

The Future of Healthcare

7 key areas

CMA Sydney Dec 8, 2022

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7 key areas



1. Ageing – getting older and living longer

2. Mental Health – increasing prevalence but services lag behind

3. Viral infections & long Covid – and other infectious viral diseases and consequences

4. Medication over-use – a major health crisis

5. Climate & sustainability – effects on raw materials & population health

6. Digital and Data –AI, diagnostics and discovery platforms

7. Changing models of care – digital, allied health care roles, self-care



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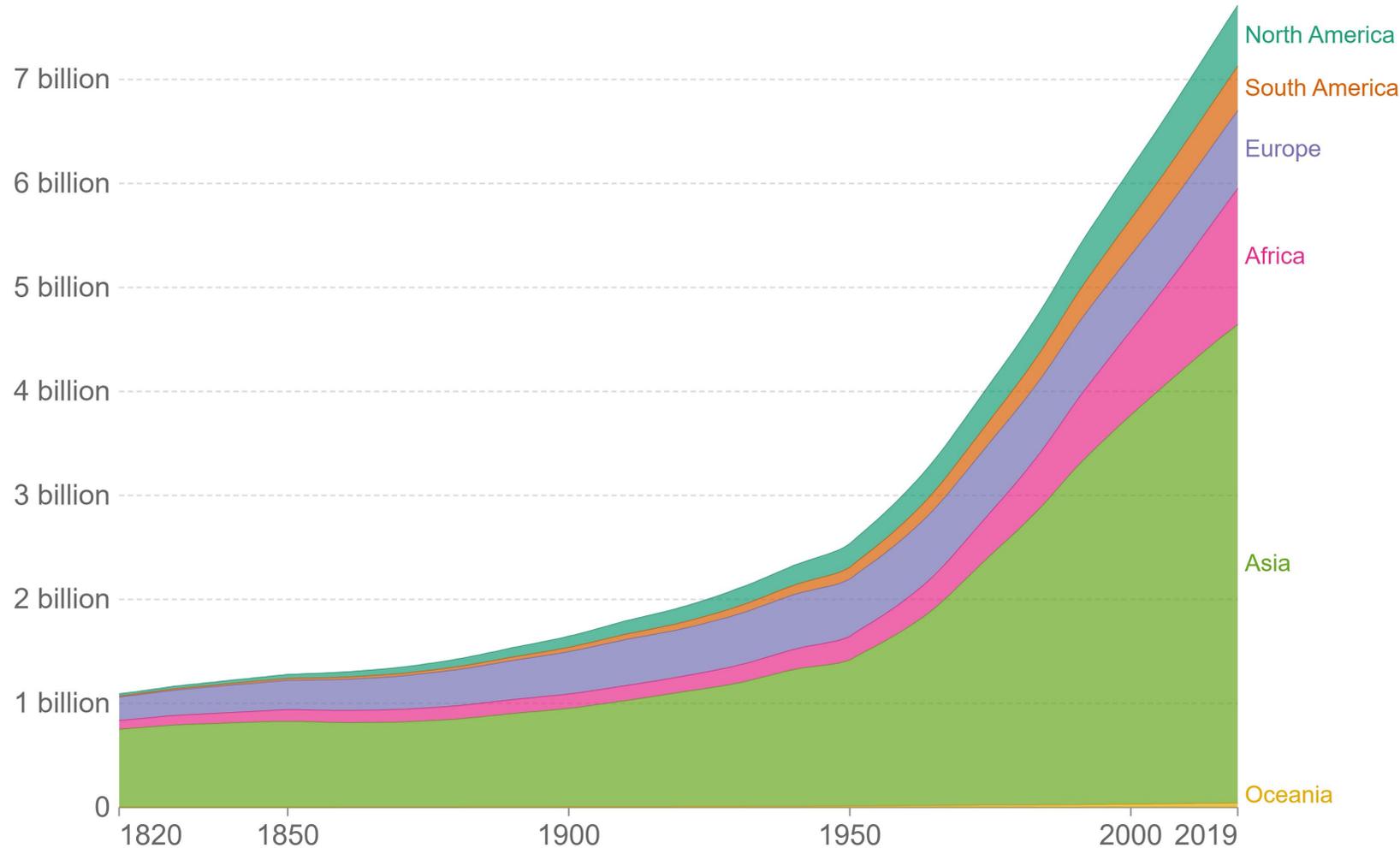
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1. Growing population

World population by region

Our World
in Data

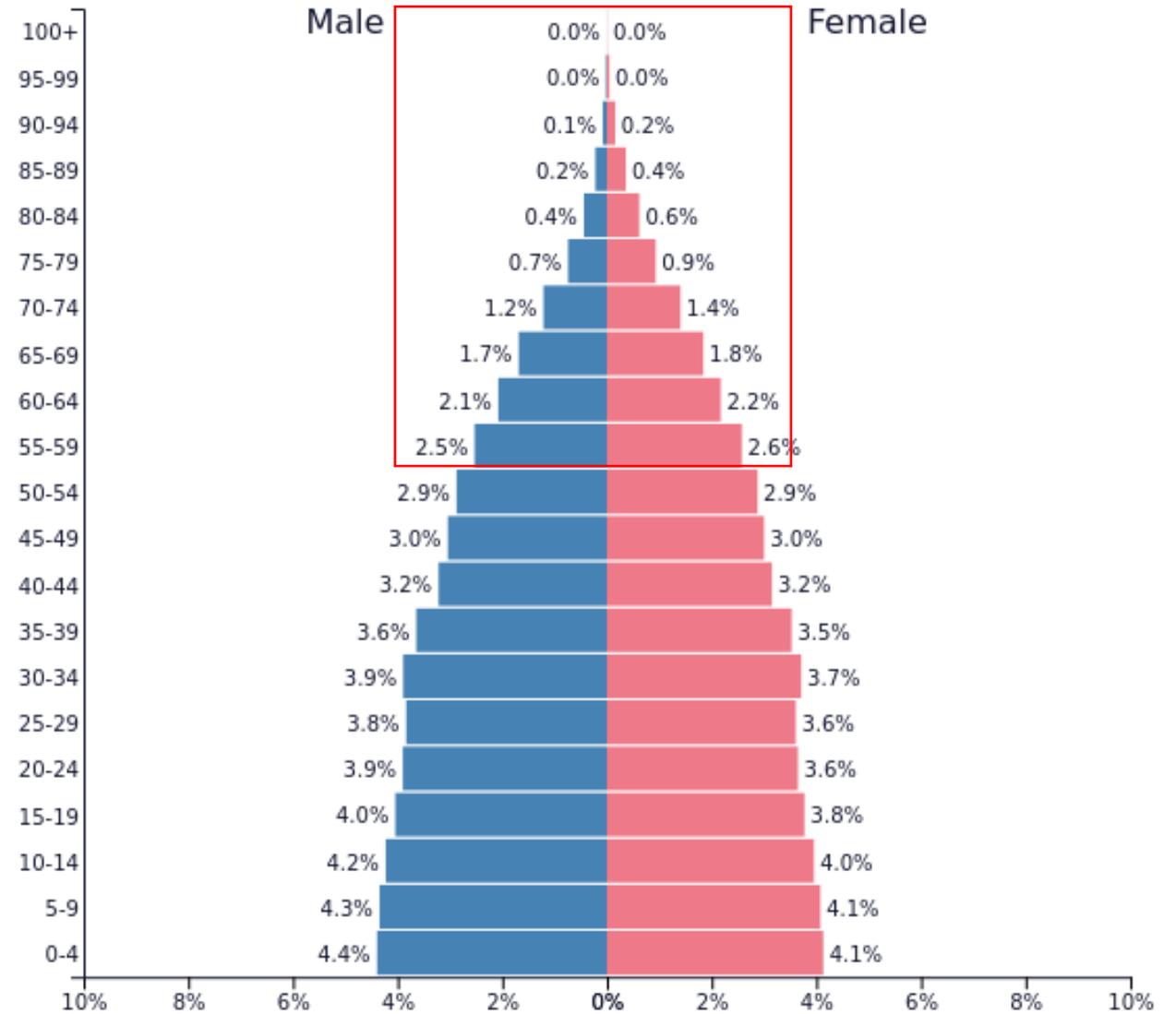


In mid-November 2022, the global human population hit **8 billion**

Birth rates began declining in 1988 due to

- INC access to contraception
- INC female education levels

Ageing is being redefined



Living longer, but with more illness

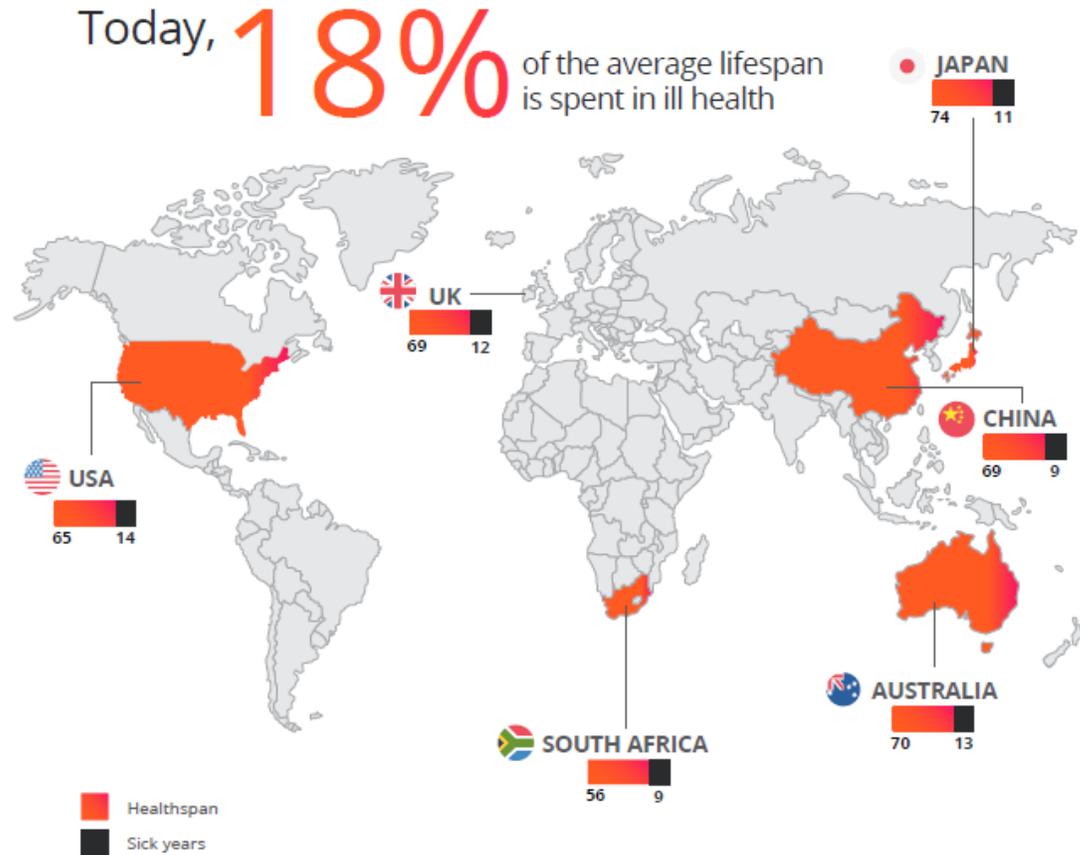
People are now living longer than ever before, thanks to scientific advances that extend lifespan. However, these extra years of life are not always spent in good health.

Lifespan:

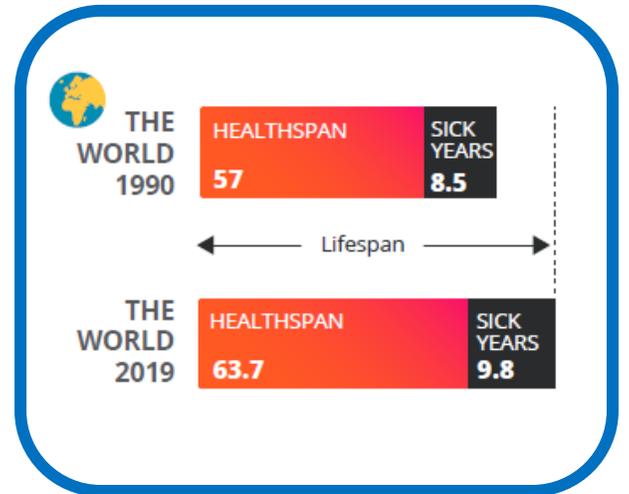
An estimate of the average number of years of life a person has remaining at a given age.

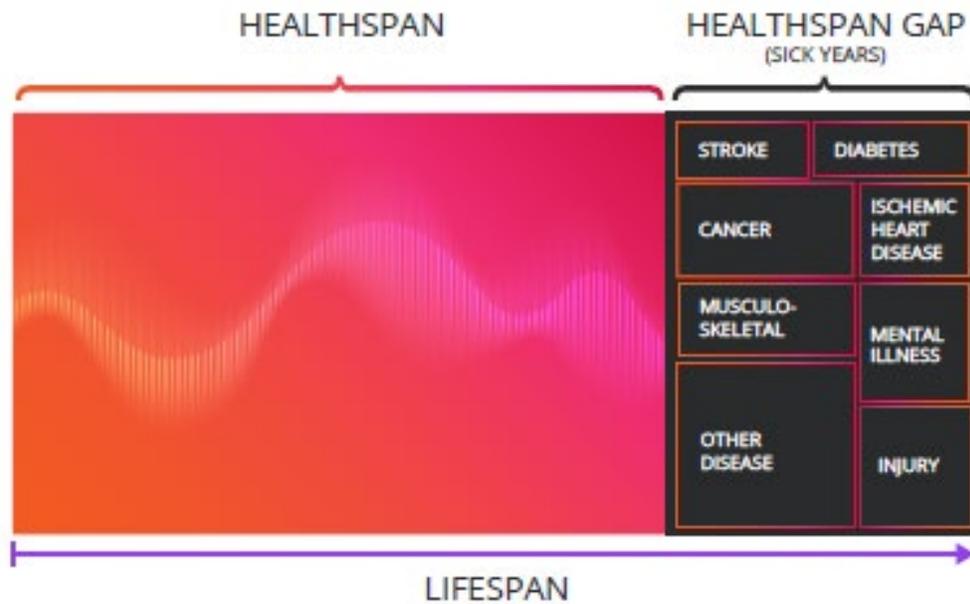
Healthspan:

An estimate of the average number of years that an individual can expect to live in good health, at a given age.



Increases in life expectancy or lifespan are outpacing increases in healthy life expectancy or healthspan, meaning that people are spending a greater proportion of their lives in poor health.





- Osteoporosis
- Age-related macular degeneration
- Cataracts
- Hearing loss
- Chronic obstructive pulmonary disease
- Cancer
- Osteoarthritis
- Cardiovascular disease
- Diabetes
- Kidney disease
- Heart failure
- Dementia
- Parkinson's disease

Longevity research is getting serious



HEVOLUTION

Saudi government investing **US\$1B each year** into longevity research & industry via not-for-profit Hevolution Foundation via Royal Decree.

Is glucosamine an anti-aging medicine ?



NIH Public Access

Author Manuscript

Eur J Epidemiol. Author manuscript; available in PMC 2013 August 01.

Published in final edited form as:

Eur J Epidemiol. 2012 August ; 27(8): 593–603. doi:10.1007/s10654-012-9714-6.

Use of Glucosamine and Chondroitin in Relation to Mortality

USA; 77,510 people followed over 8 years

People who had ever used glucosamine VS non-users:

- 18% DEC total mortality
- 13% DEC from cancers
- 33% DEC death from other causes

**adjusted for age, cig smoking, exercise, cholesterol lowering drugs, alcohol, aspirin use, BMI etc*

**use of chondroitin no extra benefit*

Epidemiology

EPIDEMIOLOGICAL SCIENCE

Associations of regular glucosamine use with all-cause and cause-specific mortality: a large prospective cohort study

UK Biobank; 500,000 people followed up over 8.9 yrs
19.1% used glucosamine (n=94,346)

Those using glucosamine VS non-users had :

- 15% DEC in all-cause mortality
- 18% DEC in CVD mortality
- 6% DEC in cancer mortality
- 27% DEC in respiratory death
- 26% DEC in digestive disease deaths

**adjusted for age, gender, lifestyle, other supplements, meds, health status* (all results p<0.001)

ORIGINAL RESEARCH

Glucosamine/Chondroitin and Mortality in a US NHANES Cohort

Dana E. King, MD, MS and Jun Xiang, MS, MA

USA, 16,686 people reviewed; 107 mths follow-up

- 3.94% used glucosamine + chondroitin

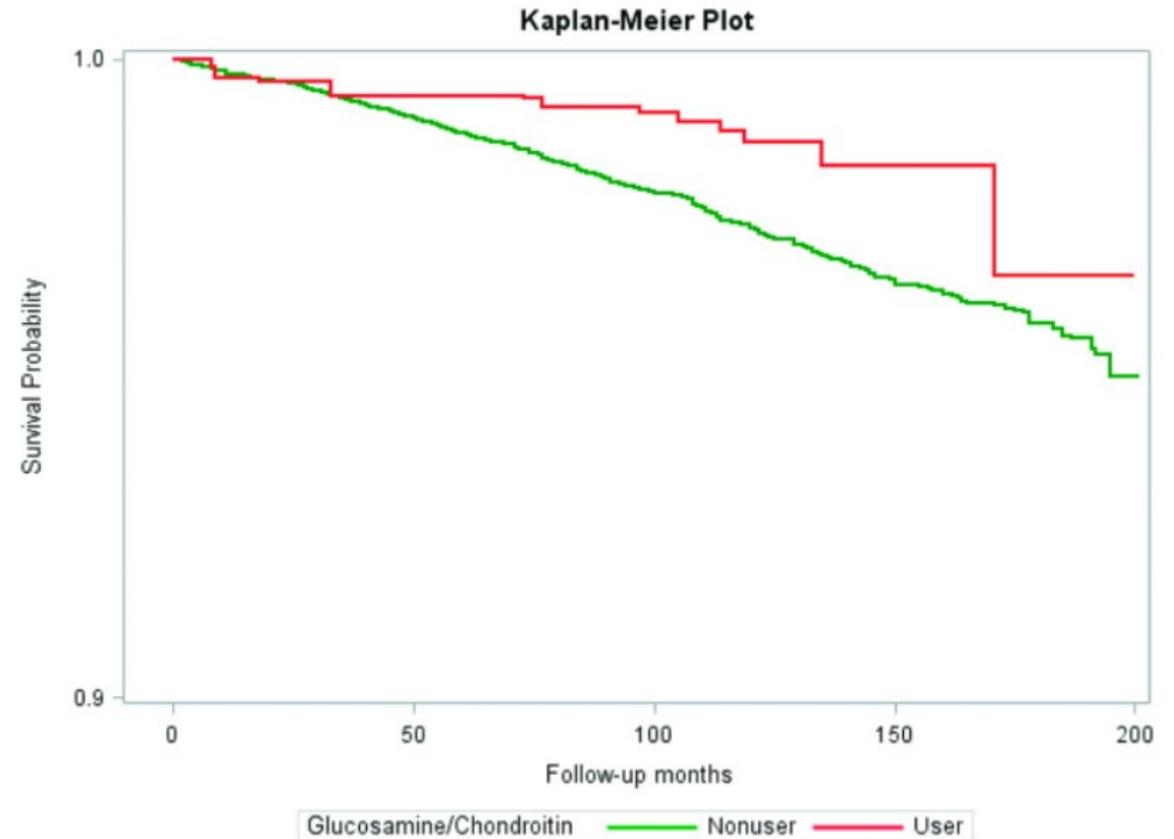
Those using glucosamine VS non-users :

- 39% DEC in all-cause mortality
- 65% DEC CVD mortality
 - *This remained true when results were adjusted for influences such as age, gender, race, education, smoking status, and physical activity*
- AS effective as exercise (without exercising)



yahoo/life Yahoo Life UK

Joint pain supplement reduces premature death risk as effectively as exercise, study suggests



Vitamin-D, Omega-3, exercise can reduce cancer risk by 61%: Study

A combination of high-dose Vitamin D, Omega-3s, and simple home strength exercises can help reduce cancer risk in healthy adults aged 70 or older by 61 per cent

Monday April 25, 2022 6:15 PM, IANS

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London: A combination of high-dose Vitamin D, Omega-3s, and simple home strength exercises can help reduce cancer risk in healthy adults aged 70 or older by 61 per cent, claims a study.



Combined Vitamin D, Omega-3 Fatty Acids, and a Simple Home Exercise Program May Reduce Cancer Risk Among Active Adults Aged 70 and Older: A Randomized Clinical Trial

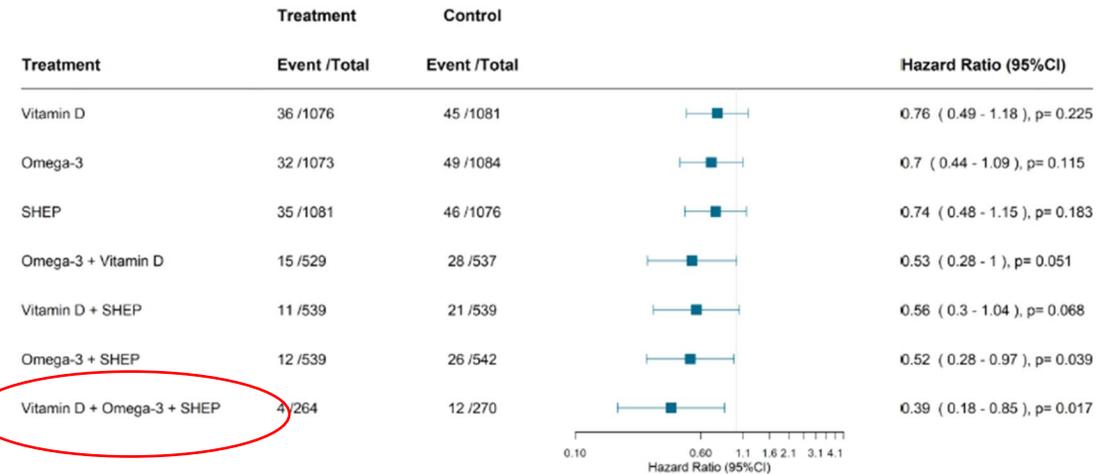


FIGURE 2 | Primary endpoint — effect of treatments on the prevention of any invasive cancer. Cox-proportional hazard model adjusted for history of cancer, sex, BMI, prior fall, age, and study center. The comparison group is always the group that does not have the respective treatment(s) of interest. For all three treatments, it is the group who received only the placebo. All verified new invasive cancer cases ($n = 81$) among all 2,157 participants. Abbreviation: SHEP, Simple home exercise program.

Mental health issues make up 12% of Australia's burden of disease – equating to \$60 billion annually.



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2. Mental health

- A 13% rise in mental health conditions and substance use disorders 2007-2017.

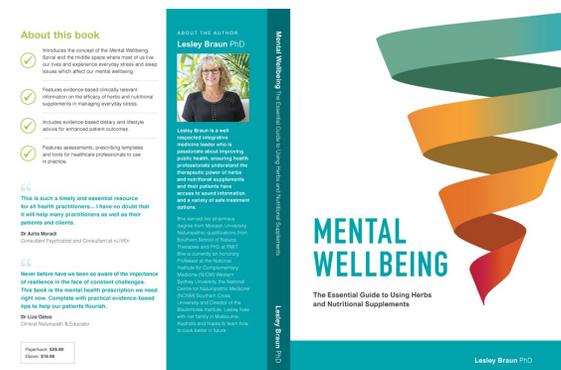
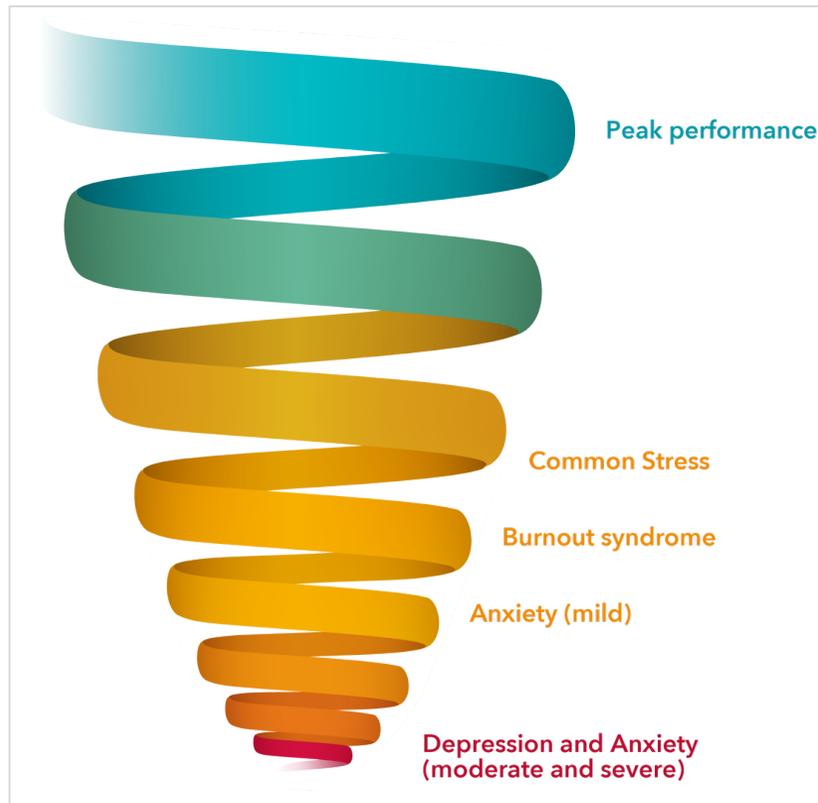
https://www.who.int/health-topics/mental-health#tab=tab_2

Type	% global population (2017)	Females %	Males %
All mental disorders	10.7% 792 mil	11.9	9.3
Depression	3.4	4.1	2.7
Anxiety disorders	3.8	4.7	2.8

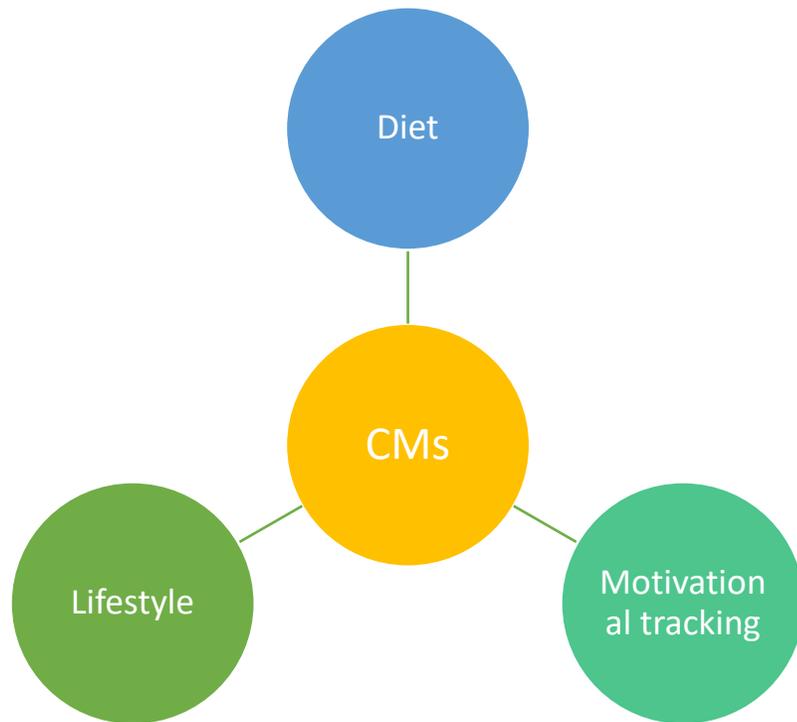
Mental Health VS Mental Wellbeing

“Mental wellbeing is a state where an individual can readily cope with the daily stresses of life and use their cognitive and emotional abilities to realise their potential.”

With this comes the ability to form fulfilling relationships and deep connections, be productive and successfully adapt to change.”



Moving up the MWB spiral naturally



Stress & anxiety	Sleep	Depression
Adaptogens eg ashwagandha, bacopa, tulsi, rhodiola, the ginsengs	Adaptogens eg ashwagandha, bacopa, tulsi, rhodiola, the ginsengs	St John's wort
Kava kava	Valerian, passionflower, hops	Psychobiotics
L-theanine	Chamomile	Saffron
Magnesium	L-theanine	Fish oils
Saffron	Lavender	SAMe
Vitamin B complex	Saffron	etc
Galphimia	Lemon balm	
Lactium	Lactium	
Psychobiotics	Psychobiotics	



Long Covid stats

~30% of Australian adults have had symptoms lasting >4 weeks

~ 5% of Australian adults have had or currently have post-COVID-19 syndrome lasting >3 months

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3. Viral infection – the race speeds up

Governments actively accelerating research into new anti-virals and other therapeutics

Major research investment and activity investigating :

- In the West : investigation for new drugs for influenza, common cold, HIV, coronaviruses etc
- In the East : Govt's in China and India also funding studies into traditional herbals

Sept/2022 Australian news

The Cumming Global Centre for Pandemic Therapeutics to open in Melbourne, with **Au\$250m** philanthropic funding from Geoff Cumming.

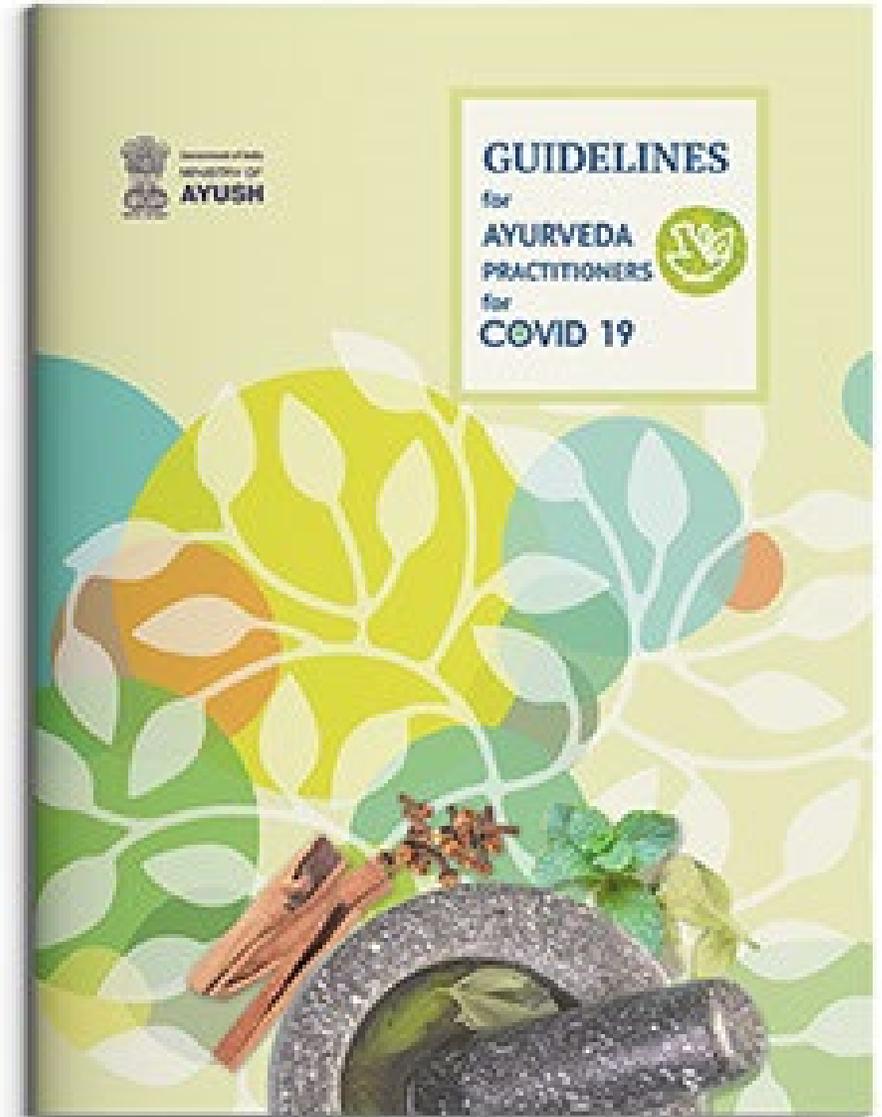
The Centre aims to ultimately raise A\$1.5 billion, including funding from governments.

Similar initiatives from the National Institutes for Health (USA) and the Pandemic Antiviral Discovery (PAD) group led by the Bill & Melinda Gates Foundation and other partners.

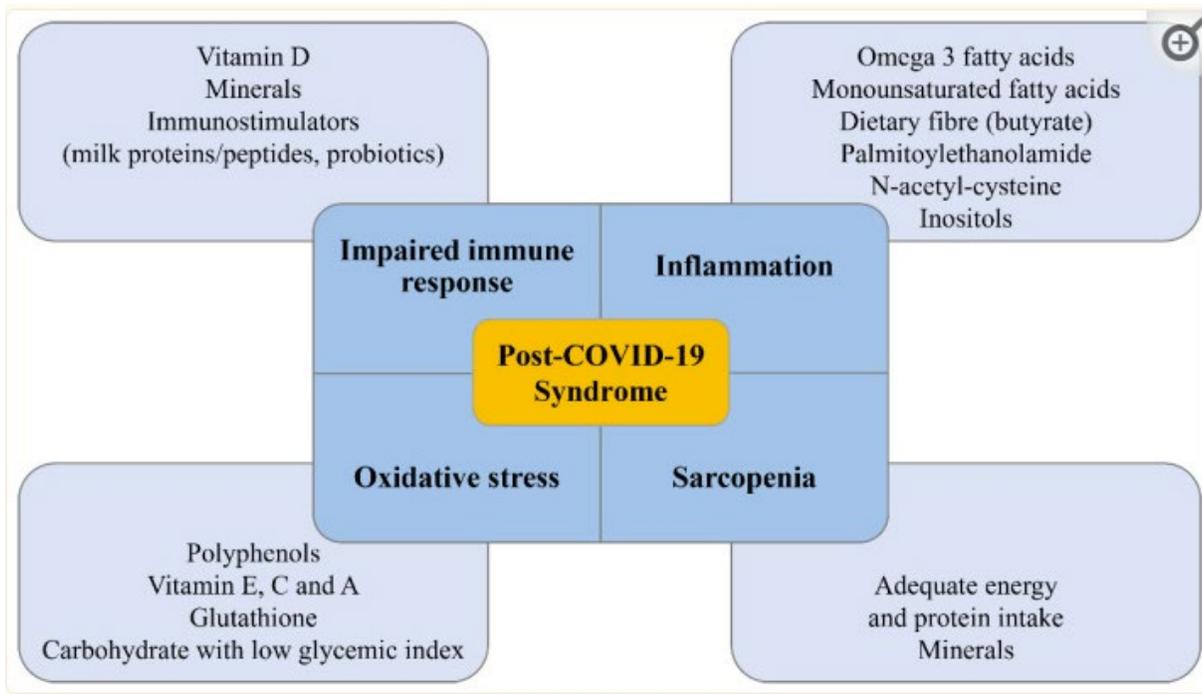
Covid – Ministry of Ayush

“The Ministry of Ayush was formed on the 9th of November 2014 with a vision of reviving the profound knowledge of our ancient systems of medicine and ensuring the optimal development and propagation of the Ayush systems of healthcare”.

- Have funded 142 research projects into Covid 19
- 73 on Ayurvedic treatments
- 29 on homeopathy
- 19 on yoga/naturopathy
- Interventional and preventative studies



Long-Covid | Post-Covid Syndrome




72% of people with long-covid are not meeting their **energy** requirements.

56% of people are not meeting their **protein** requirements

>45% have **insufficient Vitamin D**.

Nearly 2/3 of people with long-covid are **malnourished**

“Dr Cliff Harvey”

Main targets of recommended dietary compounds for people with post-COVID 19 syndrome



Which drug-class is ONE of the biggest threats to human and animal health, according to the Australian Government ?

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← → ↻ 🏠 amr.gov.au



Australian Government

Antimicrobial Resistance

Home About AMR Australia's response What you can do Activity and research directory

Antimicrobial resistance is one of the biggest threats to human and animal health today.

[Find out how AMR affects you >](#) [Find out when antibiotics are needed >](#)



Australian Government

Antibiotic resistance occurs when bacteria change to protect themselves from an antibiotic. The more we use antibiotics, the more chance bacteria have to become resistant to them.



What health professionals can do:

- 

1 Consider any safe alternatives to an immediate antibiotic prescription
- 

2 Prescribe in accordance with therapeutic guidelines, and where possible use diagnostics to inform treatment decisions
- 

3 Talk to patients about the importance of appropriate antibiotic use and the dangers of antibiotic resistance
- 

4 Give patients advice on how to manage symptoms without antibiotics
- 

5 Apply best practice infection prevention and control
- 

6 Talk to patients about how to prevent infections and their spread (e.g. vaccination, good hygiene and hand washing)

4. Medication over-use

Antibiotic resistance

- New resistance mechanisms are emerging and spreading globally, threatening the ability to treat common infectious diseases
- Antimicrobial resistance occurs naturally as bacteria and fungi adapt & become harder to kill

**Is there a more important role for herbals ?*

** Neither have resistance issues*





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5. Sustainability and climate change

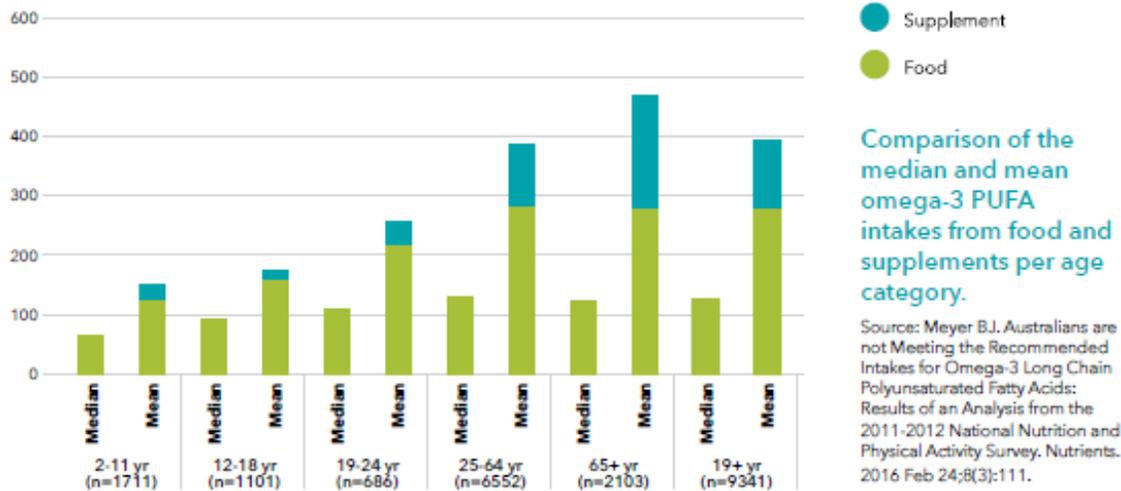
- Climate change affects the social and environmental determinants of health
 - clean air, clean drinking water, sufficient & nutritious food and secure shelter
- The value of health gains from reducing carbon emissions would be **approximately double** the global cost of implementing carbon mitigation measures



Climate change & omega-3 sources

- Demand for supplemental omega-3 EFAs will continue
- The body of scientific evidence continues to show significant benefits
- Diets in Australia proven to be insufficient
- Many sources of omega 3's are vulnerable to climate change effects

Australian n-3 LCPUFA intakes (mg/day) from food and supplements



Climate change affects phytoplankton and single-cell algae survival and omega 3 production in 2 ways :

1. INC in UVB radiation inhibits photosynthesis, damages cellular DNA and reduces ATP production = **reduces ability to produce n-3 EFAs**
2. Increases in atmospheric CO₂ = **DEC n-3 EFA production** in algal cells with INCs omega 6 & 9

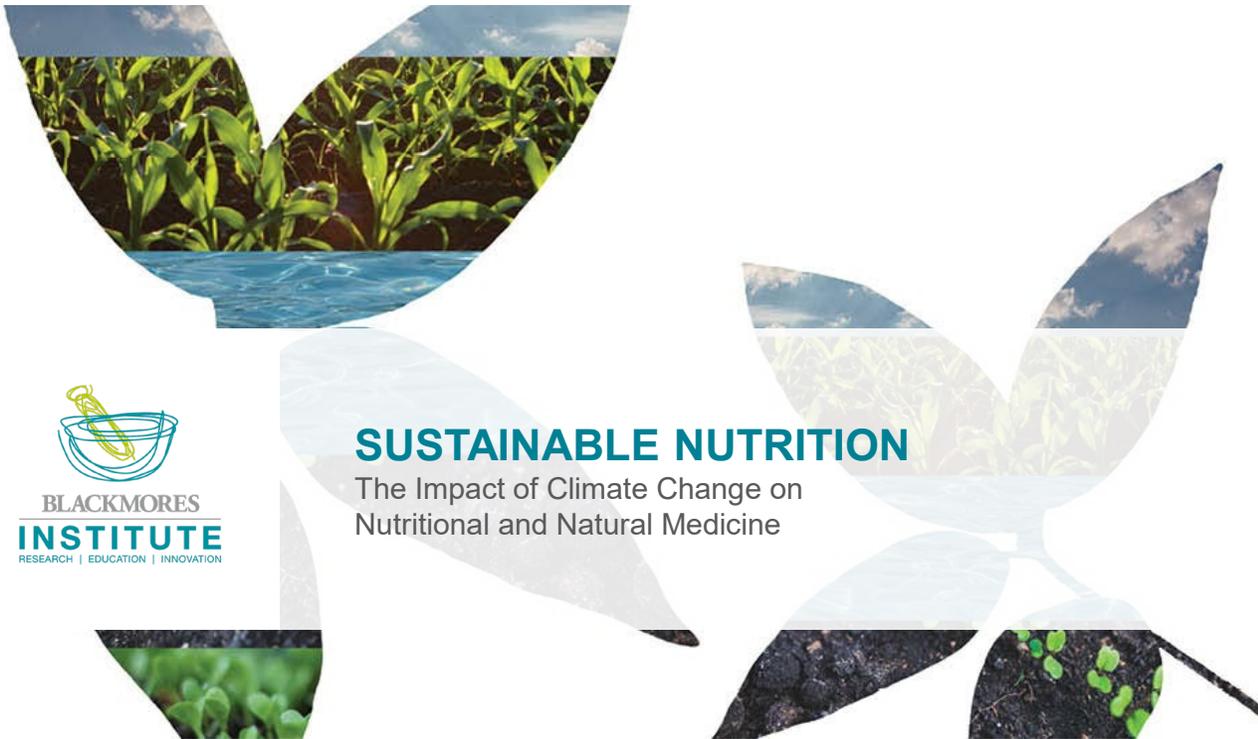


Biodiversity affects human nutrition

- Biodiversity ensures productivity of soils, crops, livestock, and marine species harvested for food.
- Less biodiversity (due to intensified food production, pesticide use and cropping patterns) can impact the micronutrient levels of food crops

What is the long-term impact on availability and sustainability of herbal medicines ?

Will fortified foods and nutritional supplementation become even more important ?



SUSTAINABLE NUTRITION

The Impact of Climate Change on
Nutritional and Natural Medicine

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Released June 2019

available on <https://www.blackmoresinstitute.org/sustainablenutrition>



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AI and healthcare – diagnostics



1. Faster, cheaper, better radiology :

Next generation MRI & CT scans.

Less data points needed & less workforce, pattern recognition to diagnose – greater accuracy, less exposure of patients to radiation

2. Instant blood and at-home rapid testing:

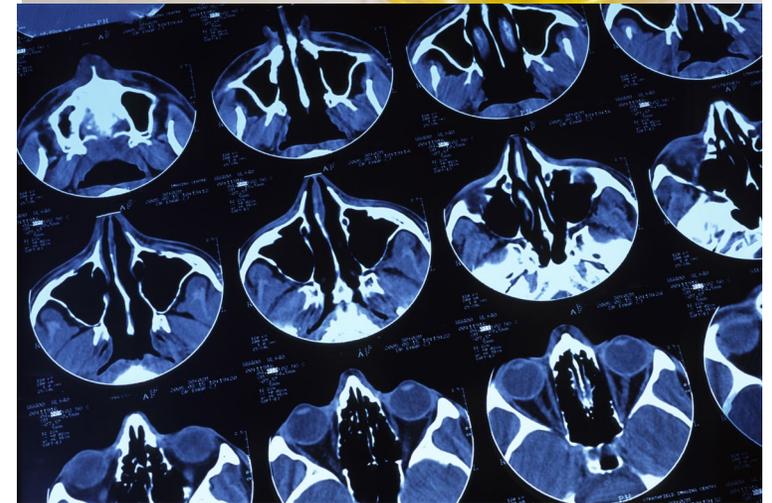
AI will edge out labs for certain tests & people will test more themselves

e.g. urine contains rich information – AI assists to diagnose various cancers, heart failure, need for colonoscopy ¹; Also being explored for Alzheimer's dementia risk prediction

3. Telepathology:

AI and digital slides to be the new norm for labs

Increased speed, precision and less specialty workforce required



¹Translational Andrology and Urology Vol 10, No 4 (April 2021)

AI and healthcare – discovery

4. Evidence creation from large data sets:

Undertaking more real-world ‘effectiveness’ studies using large health data sets from e health records and other sources. Most useful for :

- multi-intervention treatments and impact on patient health eg VDS + lifestyle changes
- healthcare delivery assessment eg naturopathy

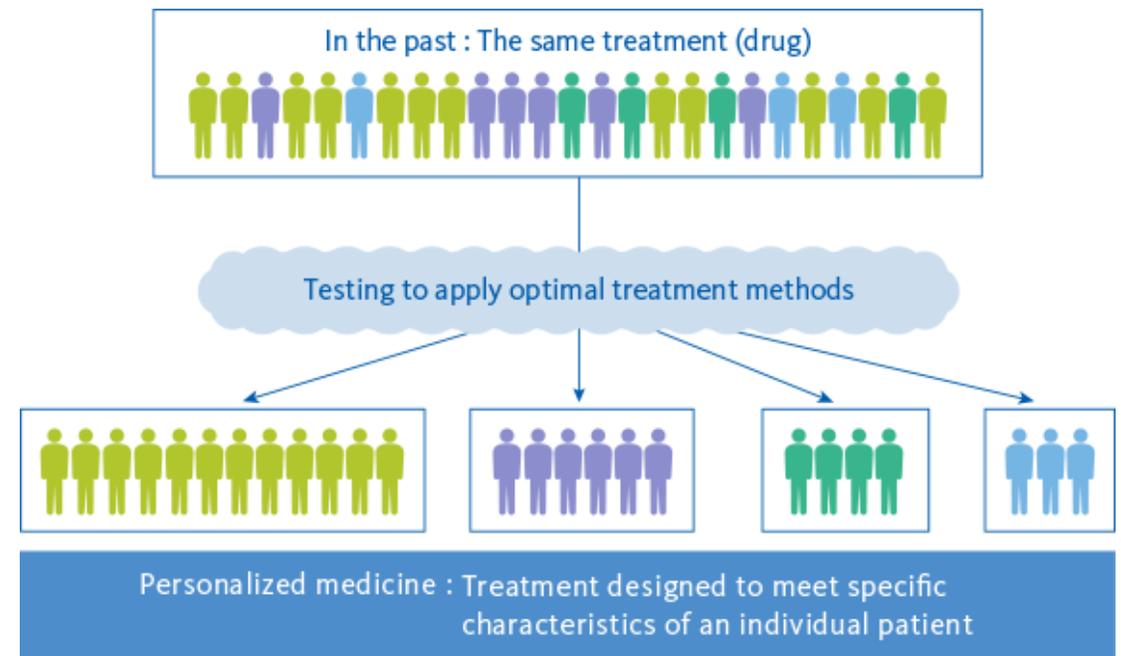
5. Therapeutics discovery :

AI reducing discovery times for new ingredients with therapeutic potential

Increasing success rates

6. Personalised medicine :

Identifying best treatments based on genetics, sensitivities, biomarkers, metabolism, lifestyle and environmental factors, microbiome ?



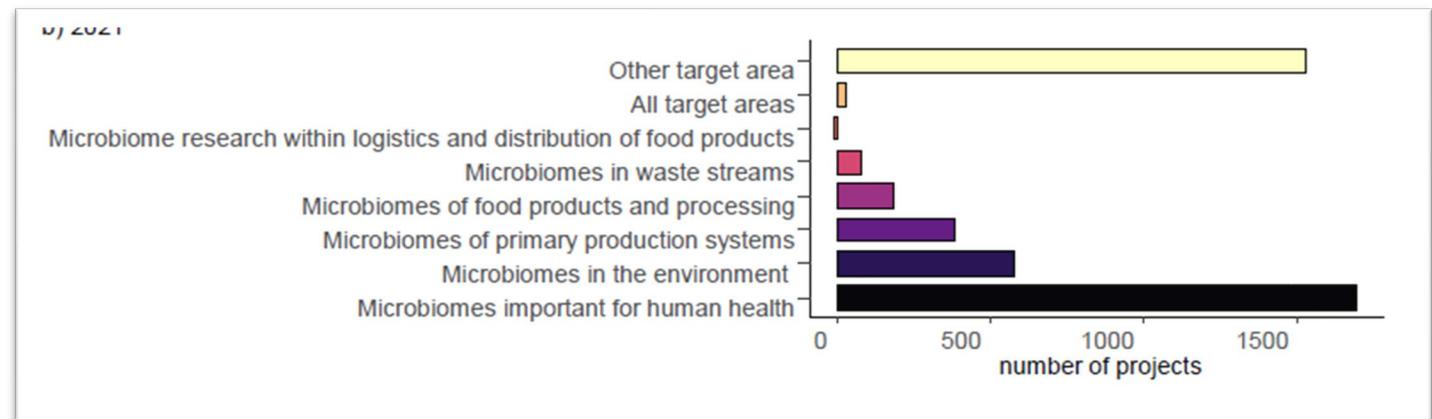
Microbiome research in healthcare

Computational Bioinformatics :

Mining vast biological datasets (eg public microbiome datasets) to:

1. identify new strains of relevance to human health and disease
2. What is the effect of changing microbiome
3. Influences on microbiome and health outcomes

In 2021, most research on human health, environment & agriculture





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6. Digital and data – diagnostics, evidence innovation, treatment delivery

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Availability of medical doctors & workforce issues

Region	Yr of latest stats	Number dr's per 1000 people
World	2017	1.8
Australia	2019	4.2
China	2017	2.0
Indonesia	2019	0.5
Malaysia	2018	1.5
NZ	2018	3.4
Singapore	2016	2.3
Thailand	2019	0.9
U.K.	2017	5.8

World-wide shortage of nurses

In Australia, less than 20% of medical students interested in general practice

Likely outcomes in Au :

Complex medical issues & minor surgeries will become the mainstay of medical practice

Other services will be shared/transition to other HCPs such as pharmacists, nurse practitioners, allied health, naturopaths and nutritionists ?

Greater reliance on 'self-care' in the community for preventative medicine and management

Greater reliance on digital diagnostics and healthcare delivery eg evidence based apps? Robotics ?

A greater role for pharmacy

Taking the burden off medical clinics and hospitals :

- Greater use of technology & technicians to dispense script medicines in pharmacy
- Vaccination programs expand beyond Fluvax, Covid
- Minor ailment diagnostics and treatment expands
- Triage system and referral to HCPs
- More involved in management of NCDs
- Prescribing rights for more drugs
- Screening and point-of-care testing – in addition to blood pressure, lipids etc
- Telehealth consults
- Offer more on-site HCP services
- Becomes a community wellness hub ?

**funding models & medical turf issues need to be addressed*



A greater role for allied health and naturopaths

- Telehealth has exploded here – practice from anywhere
- No need to ‘own’ dispensary – use 3rd party
- Use of 3rd party platforms linking consumers to accredited HCPs
- A greater role in preventative health
- More involved in management of NCDs
- Greater integration into the mainstream healthcare landscape
- Various funding models
- Role of health insurers ? Eg AIA Vitality program – expand to include naturopaths (not just dieticians?)



A greater role for self-care - individual empowerment

- WHO definition :

Self care is the ability of individual, families and communities to promote their own health, prevent disease, maintain health and cope with illness and disability with or without a HCP.

- Individual empowerment requires adequate health literacy, access to reliable & relevant information
- Also requires the individual to be actively involved in their own healthcare

OTC drugs and complementary medicines play a major role here

<https://www.selfcarefederation.org/sites/default/files/media/documents/2022-10/Self-Care-Readiness-Index-Report-2022-digital-18102022.pdf>



To recap Our 7 key areas

1. Ageing – Lifespan Vs Healthspan – Glucosamine, Vit D and Omega 3
2. Mental Health Vs Mental wellbeing – changing the discussion
3. Viral infections and long Covid – Nutritional support
4. Antimicrobial resistance – CM options for symptoms and immunity
5. Climate change and sustainability – effects on health and our raw materials eg omega 3 EFAs
6. Digital and data – diagnostics and discovery platforms
7. Changing models of care – expanding roles of pharmacy, naturopaths, allied health and self-care

