



– alpha

Artificial Intelligence in Alpha's Health Moonshot: empathy, explainability and privacy



Academy of
Medical Royal
Colleges



January / 2019

Artificial Intelligence in Healthcare



Recommendations:

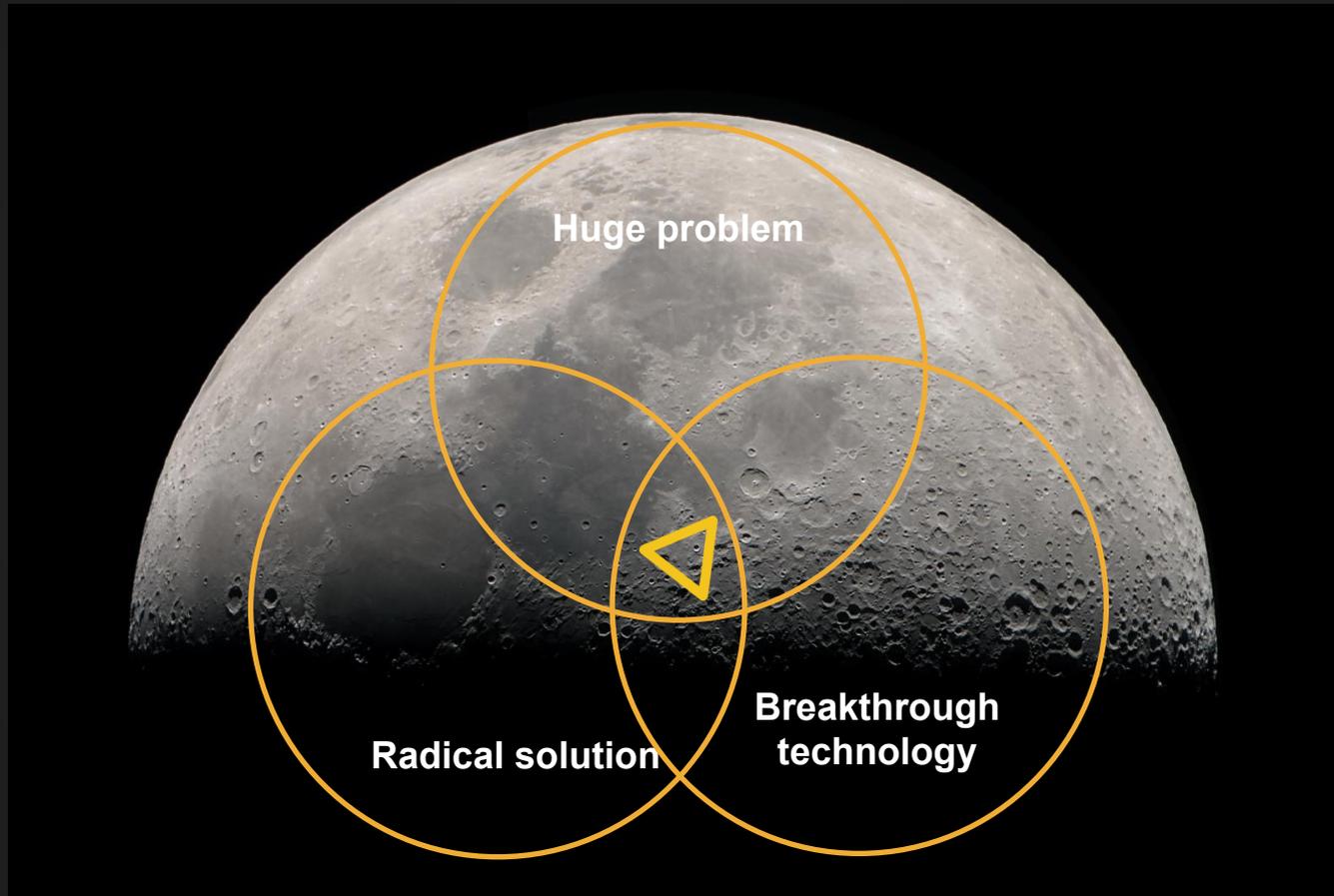
1. Politicians and policymakers should avoid thinking that AI is going to solve all the problems the health and care systems across the UK are facing. Artificial intelligence in everyday life is still in its infancy. In health and care it has hardly started – despite the claims of some high-profile players
2. As with traditional clinical activity, patient safety must remain paramount and AI must be developed in a regulated way in partnership between clinicians and computer scientists. However, regulation cannot be allowed to stifle innovation
3. Clinicians can and must be part of the change that will accompany the development and use of AI. This will require changes in behaviour and attitude including rethinking many aspects of doctors' education and careers. More doctors will be needed who are as well versed in data science as they are in medicine
4. For those who meet information handling and governance standards, data should be made more easily available across the private and public sectors. It should be certified for accuracy and quality. It is for Government to decide how widely that data is shared with non-domestic users



5. Joined up regulation is key to make sure that AI is introduced safely, as currently there is too much uncertainty about accountability, responsibility and the wider legal implications of the use of this technology
6. External critical appraisal and transparency of tech companies is necessary for clinicians to be confident that the tools they are providing are safe to use. In many respects, AI developers in healthcare are no different from pharmaceutical companies who have a similar arms-length relationship with care providers. This is a useful parallel and could serve as a template. As with the pharmaceutical industry, licensing and post-market surveillance are critical and methods should be developed to remove unsafe systems
7. Artificial intelligence should be used to reduce, not increase, health inequality – geographically, economically and socially.

ALPHA: EUROPE'S 1st MOONSHOT FACTORY

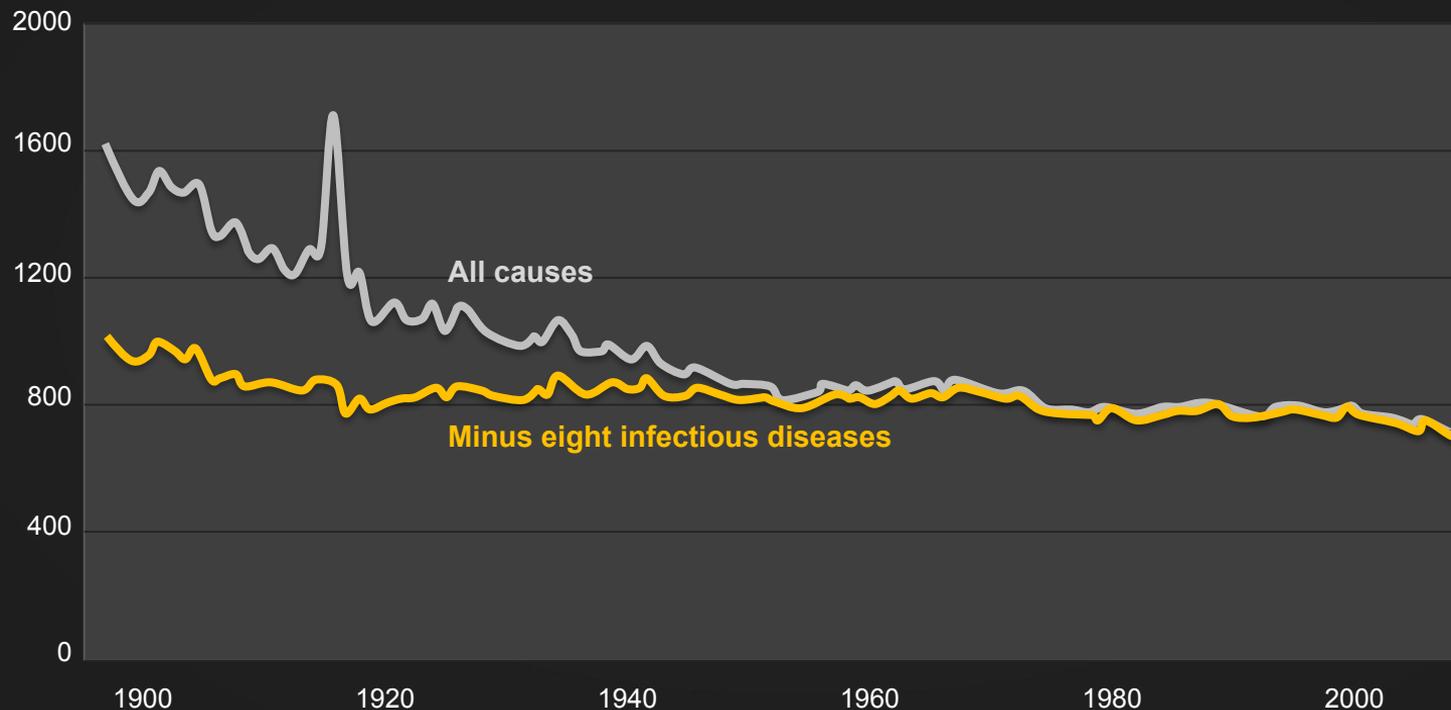
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DESPITE HUGE GLOBAL INVESTMENT HEALTHCARE HAS MADE LITTLE PROGRESS BEYOND INFECTIOUS DISEASE

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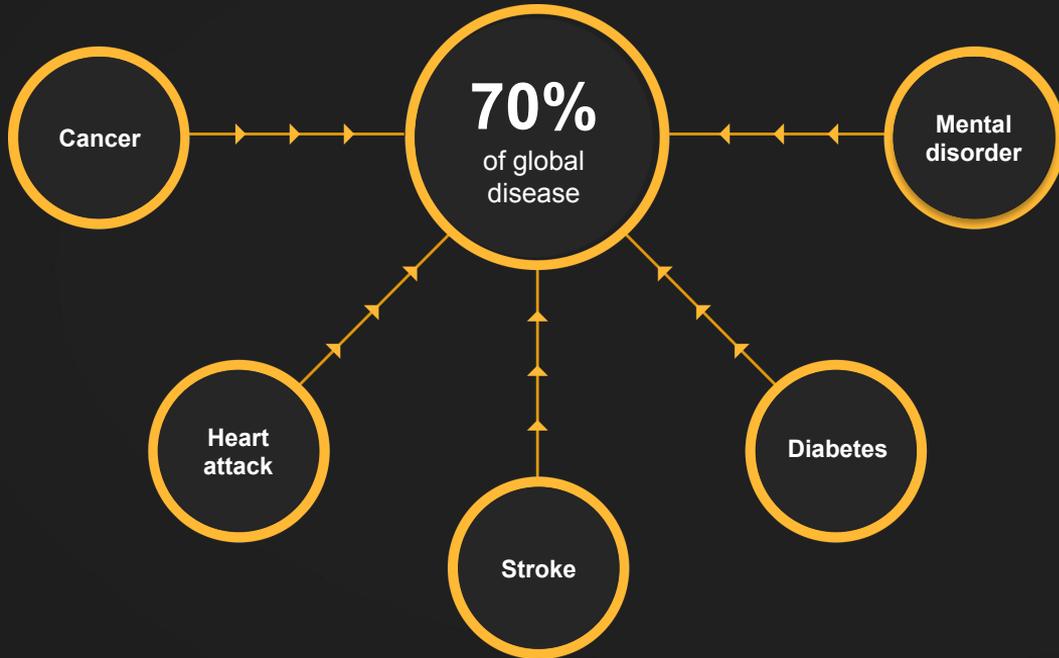
Mortality rate per 100,000 population





THE KEY REASON IS A SHIFT FROM ACUTE DISEASE TO CHRONIC DISEASE...

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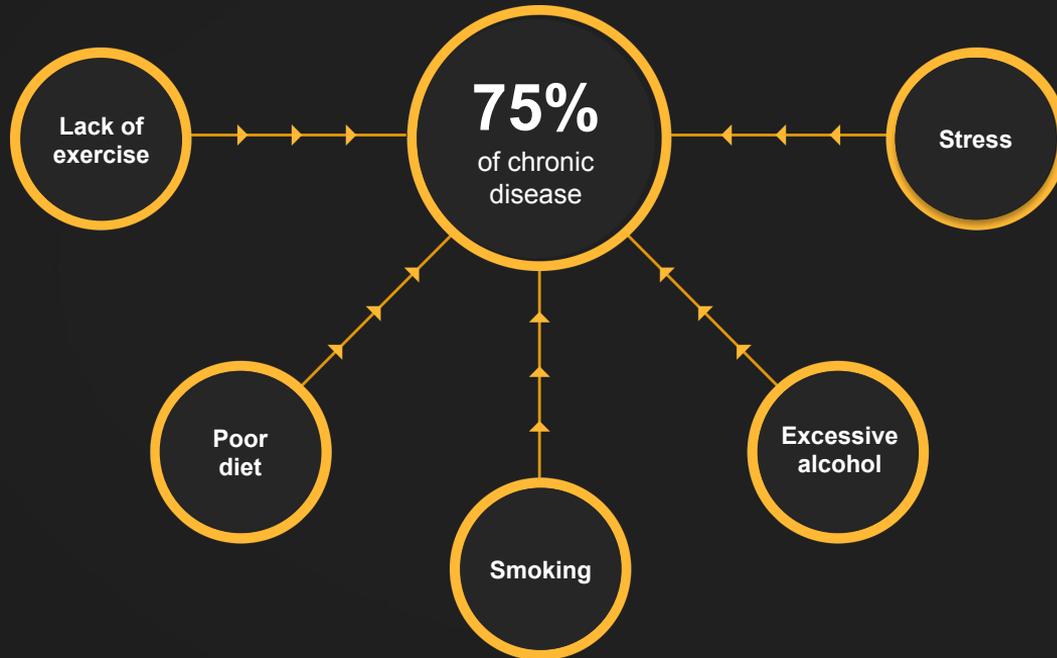


Since 2000, for every life saved from infectious disease, two lives have been lost from chronic disease



...AND THE KEY DRIVER OF CHRONIC DISEASE IS EVERYDAY BEHAVIOUR

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**These five
everyday
behaviours
cost the
world \$5tn**



ALPHA HEALTH: OUR MOON & OUR SHOT

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A personal health assistant that guides you along an **effective path** to improve **health-related behaviours** and live a **happier and healthier life**

ENCOURAGE
BEHAVIOUR
CHANGES THAT
WILL RADICALLY
REDUCE THE
BURDEN OF
CHRONIC DISEASE
GLOBALLY.





CUTTING EDGE AI RESEARCH FROM BCN FOR THE WORLD: THE ALPHA HEALTH AI LAB

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Trustworthy AI

Design and implementation of AI and ML algorithms and systems which are “explainable”, helping to build trust in AI/ML for sensitive use-cases.

Empathic AI

Understanding and reacting to human emotion in multi-modal, interactive settings.

Privacy-Preserving AI/ML

Development and implementation of AI/ML frameworks making “touching” or “seeing” the users’ data obsolete.

Our Aim

*Developing and scaling the **breakthrough methods** necessary for **answering our moonshot question** while becoming a **globally acknowledged player for translational AI/ML research.***

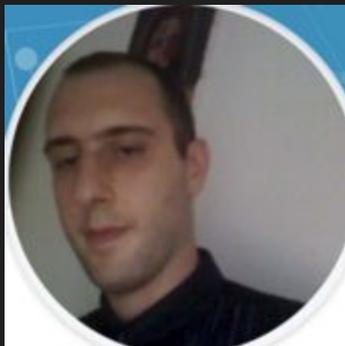


THE ALPHA HEALTH AI LAB (BEYOND ME)

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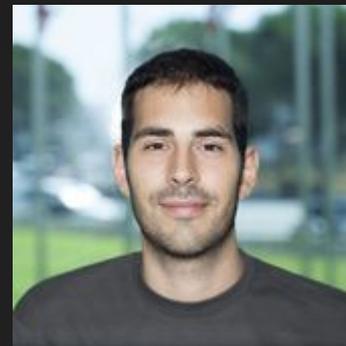
Daniel Malagarriga



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Clinical Tools (Cognitive Behavioral Therapy & Crisis anticipation)

- **Body dysmorphic disorder (in collaboration with MGH, FDA approved)**
- **Other mental health conditions in progress**

Tools for lifestyle changes with impact on chronic disease (based on CBT)

- **Sleep patterns**
- **Exercise patterns**
- **Socialization**
- **Nutrition patterns**
- **Smoking, alcohol, and drugs**



TECHNIQUES WE ARE CURRENTLY USING

- Deep neural networks
- Natural language processing
- Signal processing
- Image processing
- Dynamical systems models
- Decision trees & network explanation methods

TOOLS CURRENTLY IN USE

- TensorFlow, PyTorch, Keras
- AWS
- Spacy
- In-house libraries for explainable AI



CURRENT COLLABORATORS

- London School of Economics & Political Science
- City, University of London
- Royal College of Art
- University of Birmingham
- Massachusetts General Hospital
- National Health Service

SPECIAL INTERESTS FOR COLLABORATION

- Behavioral experimentation and data collection
- Privacy-preserving AI
- Open to suggestions



...IN THE WHAT AND HOW OF THE SOLUTIONS WE PROVIDE...

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...AND IN WHO IS SETTING THE AGENDA.

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JOIN US IN BUILDING TOMORROW'S ETHICAL AI AND TECH APPLICATIONS

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We've got a real opportunity with AI based tech to gain time and efficiencies, but it has to be implemented in a safe and trusted way. We need to bring everyone with us on this journey of transformation.

Dr Indra Joshi, Digital Health and AI Clinical Lead, NHS England



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