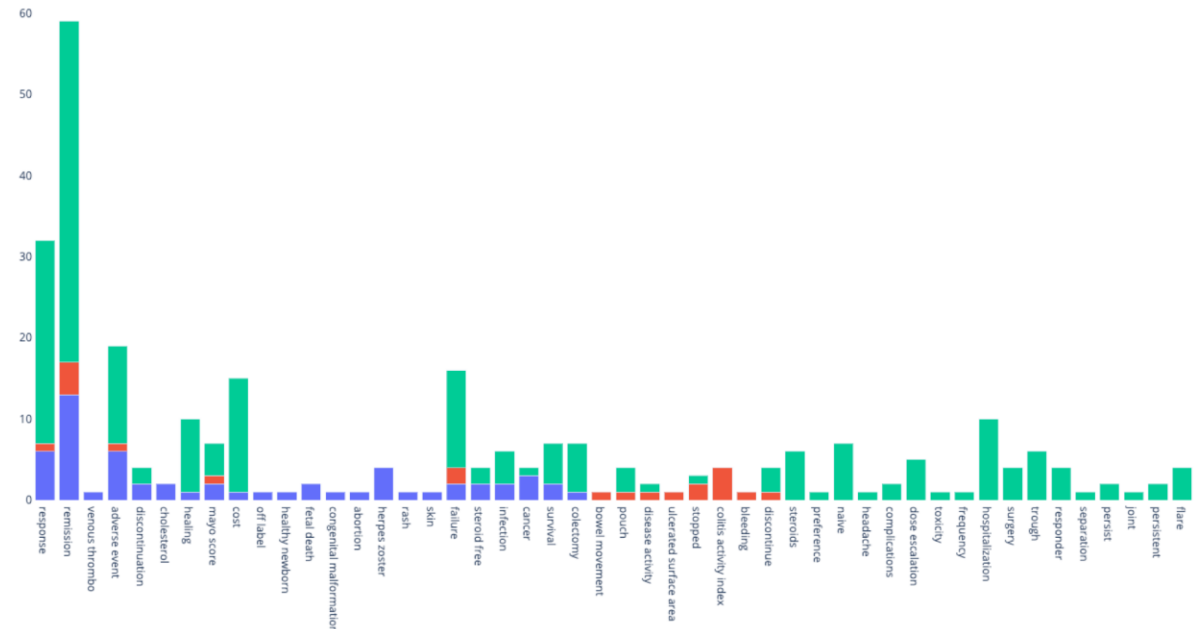
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ABSTRACT

Background: Rapid access to evidence is crucial in times of an evolving clinical crisis. To that end, we propose a novel approach to answer clinical queries, termed rapid meta-analysis (RMA). Unlike traditional meta-analysis, RMA balances a quick time to production with reasonable data quality assurances, leveraging artificial intelligence (AI) to strike this balance.

Tenet: Nonmaleficence (do not harm)

Provenance and Transparency

– Control
  - Human is in control (AI is "just data")
– Determinism
  - What you get, you get each time (unless you change it!)
– Accuracy
  - Reported in JMIR paper
– Cybersecurity
  - No manipulation of data or algorithms

Tenet: Justice (non discrimination)

- Minimize bias
  - Process **all** journals and therapy areas we can, not just some
  - Decisions made from a breadth of data (**≈75M data points**)
  - Rely on English language abstracts (translated)
    - In the future, use Machine Translation to cover any!

Tenet: Dignity

- No gaming
  - Raw machine – generated results
    - You can change them, but only you see those changes
    - Implied risk – mistakes are not healthcare critical

Result extracted	Recall	Precision	Perfect Precision	F-measure	F-measure (Perfect)
Numerator (N=42)	92.86%	95.12%	95.12%	93.98%	93.98%
Denominator (N=23)	91.30%	91.30%	91.30%	91.30%	91.30%
Percent (N=40)	90.00%	94.74%	92.11%	92.31%	91.04%
Continuous Value (N=29)	89.66%	92.86%	92.86%	91.23%	91.23%
Continuous Unit (N=24)	83.33%	95.24%	90.48%	88.89%	86.76%
Intervention (N=85)	84.71%	94.74%	86.84%	89.44%	85.76%
Outcome (N=100)	95.00%	97.94%	79.38%	96.45%	86.49%

Polling question 3

Based on your opinion, where should be strong resonance between medical and AI ethics?

1. In everything that healthcare and industry are doing

2. It is a must in areas facing patients within healthcare and clinical trials

3. Strong resonance is not needed at all; instead it is better to work out actions to mitigate the risks

Polling question 4

After hearing the presentation, would you consider the impact of ethics when introducing AI in medical affairs?

1. Yes, it makes sense to consider
2. Yes, it makes sense but I need still more guidance
3. Yes, it make sense but will prefer to wait on others to take the first step
4. No, I am not convinced