Cognitive Bias, Heuristics, Nudging and Behavioural Insights in Medicine

Dr Alex Gyani

THE
BEHAVIOURAL
INSIGHTS
TEAM

What does the next hour have in store?

What do we know about human behaviour?

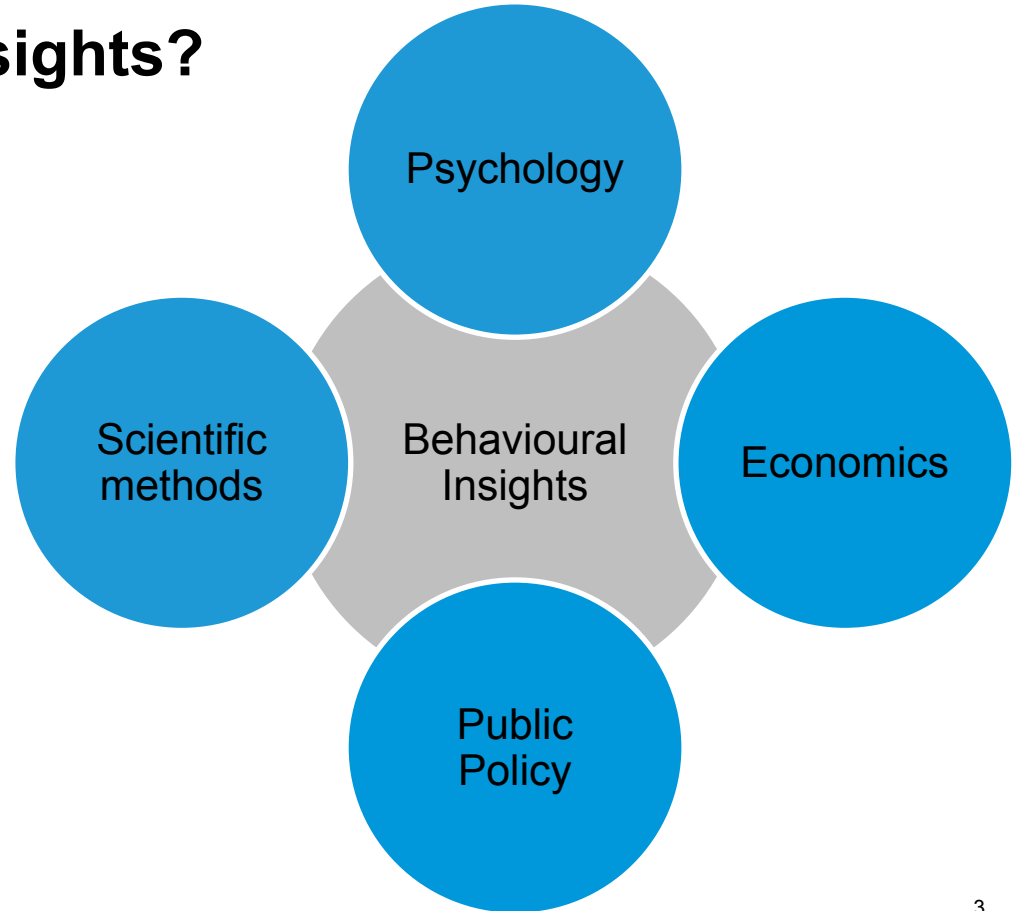What does this mean for surgeons?

How can **you** apply behavioural insights to public health and the wider public health system?

What are Behavioural Insights?

Understanding how people behave in practice will help us design better policies and services

Psychology

Scientific methods

Behavioural Insights

Economics

Public Policy

We need to think different about behaviour

System 1

Fast thinking/Automatic intuitive, effortless

2x2

Taking your daily commute

"It turns out that the environmental effects on behavior are a lot stronger than most people expect"
Daniel Kahneman, Nobel Laureate

System 2

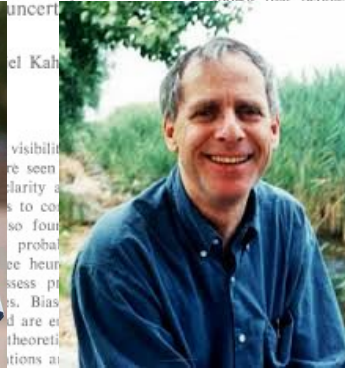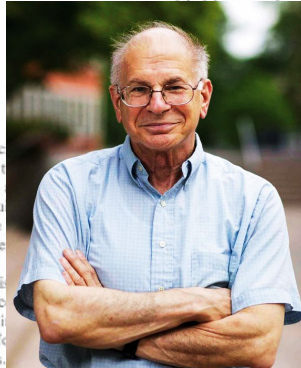Slow thinking/Reflective deliberate, analytic

24x17

Planning a trip overseas

The Beha viour

System 1 is often affected by biases and heuristics

*"Heuristics are highly economical and usually effective, but they lead to **systematic** and **predictable errors**."*

Example Biases

Framing	*Diagnosis momentum*
Anchoring	
Present bias	*Search satisficing*
Vividness	*Curse of knowledge*
Status quo bias	*Déformation professionnelle*

Framing can be a powerful bias and affects seasoned decision makers

"Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows…"

Problem 1

If Program A is adopted, **200 people will be saved**.

If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.
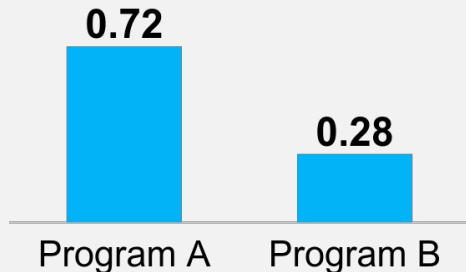
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0.72	**0.28**
Program A	Program B

Problem 2

If Program C is adopted, 400 people will die.

If Program D is adopted there is **1/3 probability that nobody will die**, and 2/3 probability that 600 people will die.

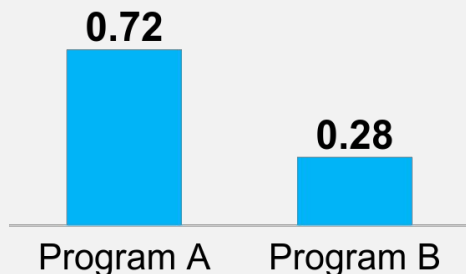|	
0.22	**0.78**
Program C	Program D

Framing can be a powerful bias and affects seasoned decision makers

"Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows…"

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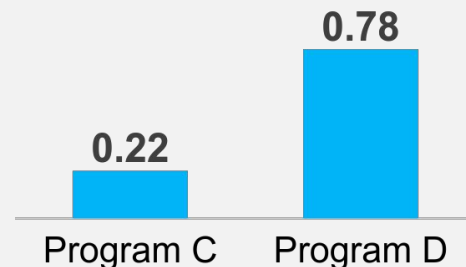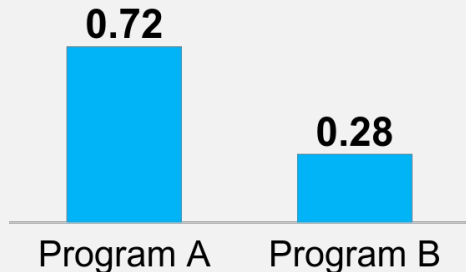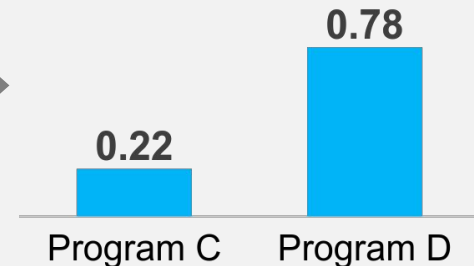If Program A is adopted, **200 people will be saved**.

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Preference Reversal

Problem 1: Program A 0.72, Program B 0.28

Problem 2: Program C 0.22, Program D 0.78

How does this apply to surgeons?

Framing: Does the way in which you present a procedure affect the likelihood that a patient goes through with it?

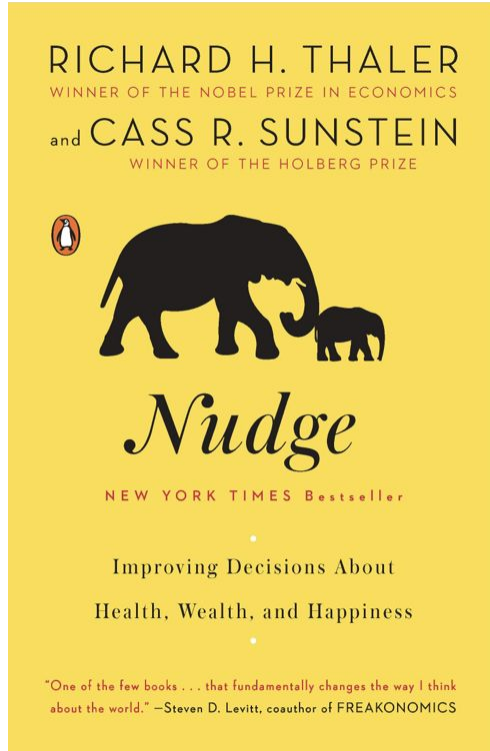**Anchoring**: Is one piece of a patient's history guiding your treatment plan?

Commission bias: What are the costs of being biased towards action?

**Déformation professionnelle:** What problems are you solely viewing through a surgeon's lens?

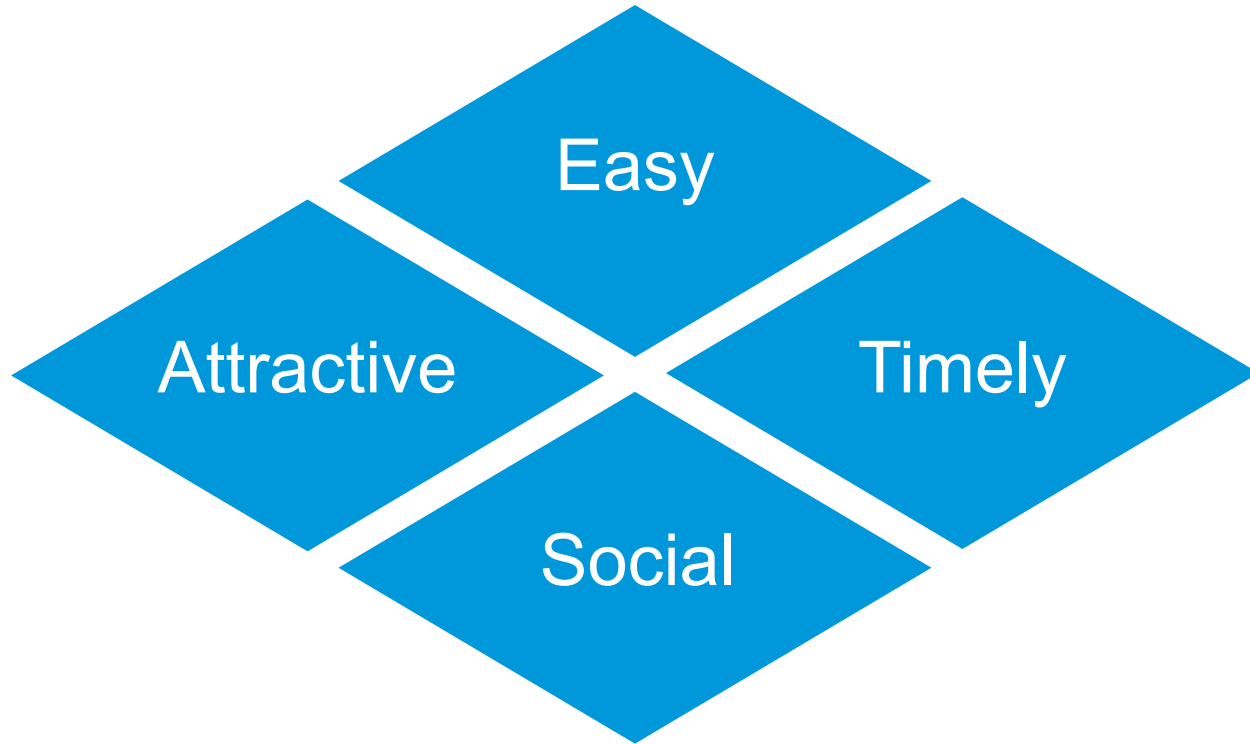# What can we do about it?

What's a nudge?

RICHARD H. THALER
WINNER OF THE NOBEL PRIZE IN ECONOMICS
and CASS R. SUNSTEIN
WINNER OF THE HOLBERG PRIZE

Nudge

NEW YORK TIMES Bestseller

Improving Decisions About
Health, Wealth, and Happiness

"One of the few books . . . that fundamentally changes the way I think about the world." —Steven D. Levitt, coauthor of FREAKONOMICS

"any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives."

What's a nudge?
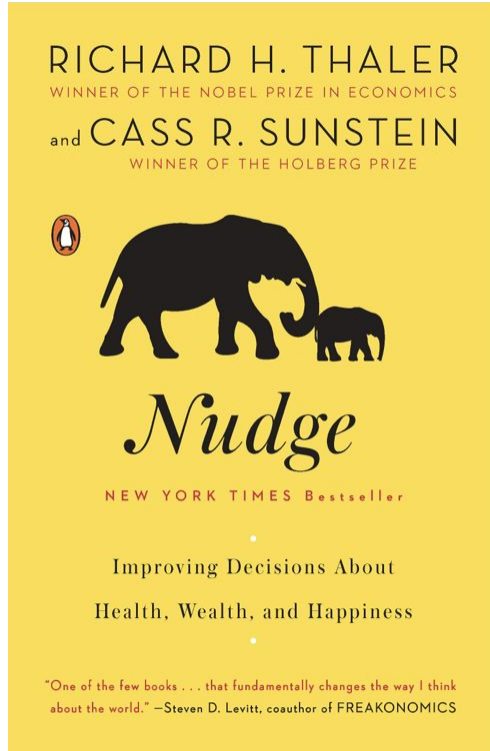
"To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not."
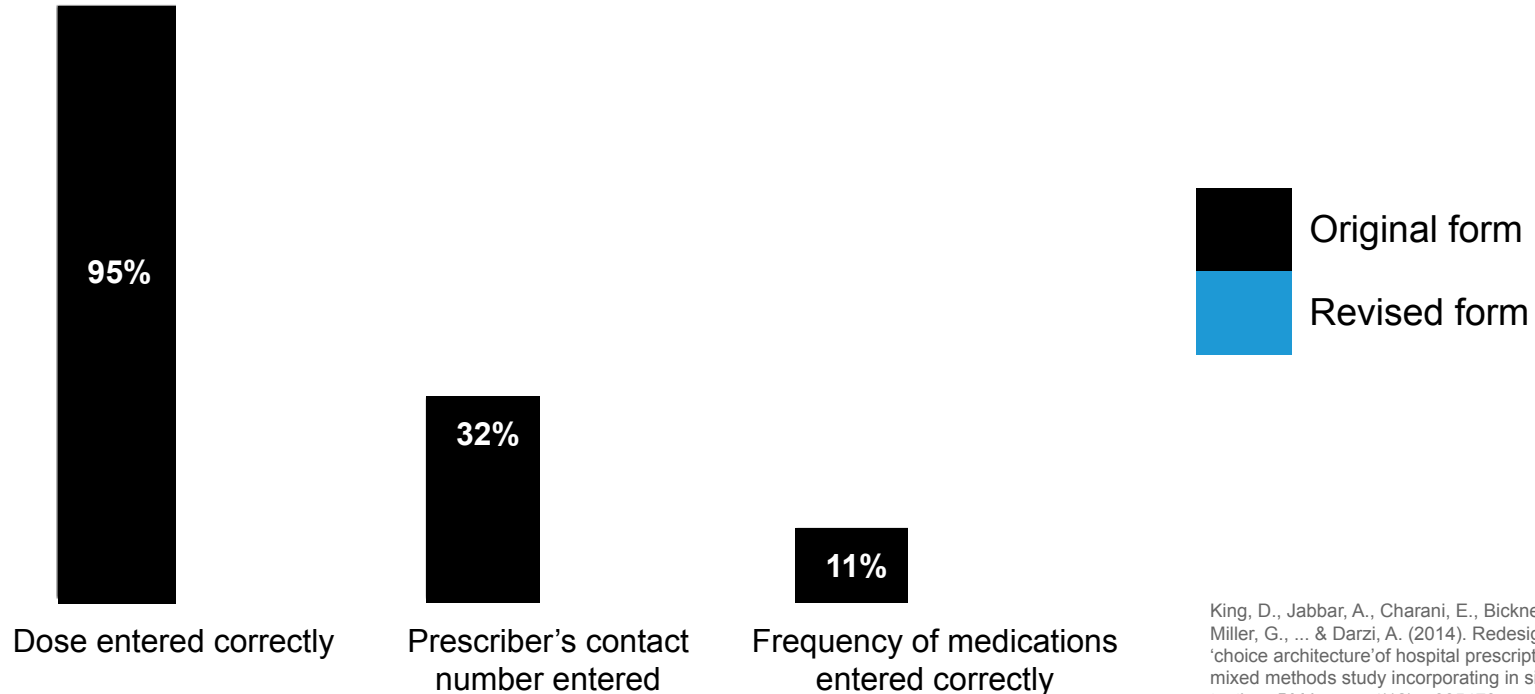
The EAST Framework

Designing out bad handwriting

The new form had a huge impact on the error rate

95%
Dose entered correctly

32%
Prescriber's contact number entered

11%
Frequency of medications entered correctly

■ Original form

■ Revised form

King, D., Jabbar, A., Charani, E., Bicknell, C., Wu, Z., Miller, G., ... & Darzi, A. (2014). Redesigning the 'choice architecture' of hospital prescription charts: a mixed methods study incorporating in situ simulation testing. *BMJ open*, *4*(12), e005473.

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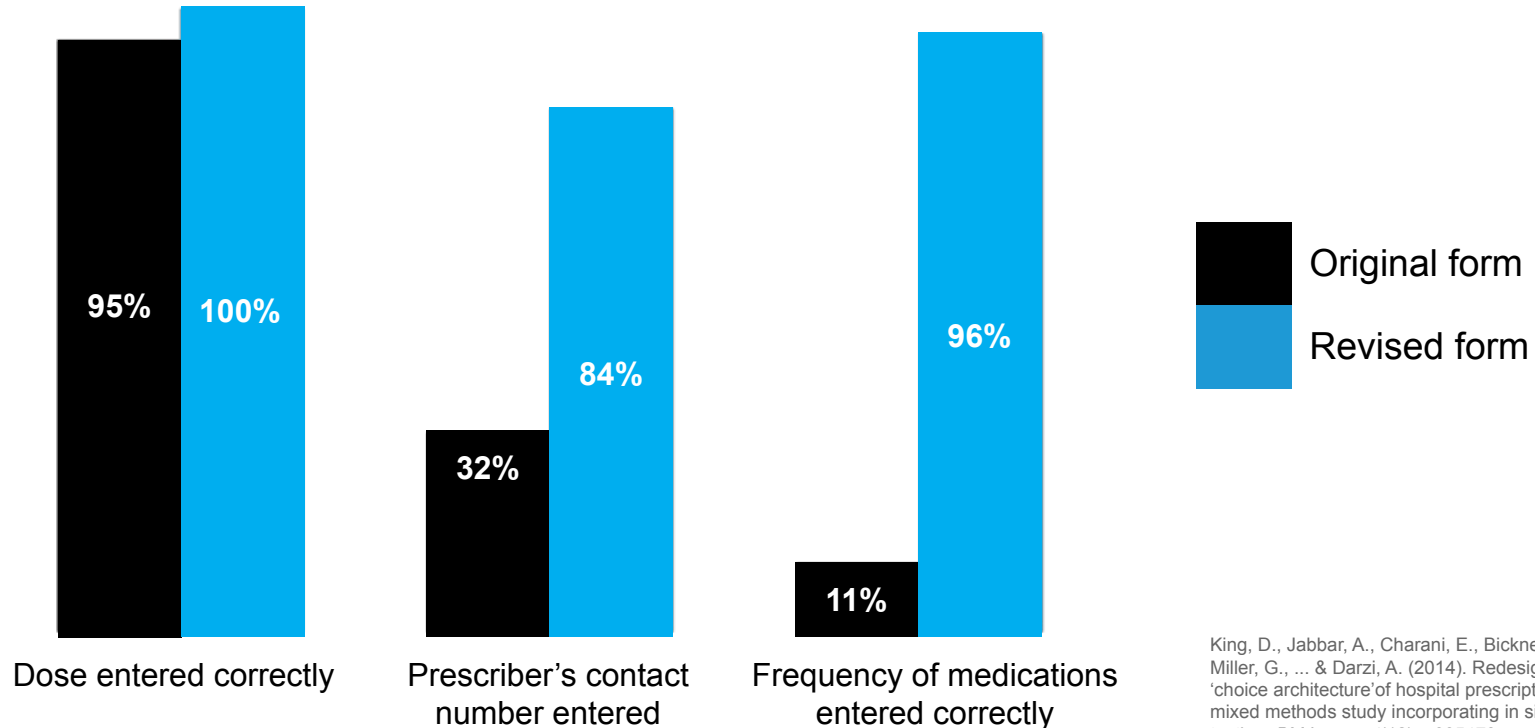
Dose entered correctly: Original form 95%, Revised form 100%

Prescriber's contact number entered: Original form 32%, Revised form 84%

Frequency of medications entered correctly: Original form 11%, Revised form 96%

Original form

Revised form

King, D., Jabbar, A., Charani, E., Bicknell, C., Wu, Z., Miller, G., ... & Darzi, A. (2014). Redesigning the 'choice architecture' of hospital prescription charts: a mixed methods study incorporating in situ simulation testing. *BMJ open*, *4*(12), e005473.

Using Behavioural Insights in Public Health

Antimicrobial resistance (AMR) is a growing global threat. A recent UN report suggests 10 million deaths each year by 2050 with the status quo.

New Zealand has one of the highest rates in the OECD.

Most prescribing of antibiotics is in the community by GPs.

There is also evidence that populations are being under prescribed antibiotics, most notably Māori and Pasifika patients.

Ten threats to global health in 2019

"The great majority (80%) of practices in London prescribe fewer antibiotics per head than yours."

Intervention: We sent letters to the top 30% of prescribers in each region, building on past trials in the UK and Australia

Uses social norms: "*You prescribe more antibiotics than 83% of GPs in Auckland DHB*"

Gives clear actions to reduce unnecessary prescribing

Trusted messenger

Our innovation: adding ethnicity graphs on the back page to address underprescribing to at-risk groups

Ethnicity-specific graphs to allow under-prescribers to see

Detail on specific antibiotics prescribed

We reduced prescribing by 9.2%
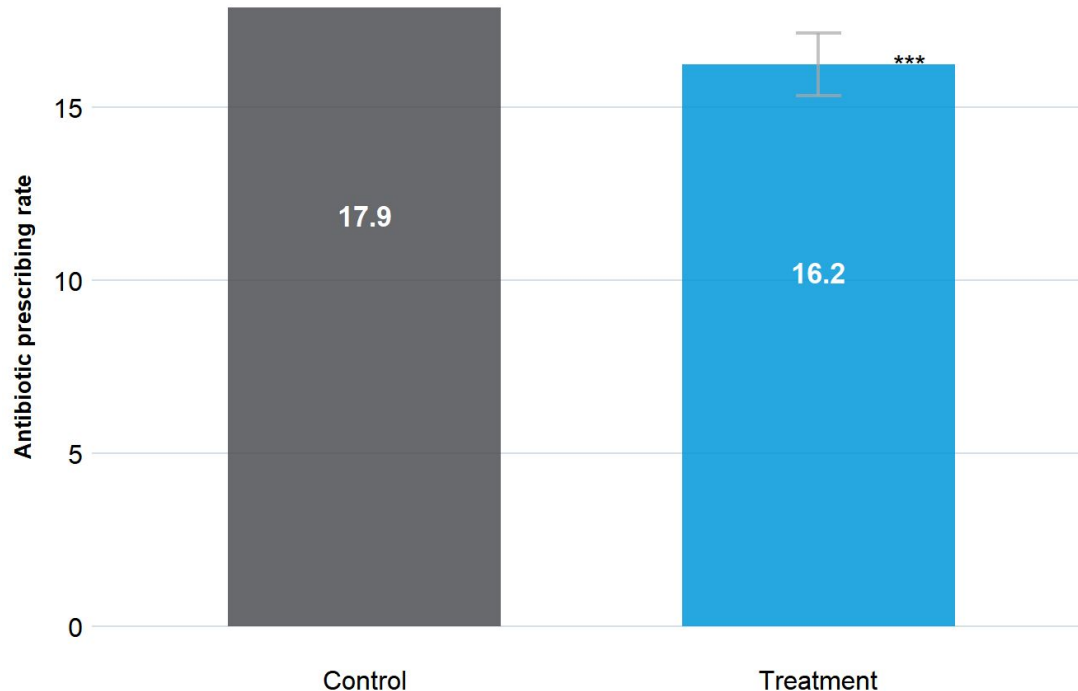
Chappell, N., Gerard, C., Gyani, A., Hamblin, R., McKree, R., Lawrence, A., ... & White, J. (2021). Using a randomised controlled trial to test the effectiveness of social norms feedback to reduce antibiotic prescribing without increasing inequities. *The New Zealand Medical Journal (Online)*, *134*(1544), 13-6.

Some GPs overused antibiotics but underuse for certain groups
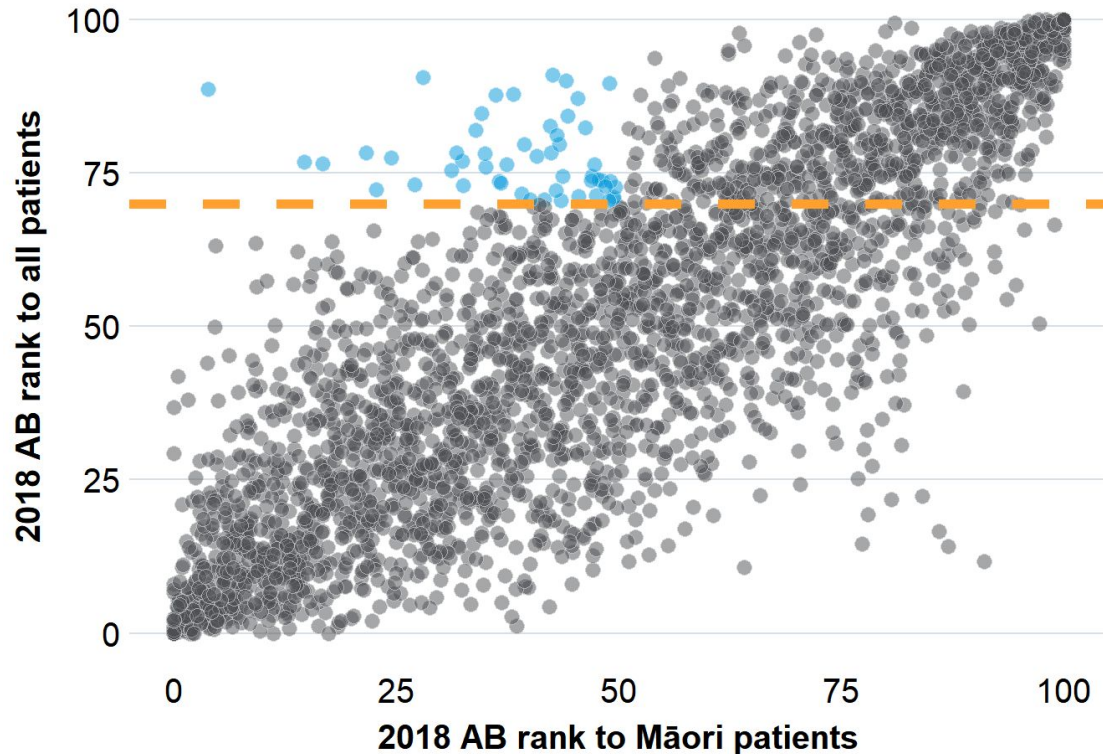
We were able to identify who the scripts were given by and then track whether or not certain groups of people were given ABs at different rates.
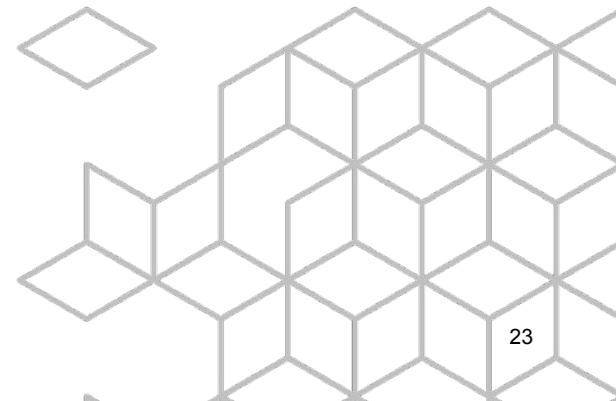
We saw a reduction in prescriptions for high prescribers to Māori patients, but no detectable impact for low prescribers

Chappell, N., Gerard, C., Gyani, A., Hamblin, R., McKree, R., Lawrence, A., ... & White, J. (2021). Using a randomised controlled trial to test the effectiveness of social norms feedback to reduce antibiotic prescribing without increasing inequities. *The New Zealand Medical Journal (Online)*, *134*(1544), 13-6.
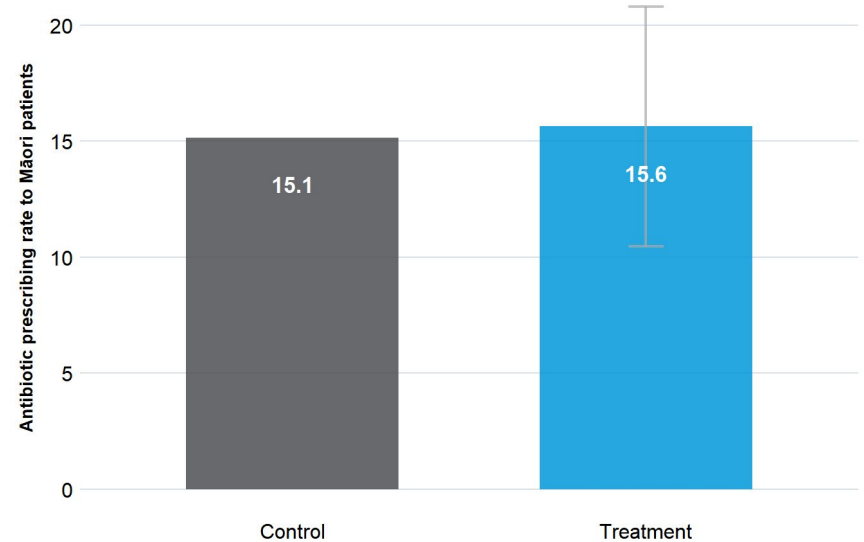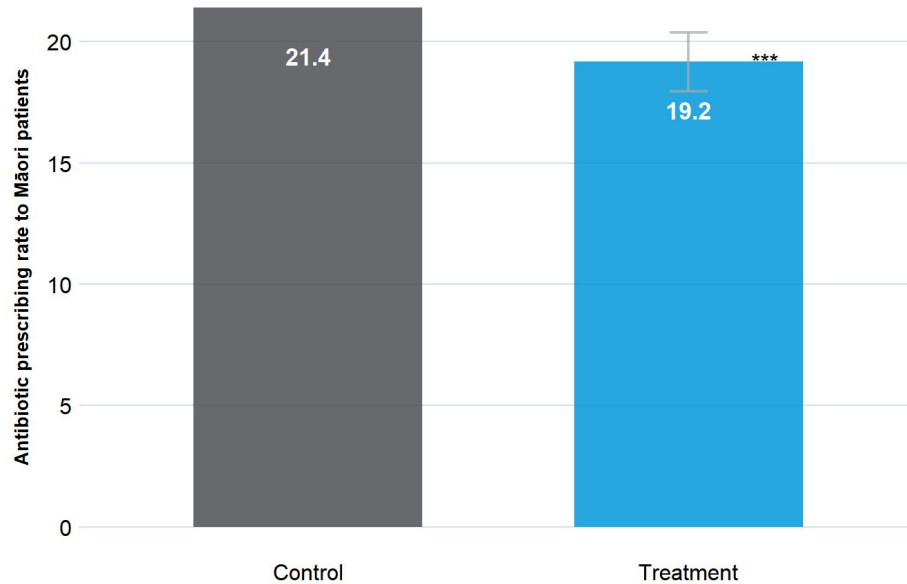
A multi-pronged approach to obesity
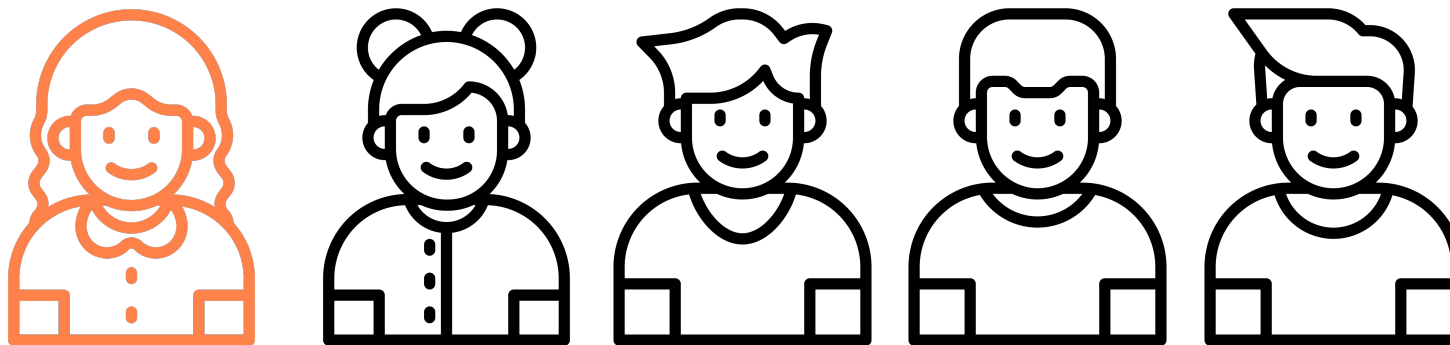
At least 1 in 5 British children are overweight or obese by 11

Department of Health & Social Care

A multi-pronged approach to obesity

Positioning out of sight

Relative impact on sales after position change

Low Sugar
drinks
+4%

No Sugar
drinks
+8%

High
Sugar
drinks
-12%

VicHealth. Behavioural insights and healthier lives. Melbourne: Victorian Health Promotion Foundation, 2016. https://www.vichealth.vic.gov.au/media-and-resources/publications/behavioural-insights-and-healthier-lives

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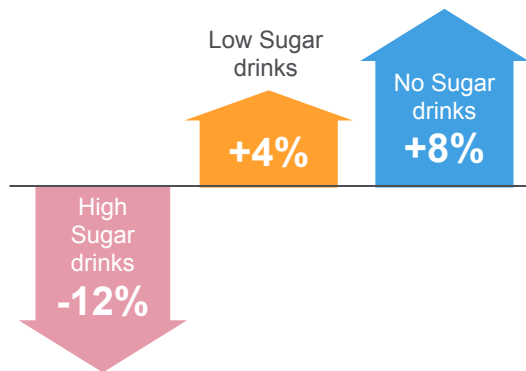
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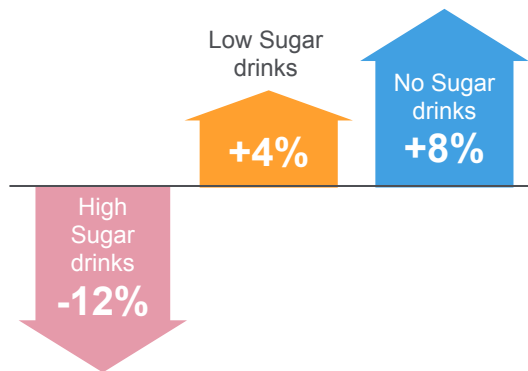
20% price increase

Proportion of high sugar drinks sold

49.10%

44.10%

**Standard
pricing**

**20% price
increase for
high sugar
drinks**

VicHealth. Behavioural insights and healthier lives. Melbourne: Victorian Health Promotion Foundation, 2016. https://www.vichealth.vic.gov.au/media-and-resources/publications/behavioural-insights-and-healthier-lives
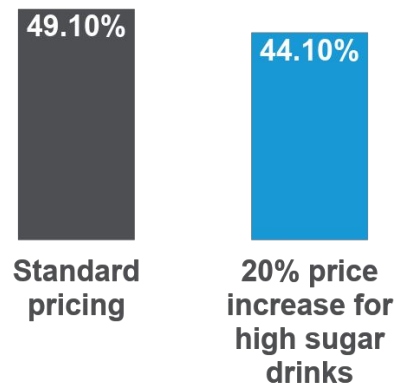
These experiments helped inform the UK sugar tax

Reformulation due to sugar tax (2016-2018)
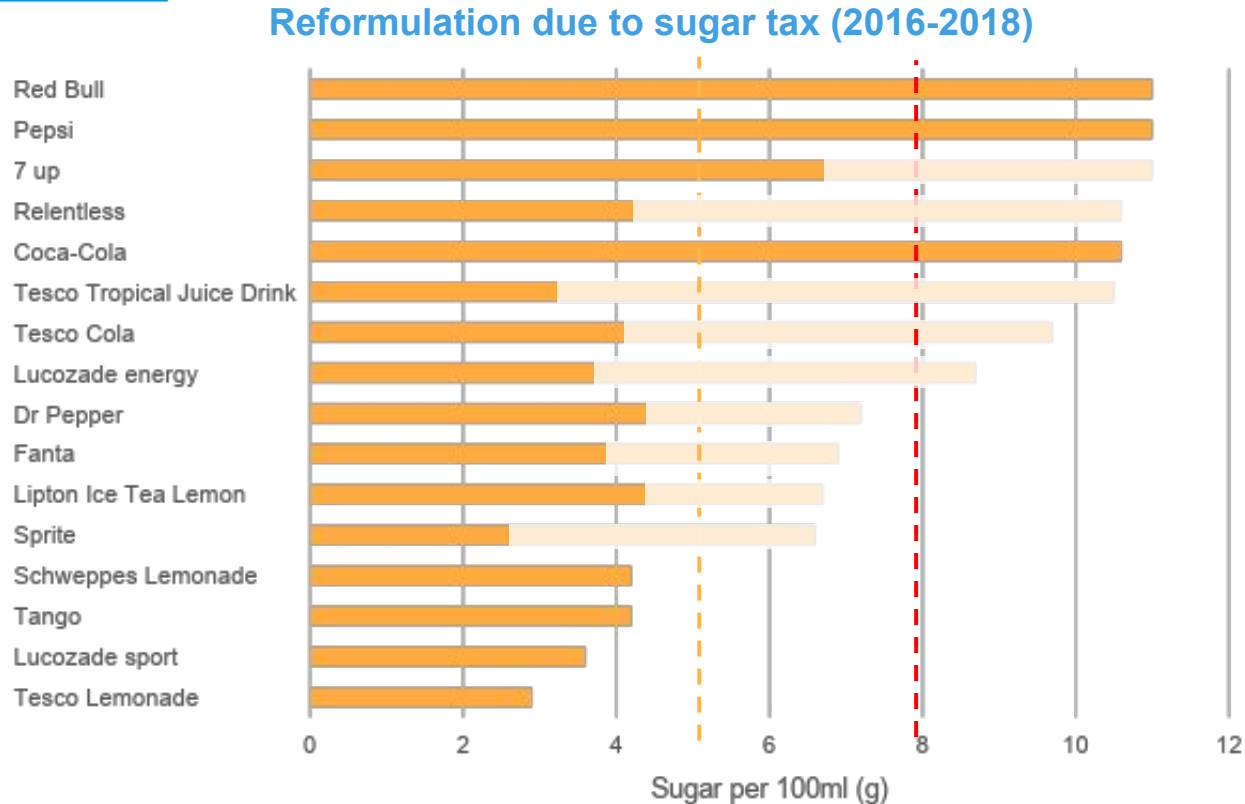
11% reduction in sugar...

...before tax even came into effect

Creating an effective healthcare system

Changing how we ask patients to share their data increased their understanding of how their data was used

The UK National Data Opt-Out Programme (NDOP) website **allows people to opt out of sharing their confidential patient information**. NDOP wanted to know whether they should give people:

Two choices: Share data or do not share data.
Four choices: The choice of sharing their data for:

1. Research only,
2. Planning only,
3. Both planning and research, or
4. Neither.

There was a fourfold difference in the number of people who understood the simple option and the option with four choices.

Your confidential patient information can be used for improving health, care and services, including:

- planning to improve health and care services
- research to find a cure for serious illnesses

Your decision will not affect your individual care and you can change your mind anytime you like.

I allow my confidential patient information to be used for research and planning:

○ Yes

○ No

Reducing NHS procurement overspend by 85 percentage points

NHS staff completed a hypothetical shopping exercise on a procurement platform. We made some amendments:

We made prices and cheaper alternatives salient

We set the cheapest delivery option as the default

We added prompts to check the order quantity

We offered swaps

We provided feedback on money spent

Participants using the standard platform had a £62,000 overspend compared to £5,000 in the treatment.

This could save up to £15 million for every £1 billion spent by NHS hospital procurement.

Londakova, K., Fussey, V. & Behrendt, H. (2021). Buying better: improving NHS procurement with behavioural insights

Shifting referrals away from overburdened services

More than four million people are waiting for NHS specialist care. Some wait more than a year for treatment.

We worked with NHS England and NHS Digital to redesign the patient referral system interface by:

1. Adding a **red 'Limited Capacity'** flag to overburdened clinics.
2. Adding a **green box** at the top, listing three local options with spare capacity.

These changes resulted in a **38% reduction in referrals to clinics with long waiting times**. If scaled up nationwide, these alerts could redirect up to **40,000 referrals** a month to shorter waiting lists.

Hallsworth, M. & Burd, H. (2021). Green means go: how to help patients make informed choices about their healthcare
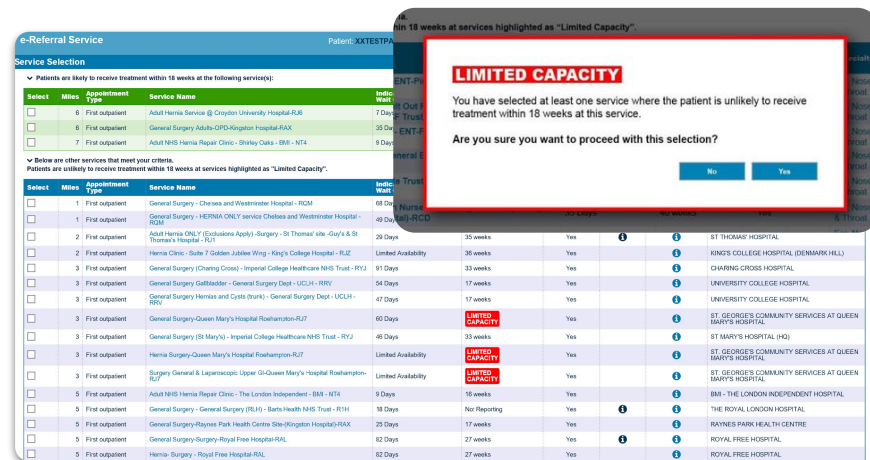
Reducing burnout and resignations among 911 call takers

Together with academics from UC Berkeley, BIT developed and tested an **intervention to reduce burnout, resignations, and sick leave** among 911 call takers and dispatchers in nine US cities.
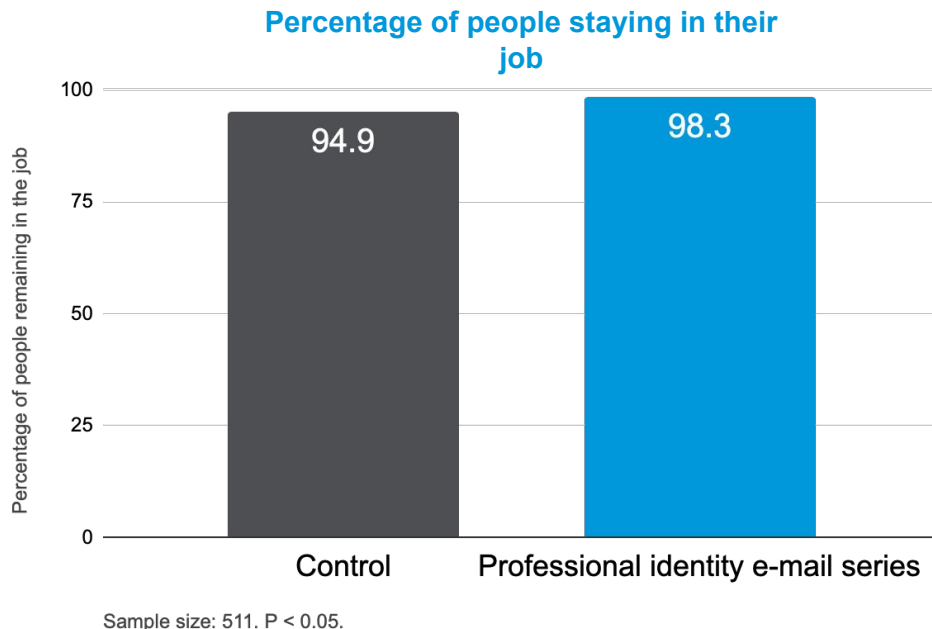
We sent **six emails outlining success stories** and **positive reflections previously shared by the 911 workforce.**

"Yes, what we do can be very stressful, sad, and some calls are seemingly unbearable, but what other job allows you to just listen, type, and save a life? Not many."

Percentage of people staying in their job

Percentage of people remaining in the job

	Control	Professional identity e-mail series
	94.9	98.3

Sample size: 511. P < 0.05.

Linos, E., Ruffini, K., & Wilcoxen, S. (2022). Reducing burnout and resignations among frontline workers: a field experiment. *Journal of Public Administration Research and Theory*, *32*(3), 473-488.
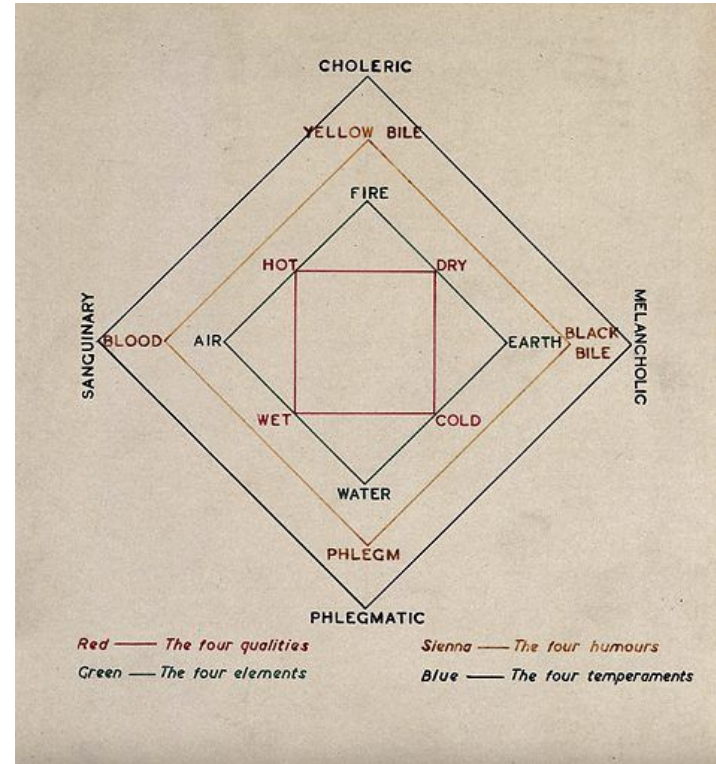
Final thoughts

In the future, practising medicine without understanding human behaviour will be akin to basing clinical decisions on Galen.

Biases shape our decisions and those of our patients. Being aware of these biases is not enough, we need to design them out of our systems.

Data and experimentation are critical for this.

Tēnā koe!

Get in touch:
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