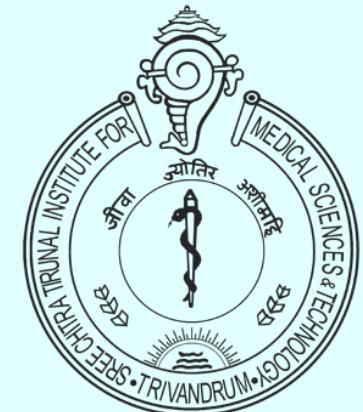


NCDs & Ayurveda: Generating Evidence for Public Health using the Data Science Approach

STP 608 | Institute of Management in Government, Thiruvananthapuram
19th April, 2022

Dr Arun Mitra
Research Scholar, AMCHSS,
Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivadrum



Contents



1. Epidemiological Transition
2. Newer Evidence on NCDs
3. Bridging the Evidence Gap: Need for Research
4. How to Generate Evidence: Data Science Approach
5. The Way Forward



About SCTIMST, Trivandrum

Institution of National Importance with the status of a University in 1980 under the Department of Science and Technology, Govt. of India by an Act of Parliament (Act 52 of 1980).

The institute has the status of a university and offers excellent research and training facilities.

It has three wings: One of the unique institutions in the country.



Super Speciality Hospital

Academic and research programs:

- MPH program
 - PhD program
 - Post Doctoral Fellowships
-



Achutha Menon Centre



Bio-Medical Technology Wing



AMCHSS, SCTIMST, Trivandrum

Regional Center for Health Technology Assessment (One of Six in India)

Established under the Department of Health Research (DHR), MoHFW, Govt of India.

Advanced Center for Clinical Trials

Established under the Indian Council for Medical Research (ICMR)

Research Collaborations

National Bodies, NGOs, International Universities, Health Agencies

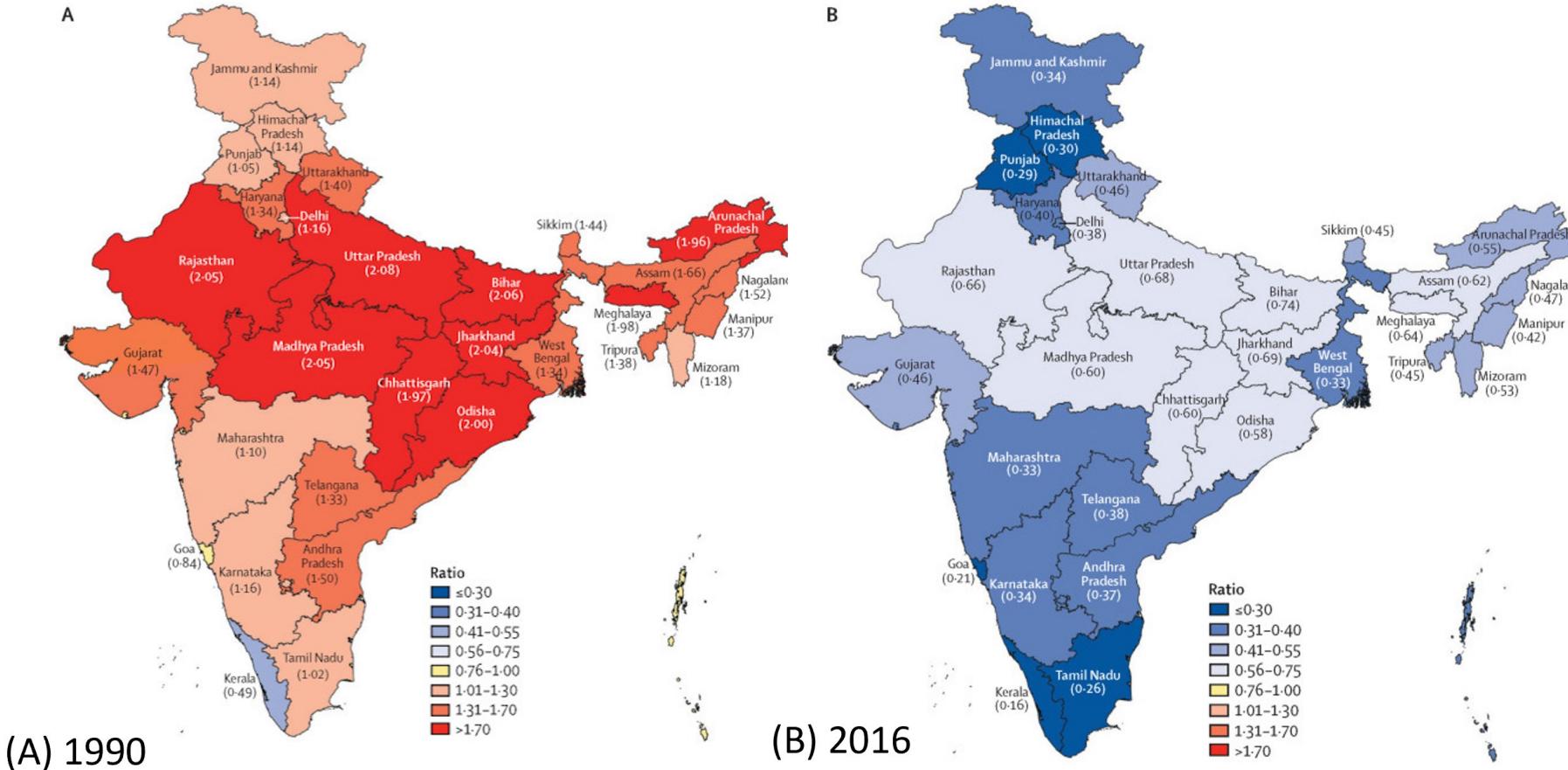
Activities on NCDs at AMCHSS



- NCD Risk factor Survey; 2016-20; funded by Govt. of Kerala
- NCD Risk Factor Survey under the Integrated Disease Surveillance Project (ICMR funded).
- Secondary prevention of stroke survivors in Kollam. 2021-2022; (GOK funded)
- Prevalence of NCD risk factors in the Kani Tribe in Trivandrum; funded by KSCSTE
- Understanding disease clustering (multi-morbidity) in the tribal population of Kerala and Tamil Nadu.
- Scaling up interventions to improve the control of hypertension and diabetes in partnership with the governments of Kerala and Tamil Nadu: Leveraging India's National NCD program. Funded by National Health and Medical Research Council, Australia
- Kerala Diabetes Prevention Project Extension study. Funded by National Health and Medical Research Council, Australia
- Systems thinking approach to developing an integrated and patient-centred intervention model for multi-morbidity care in primary care settings in India. Funded by MRC, UK
- Centre of Advanced Research Excellence in Heart Failure; funded by ICMR.

Epidemiological Transition

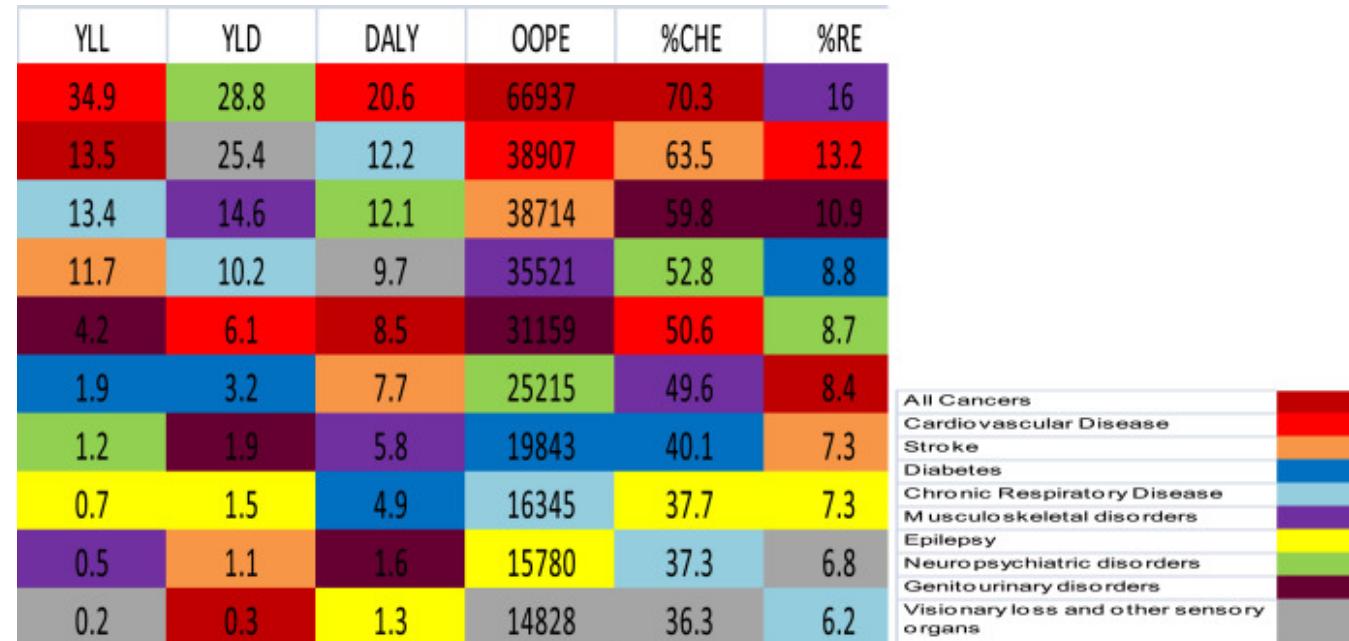
Ongoing Epidemiological Transition





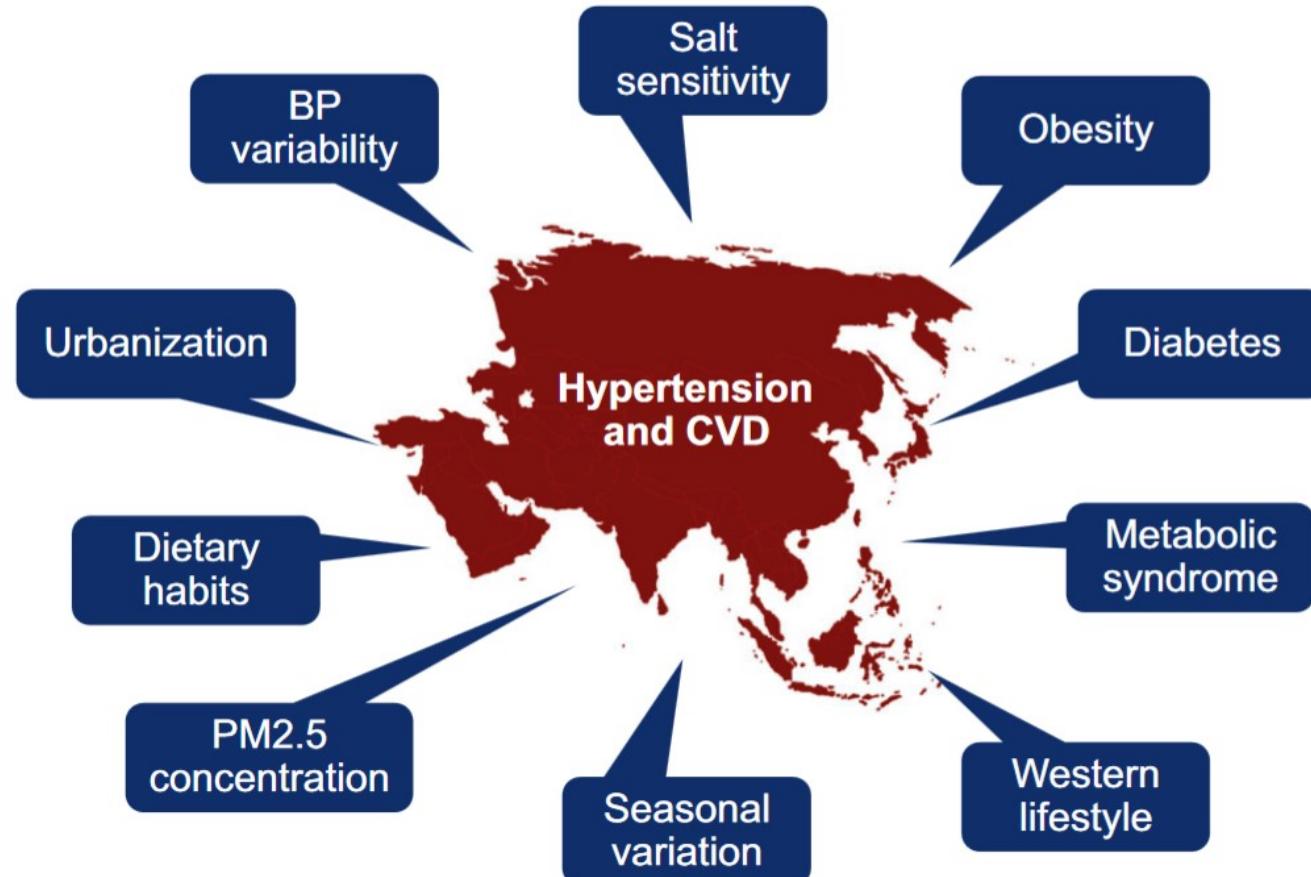
Burden of NCDs in India

- Approximately 4.7 million deaths.
- Comprised 49% of all-cause mortality.
- 16,939 DALYs per 1,00,000.
- 50–70% of patients treatment in private facilities.
- States with a higher disease burden like Kerala, utilize private health facilities more than the public health facilities.
- Hospitalization for NCDs pushed 47% of the households to catastrophic expenditure.
- Private health facilities pushed more households to CHE (66.3%) as compared to public health facilities (17.1%).

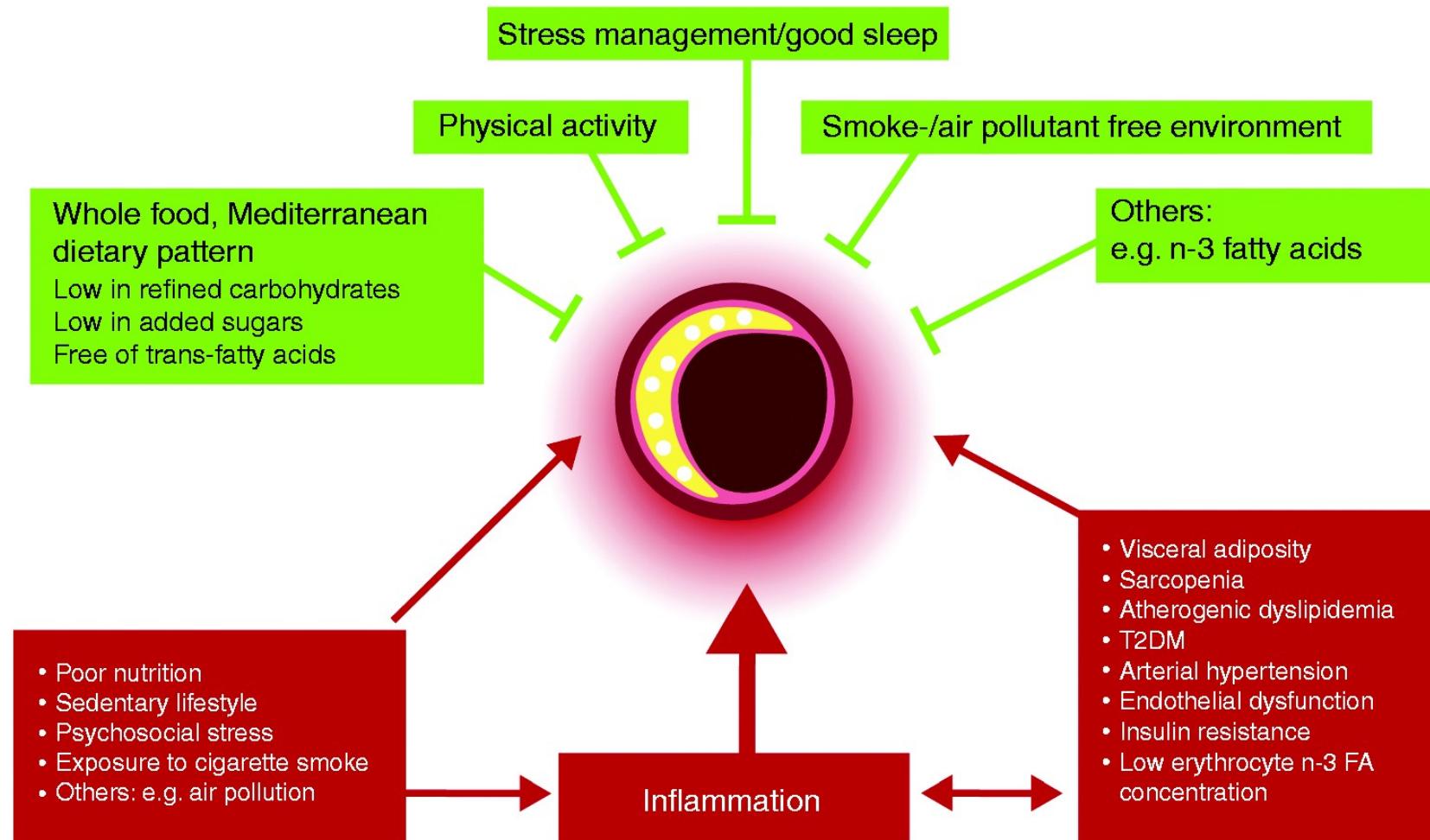


Menon GR, Yadav J, John D. Burden of non-communicable diseases and its associated economic costs in India. Social Sciences & Humanities Open. 2022 Jan 1;5(1):100256.

Factors contributing to hypertension and cardiovascular disease



Lifestyle Risk Factors of Atherosclerosis



Beyond Traditional Risk Factors

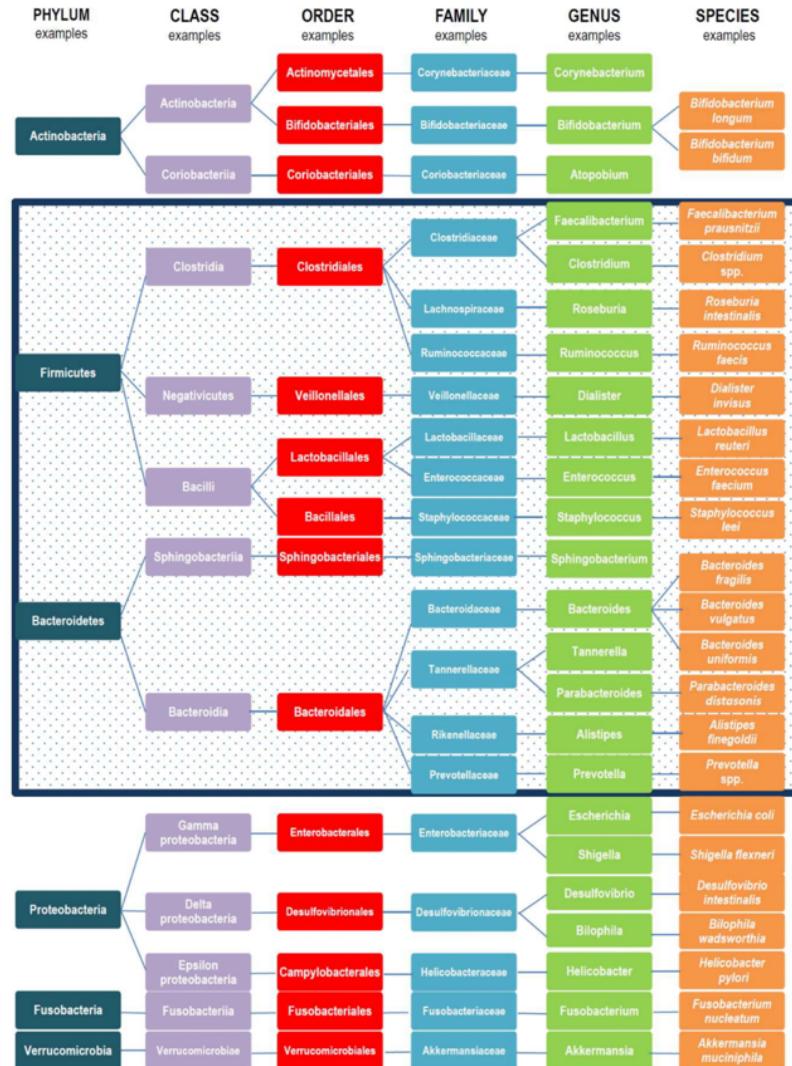
Chronic inflammation

Dysbiosis (gut microbiota), leaky gut

Lack of metabolic flexibility

Senescence & autophagy

Species Diversity



Profile of microbiota in Eubiosis

Newer Evidence on NCDs

*Editorial*

Nutrition, Microbiota and Noncommunicable Diseases

Julio Plaza-Diaz ^{1,2,3} 

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² Instituto de Investigación Biosanitaria IBS.GRANADA, Complejo Hospitalario Universitario de Granada, 18,014 Granada, Spain

³ Children's Hospital of Eastern Ontario Research Institute, Ottawa, ON K1H 8L1, Canada

Received: 21 June 2020; Accepted: 29 June 2020; Published: 2 July 2020



The advent of new sequencing technologies has inspired the foundation of novel research to ascertain the connections between the microbial communities that reside in our gut and some physiological and pathological conditions. The microbiota, defined as the full collection of microbes (bacteria, fungi, and viruses, among others) that naturally exist within a particular biological niche, is estimated to contain 500–1000 species [1–4].

Plaza-Diaz J. Nutrition, Microbiota and Noncommunicable Diseases. Nutrients. 2020 Jul;12(7):1971.

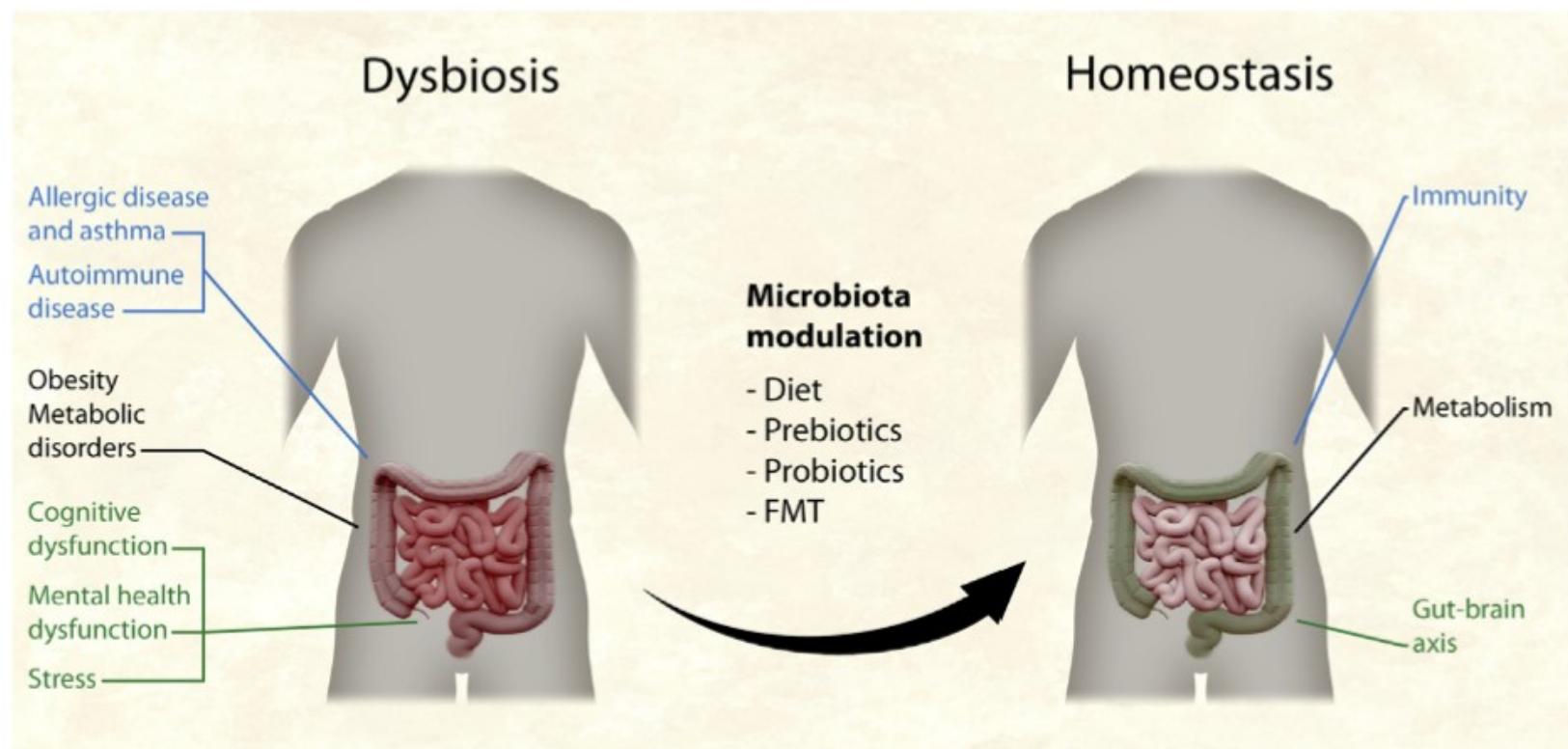


FIG 1. Dysbiosis, an “imbalance in the structure and/or function of the microbiota that leads to disruption of host-microorganism homeostasis,”⁶ has been implicated in a broad range of inflammatory disease states. There is also suggestive evidence that changes in gut microbiota have implications for cognitive and mental health dysfunction and stress responses. These diverse multisystem influences have sparked interest in strategies to favorably modulate the gut microbiota to attain homeostasis.

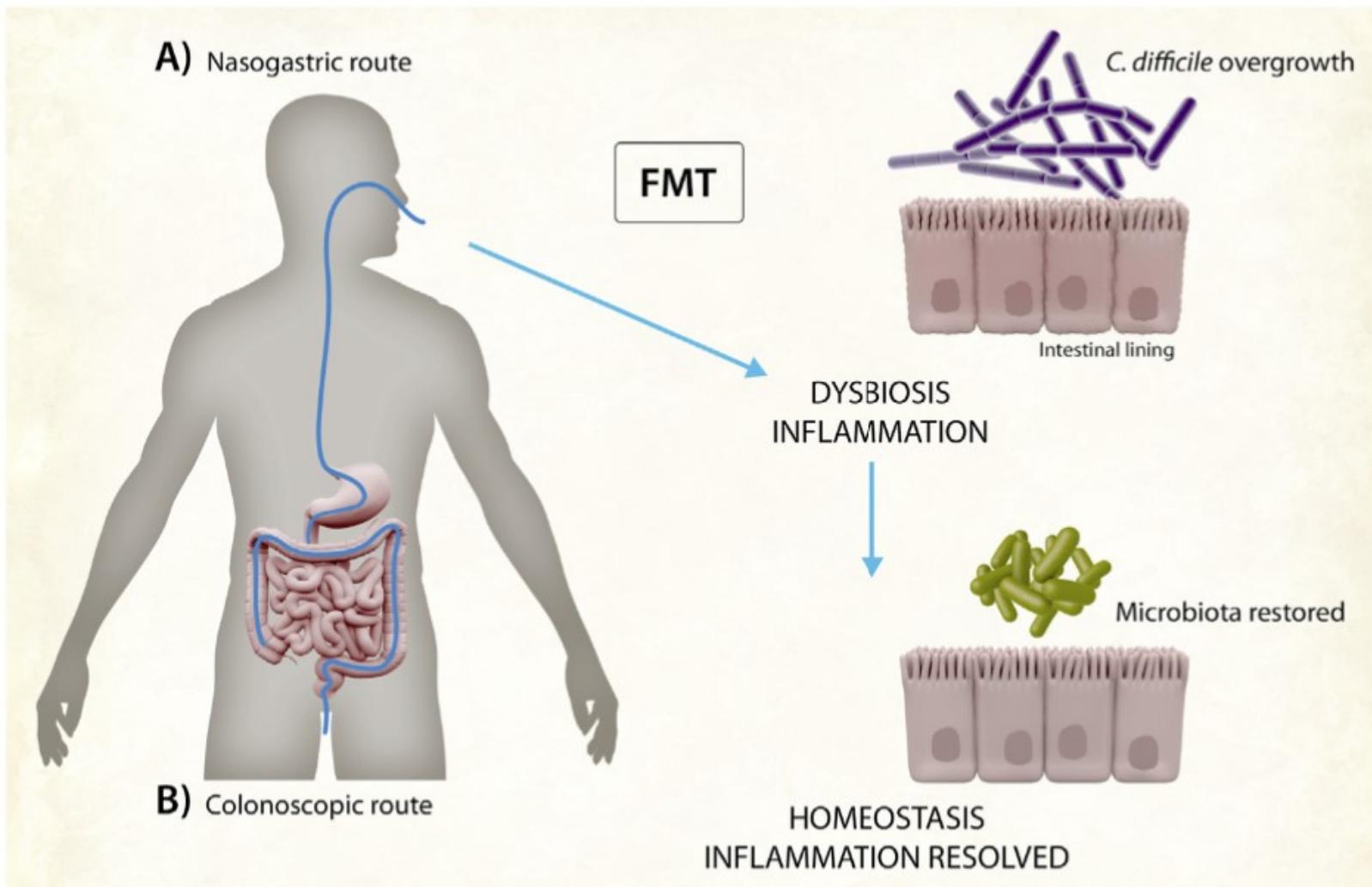


FIG 2. Overuse or repeated courses of broad-spectrum antibiotics disrupt the normal ecology, allowing colonization of *C difficile* and leading to dysbiosis. FMT with feces from a healthy donor administered through the nasogastric (**A**) or colonoscopic (**B**) routes restores microbial ecology and resolves inflammation.

Plaza-Diaz J. Nutrition, Microbiota and Noncommunicable Diseases. Nutrients. 2020 Jul;12(7):1971.

The gut microbiota and inflammatory noncommunicable diseases: Associations and potentials for gut microbiota therapies

Christina E. West, MD, PhD,^{a,b} Harald Renz, MD,^{a,c} Maria C. Jenmalm, PhD,^{a,d} Anita L. Kozyrskyj, PhD,^{a,e} Katrina J. Allen, MD, PhD,^{a,f} Peter Vuillermin, MD, PhD,^{a,g} and Susan L. Prescott, MD, PhD,^{a,h} on behalf of the in-FLAME Microbiome Interest Group: Charles MacKay, PhD,^{a,i} Seppo Salminen, PhD,^{a,j} Gary Wong, MD,^{a,k} John Sinn, MD,^{a,l} Jakob Stokholm, MD, PhD,^{a,m} Hans Bisgaard, MD, DMSci,^{a,m} Ruby Pawankar, MD, PhD,^{a,n} Paul Noakes, PhD,^{a,h} Dörthe Kesper, PhD,^{a,c} and Meri Tulic, PhD^{a,o} *Umeå and Linköping, Sweden, Marburg, Germany, Edmonton, Alberta, Canada, Melbourne, Geelong, Perth, Clayton, and Sydney, Australia, Turku, Finland, Hong Kong, China, Copenhagen, Denmark, Tokyo, Japan, and Nice, France*



Latest hypertension research to inform clinical practice in Asia

Kazuomi Kario¹ · Masaki Mogi² · Satoshi Hoshide¹

Received: 1 February 2022 / Accepted: 2 February 2022 / Published online: 5 April 2022
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Abstract

Despite the challenges associated with the coronavirus pandemic, the last 2 years have been active periods for hypertension research and initiatives in Asia. There are new hypertension guidelines from the World Health Organization that can be interpreted and applied locally. This is also the case for data from the latest Blood Pressure Lowering Treatment Trialists' Collaboration meta-analysis, which showed that greater reductions in systolic blood pressure (BP) are associated with lower risks of cardiovascular events. The randomized controlled Strategy of Blood Pressure Intervention in the Elderly Hypertensive study and the Salt Substitute and Stroke Study provide local data to inform practice. Other initiatives to help reduce high salt intake in Asia are also underway. Both drug-resistant and nocturnal hypertension are appropriate areas of focus in Asia, and there are an increasing number of pharmacological and non-pharmacological treatment options for these conditions. Digital therapeutics to promote uptake and implementation of lifestyle interventions are showing promise, and other digital-based strategies such as telemedicine, wearable BP monitors to detect beat-by-beat BP and artificial intelligence will no doubt become integral parts of future strategies to reduce the burden of hypertension and hypertension-related disease. A number of initiatives from the Hypertension Cardiovascular Outcome Prevention and Evidence in Asia Network and Japanese Society of hypertension are underway, and there is good reason for optimism regarding the ongoing and future management of hypertension in Asia based on these and the active research activities in the region.

Keywords Hypertension · Antihypertensives · Cardiovascular risk · Digital therapeutics · Artificial intelligence · Blood pressure monitoring

Plaza-Díaz J. Nutrition, Microbiota and Noncommunicable Diseases. Nutrients. 2020 Jul;12(7):1971.

Bridging the Evidence Gap: Need for Research



THE BATTLE OF OKINAWA BY THE NUMBERS

For today's Navy, the Battle of Okinawa is a stark reminder of the importance of integrated American naval power, the necessity of conducting effective joint operations, and the value of being able to learn in real time.

**THREE
MONTHS**

During the three-month battle of Okinawa, the U.S. Fifth Fleet was subjected to protracted combat with a battle-weakened enemy employing increasingly desperate tactics.

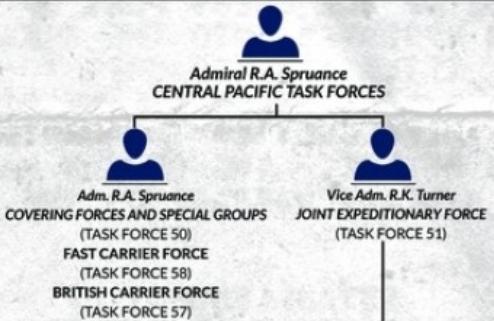
**FIFTH
FLEET**
**TENTH
ARMY**

The Fifth Fleet never wavered in its support of both the Tenth Army and the mission to seize Okinawa — earning it the post-battle accolade, "The Fleet That Came to Stay."



Organization of Central Pacific Task Forces for the Ryukyus Campaign, January 1945

While it was Adm. Raymond Spruance, Fifth Fleet, who commanded the overall effort, victory at Okinawa depended on effective cooperation between the Services and the Allied partners.



U.S. NAVY CASUALTIES & LOSSES (APPROX.)



U.S. Navy

WOUNDED
4,824



U.S. Navy

KILLED
4,907



U.S. Navy

SUNK
36



U.S. Navy

LOST
578



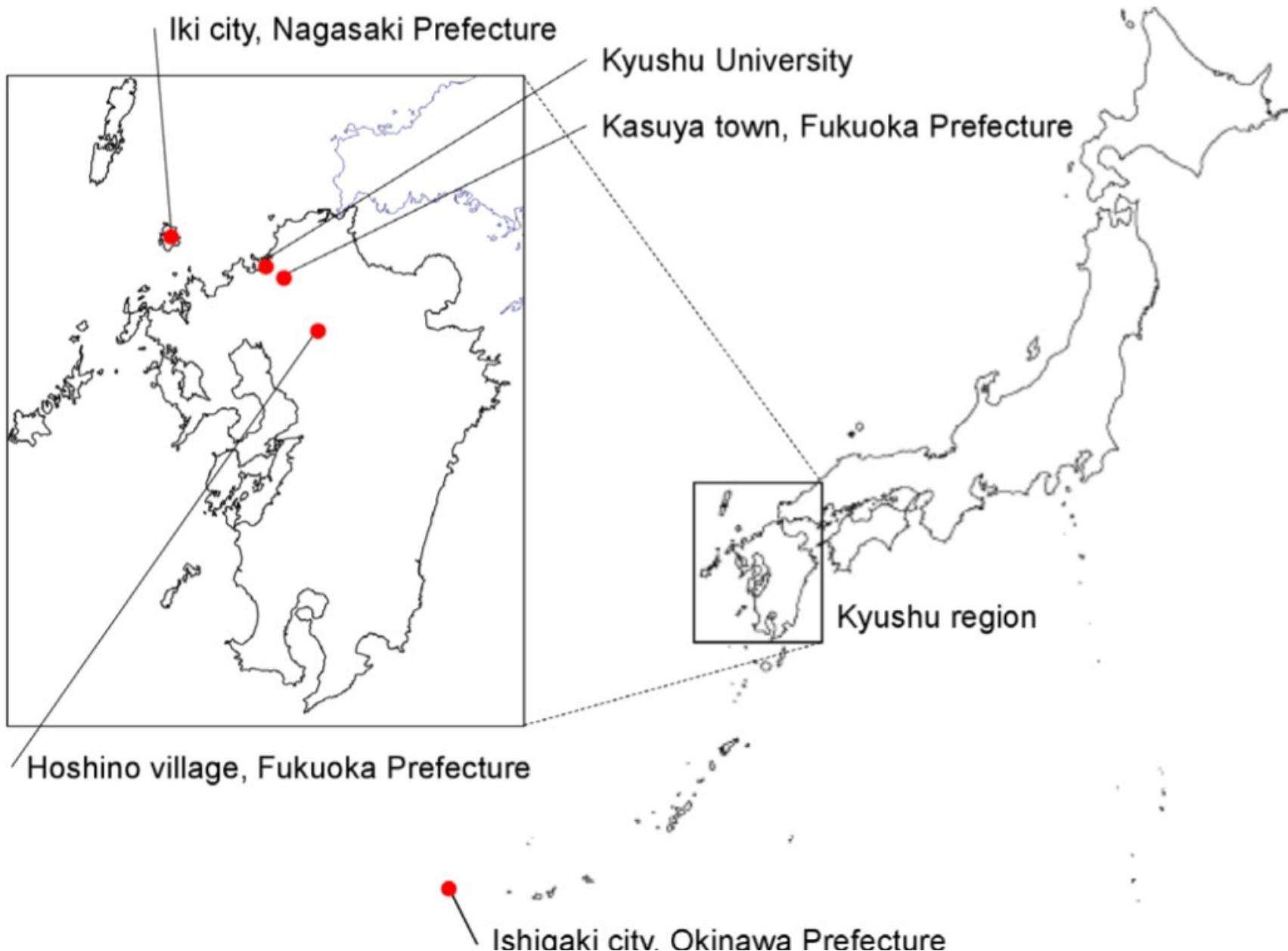
1:1

With a 1:1 ratio of those killed to those wounded, the Battle of Okinawa was the costliest naval battle of World War II.

KAMIKAZE STRIKES

Throughout the Battle of Okinawa, the Japanese Empire launched a relentless barrage of Kamikaze strikes against naval ships. The Kamikaze Special Attack Corps was an all-volunteer force created to deliberately crash bomb-laden aircrafts into the decks of Allied warships.





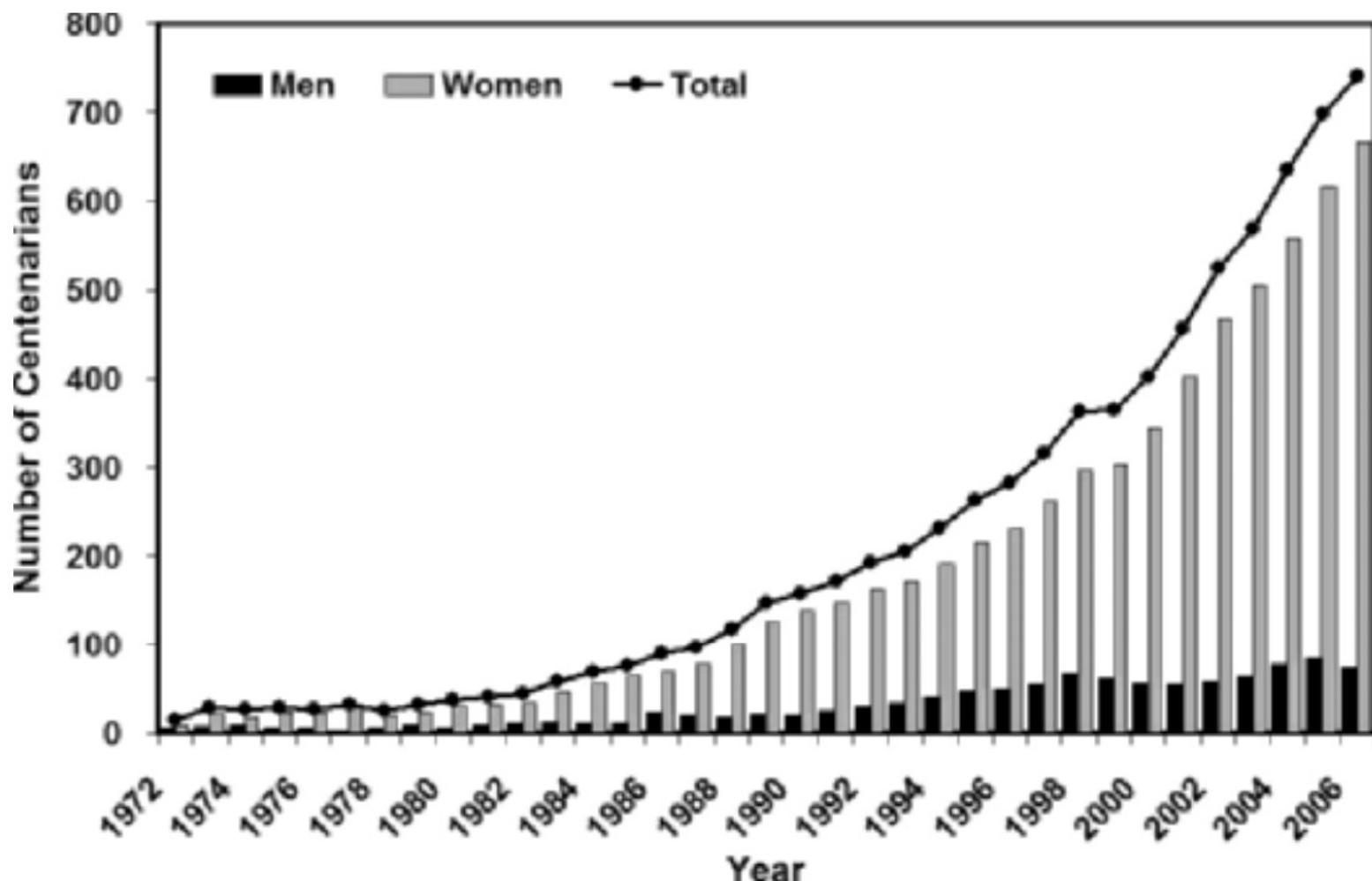


Figure 2. Number of centenarians in Okinawa from 1972–2006.

2015 Centenarian Prevalence (per 100,000 persons)

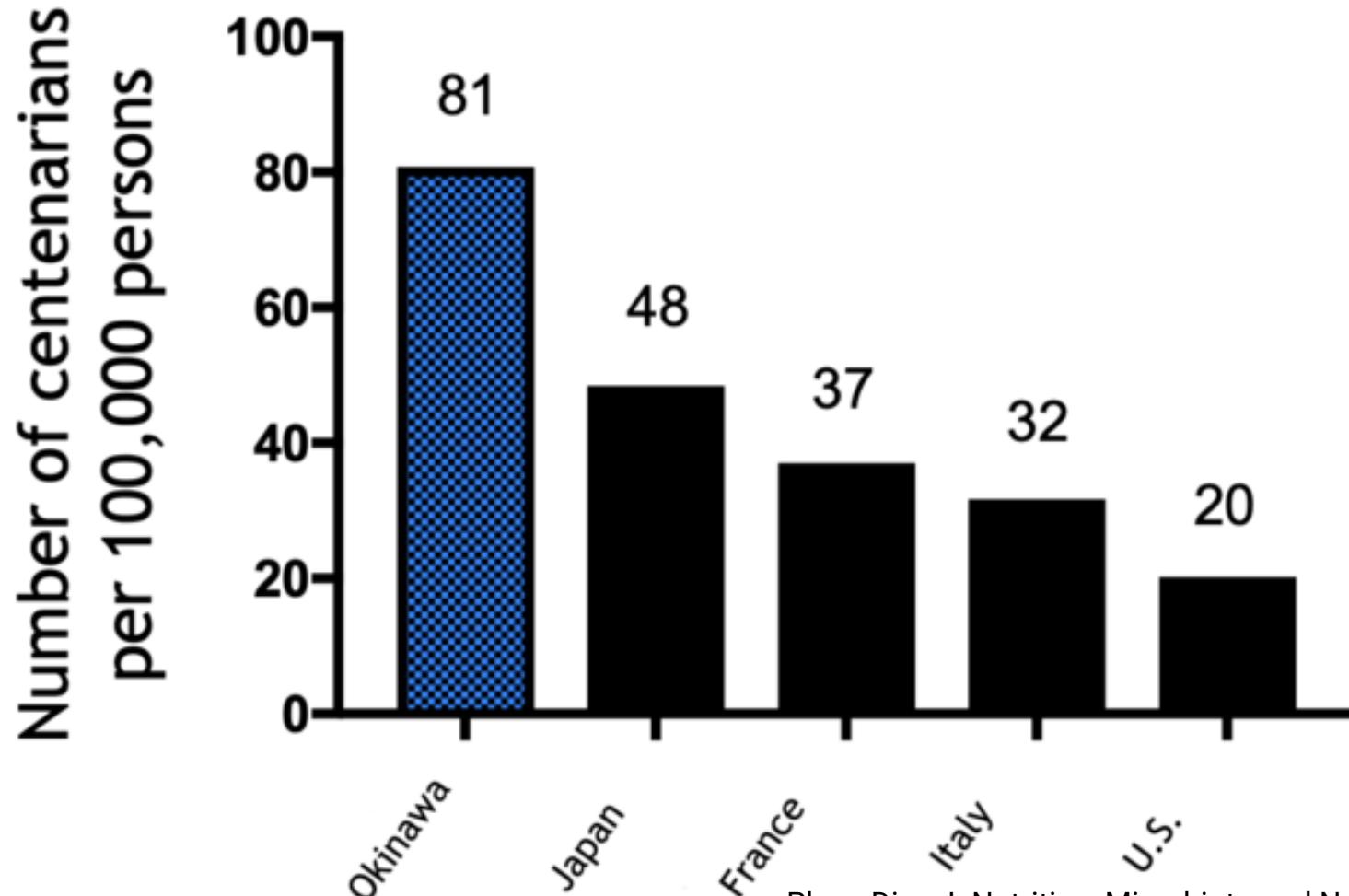


Table 5. Whipple's Index for Centenarians*

Region	Okinawa [†]	Sweden [‡]	Difference (%)
Men	0.903	0.880	2.5
Women	0.957	0.908	5.1
Both sexes	0.945	0.901	4.6

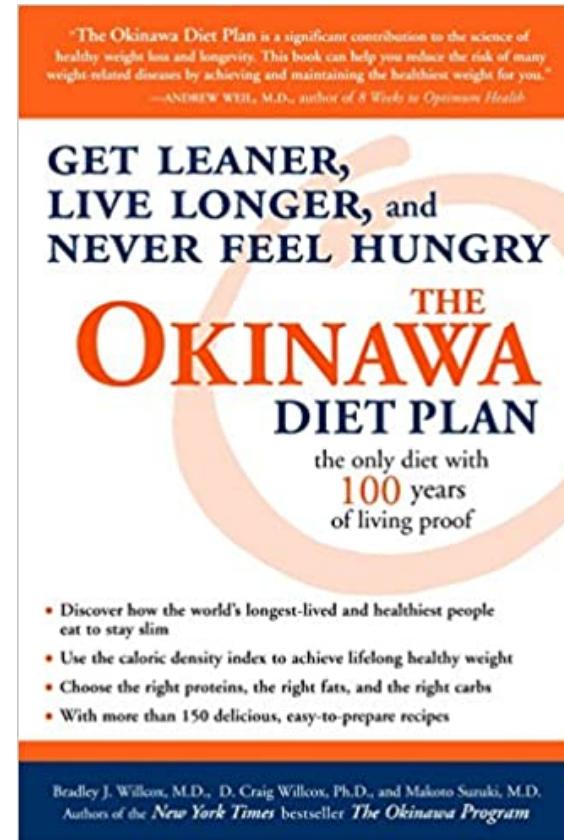
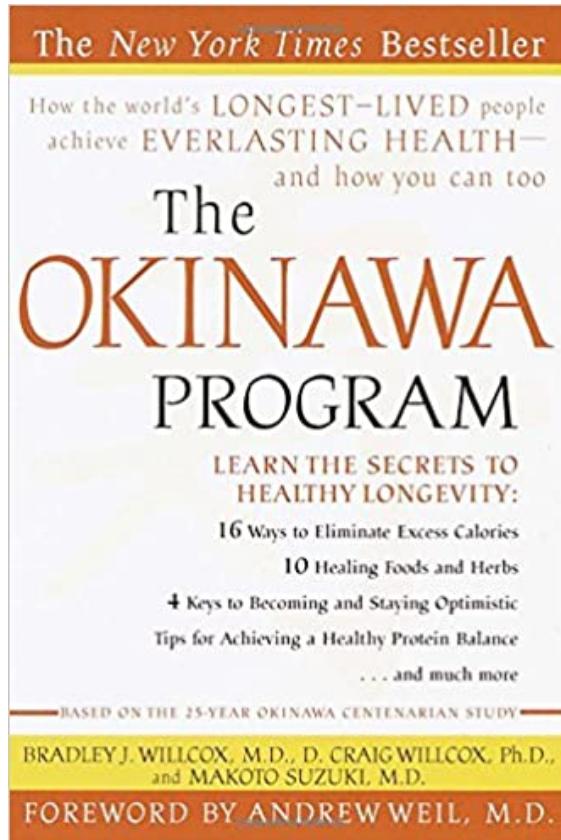
Notes: A relative deviation of <5% or 5%–9.99% indicates very accurate or relatively accurate data quality by United Nations standards (16).

*Whipple's index for centenarians = (sum of numbers of deaths at ages 95, 100, 105)/total number of deaths between ages 93 and 107 years.

[†]The index for Okinawa is based on year 2000 data from Japan Ministry of Health, Labour and Welfare (10).

[‡]The index for Sweden is based on data supplied by Wang and colleagues (16).

Lots of Books on the Okinawa Program



First autopsy study of an Okinawan centenarian: absence of many age-related diseases

Adam M Bernstein ¹, Bradley J Willcox, Hitoshi Tamaki, Nobuyoshi Kunishima, Makoto Suzuki, D Craig Willcox, Ji-Suk Kristen Yoo, Thomas T Perls

Affiliations + expand

PMID: 15602075 DOI: [10.1093/gerona/59.11.1195](https://doi.org/10.1093/gerona/59.11.1195)

ACTIONS

“ Cite

☆ Favorites

SHARE



Abstract

Consistent with the compression-of-morbidity hypothesis, several studies have reported that a significant proportion of centenarians delay or escape age-related diseases. Of those who live with such diseases for a long time, many appear to do so with better functional status than do younger persons who do not achieve extreme old age. The authors describe the first autopsy in an Okinawan-Japanese centenarian who escaped many age-related illnesses and delayed frailty toward the end of her very long life. Her late-life morbidity pattern is contrasted with that of white centenarians.

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Abstract

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Education

Want to live to be 100?

The islanders of Okinawa live longer than anyone else on the planet. And they stay fit, active and happy long into old age. Now a new book reveals their secrets. Emily Wilson reports

Emily Wilson

Thu 7 Jun 2001 16.24 BST



The cover line is guaranteed to strike fear into the heart of anyone with a God-given allergy to self-help, change-your-life health regimes. "How the world's longest-lived people achieve everlasting health, and you can too," it says. And there's more: "Features four-week turnaround plan." Now there's a lot you can do in four weeks, but I'm willing to bet, er, everything, that achieving everlasting health isn't one of them. So far, so alternative, new-age, step-plan-tastic.

Advertisement

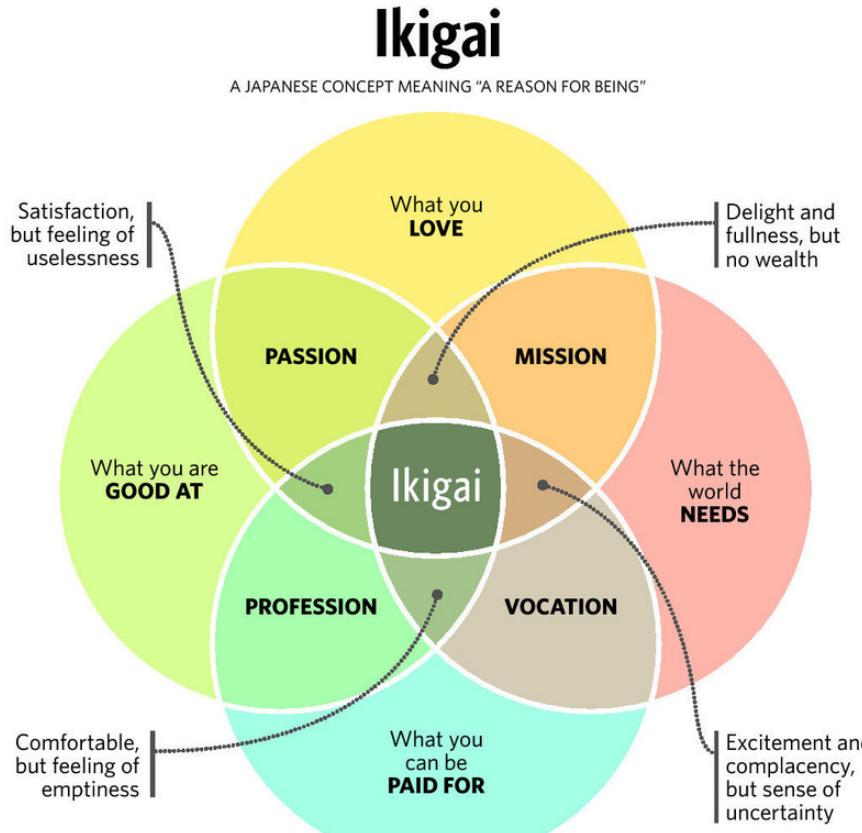
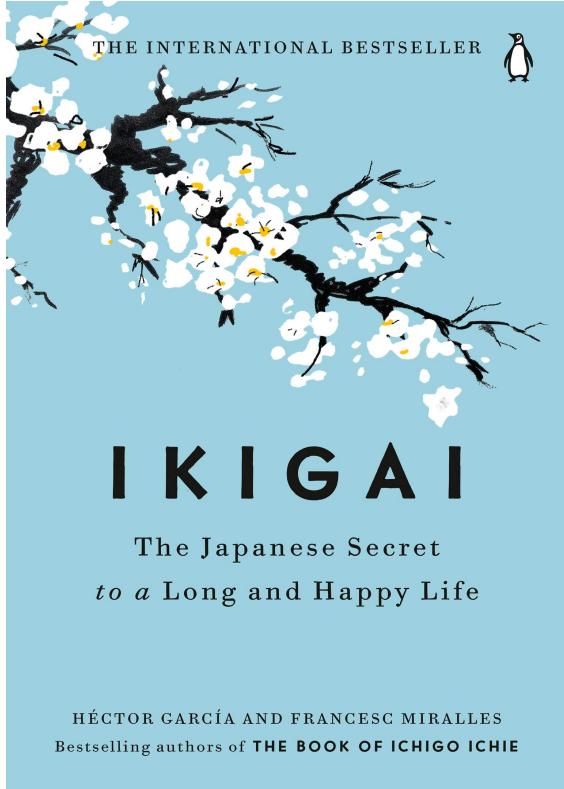
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off for a year



Secret #1: Ikigai



SOURCE: dreamstime

TORONTO STAR GRAPHIC

Secret #2: Hara Hachi Bu



Practice hara hachi bu.

Take a cue from the Okinawans and practice hara hachi bu. It's easy -- just stop eating when you're about 80% full. Notice how it makes you feel. I'll bet you'll enjoy being pleasantly satisfied but not STUFFED.



They Really Are That Old: A Validation Study of Centenarian Prevalence in Okinawa

D. Craig Willcox,^{1,2,4} Bradley J. Willcox,^{2,3,4} Qimei He,²
Nien-chiang Wang,⁵ and Makoto Suzuki^{4,6}

¹Okinawa International University, Japan.

²Pacific Health Research Institute, Honolulu, Hawaii.

³Departments of Geriatric Medicine and Medicine, John A. Burns School of Medicine, University of Hawaii, Honolulu.

⁴Okinawa Research Center for Longevity Science, Japan.

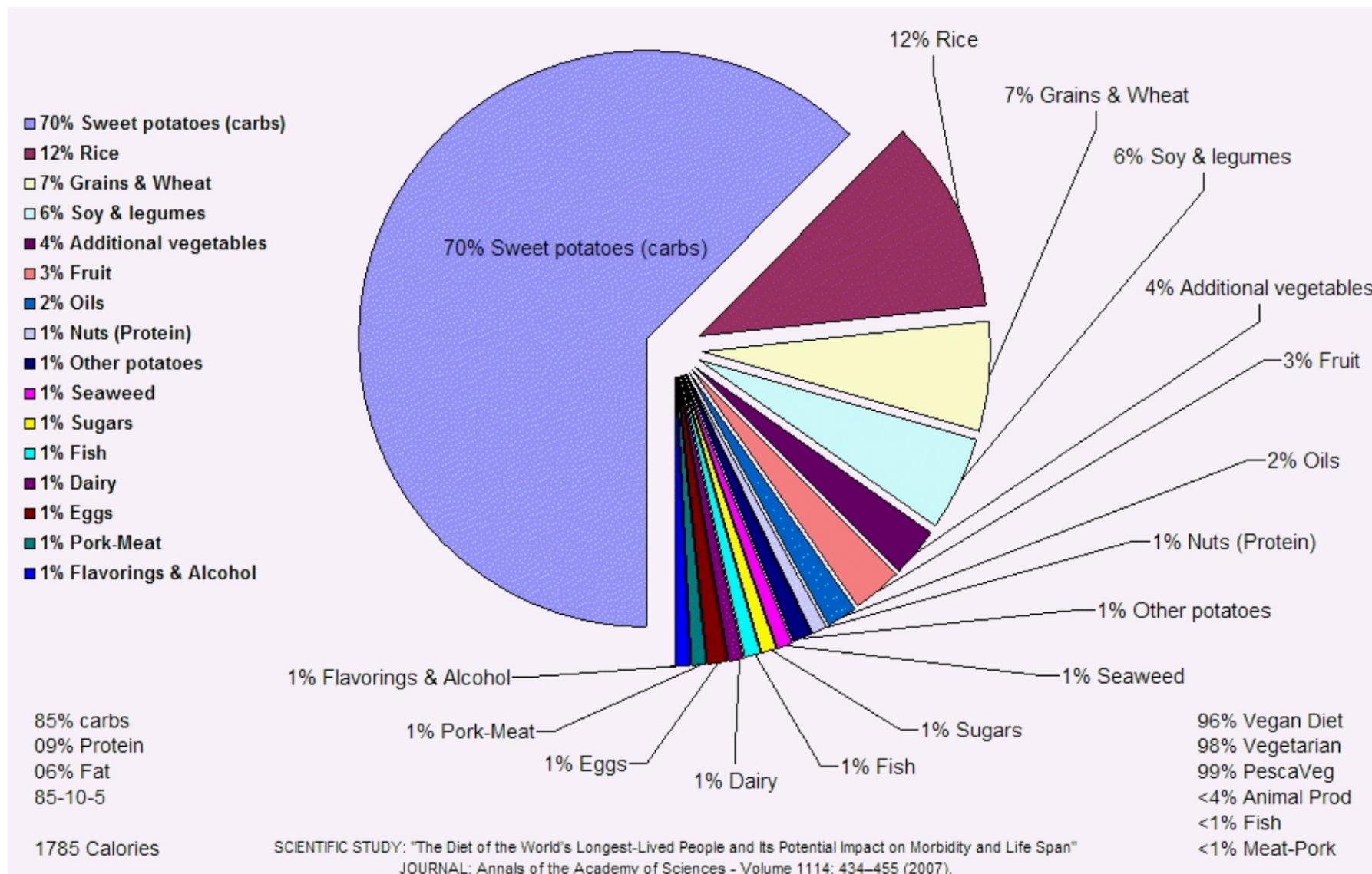
⁵National Taiwan University, Taiwan.

⁶Faculty of Medicine, University of the Ryukyus, Okinawa, Japan.

Long-lived individuals, such as centenarians, may harbor genetic or environmental advantages important for healthy aging. Populations with high prevalence of such individuals offer fertile ground for such research. However, precise phenotypes are required, particularly accurate age. Okinawa has among the world's highest reported prevalence of centenarians but, despite extensive study, no systematic validation of centenarian prevalence has been published. Therefore, we performed comprehensive age validation of a subset (8%) of the total centenarian population and assessed the reliability of the age registration system. Self-reported age was validated with several common methods and found to correlate well with documented age. Demographic methods, including assessment of age heaping, maximum age at death, centenarian proportions, and male to female ratios of centenarians indicate that the age registration system is reliable. We conclude that the high reported centenarian prevalence in Okinawa is valid and warrants further study for its genetic and environmental correlates.

Key Words: Longevity—Centenarian—Age Validation—Okinawa.

Plaza-Diaz J. Nutrition, Microbiota and Noncommunicable Diseases. Nutrients. 2020 Jul;12(7):1971.



BMJ Open Kyushu and Okinawa Population Study (KOPS): a large prospective cohort study in Japan

Hiroaki Ikezaki  ^{1,2} Norihiro Furusyo, ^{1,3} Ryoko Nakashima, ¹ Makiko Umemoto, ¹ Ken Yamamoto, ¹ Yuji Matsumoto, ^{1,4} Azusa Ohta, ^{1,4} Sho Yamasaki, ^{1,4} Satoshi Hiramine, ¹ Koji Takayama, ¹ Eiichi Ogawa, ^{1,4} Kazuhiro Toyoda, ¹ Masayuki Murata, ¹ Nobuyuki Shimono, ¹ Jun Hayashi^{1,5}

To cite: Ikezaki H, Furusyo N, Nakashima R, et al. Kyushu and Okinawa Population Study (KOPS): a large prospective cohort study in Japan. *BMJ Open* 2021;11:e053763. doi:10.1136/bmjopen-2021-053763

ABSTRACT

Purpose The Kyushu and Okinawa Population Study (KOPS) was established to investigate gene–environmental interactions in non-communicable diseases in Japan. Besides collecting blood samples and anthropometric measurements, we also obtained medical histories, psychological status and lifestyle habits, including physical activities and dietary patterns.

Participants KOPS is a community-based prospective cohort

Strengths and limitations of this study

- ▶ The Kyushu and Okinawa Population Study is a large-scale, population-based prospective cohort and aims to investigate the gene–environmental interactions on non-communicable diseases in Japan.
- ▶ We collected the extensive data on medical histories, lifestyle habits, psychological factors and genomic

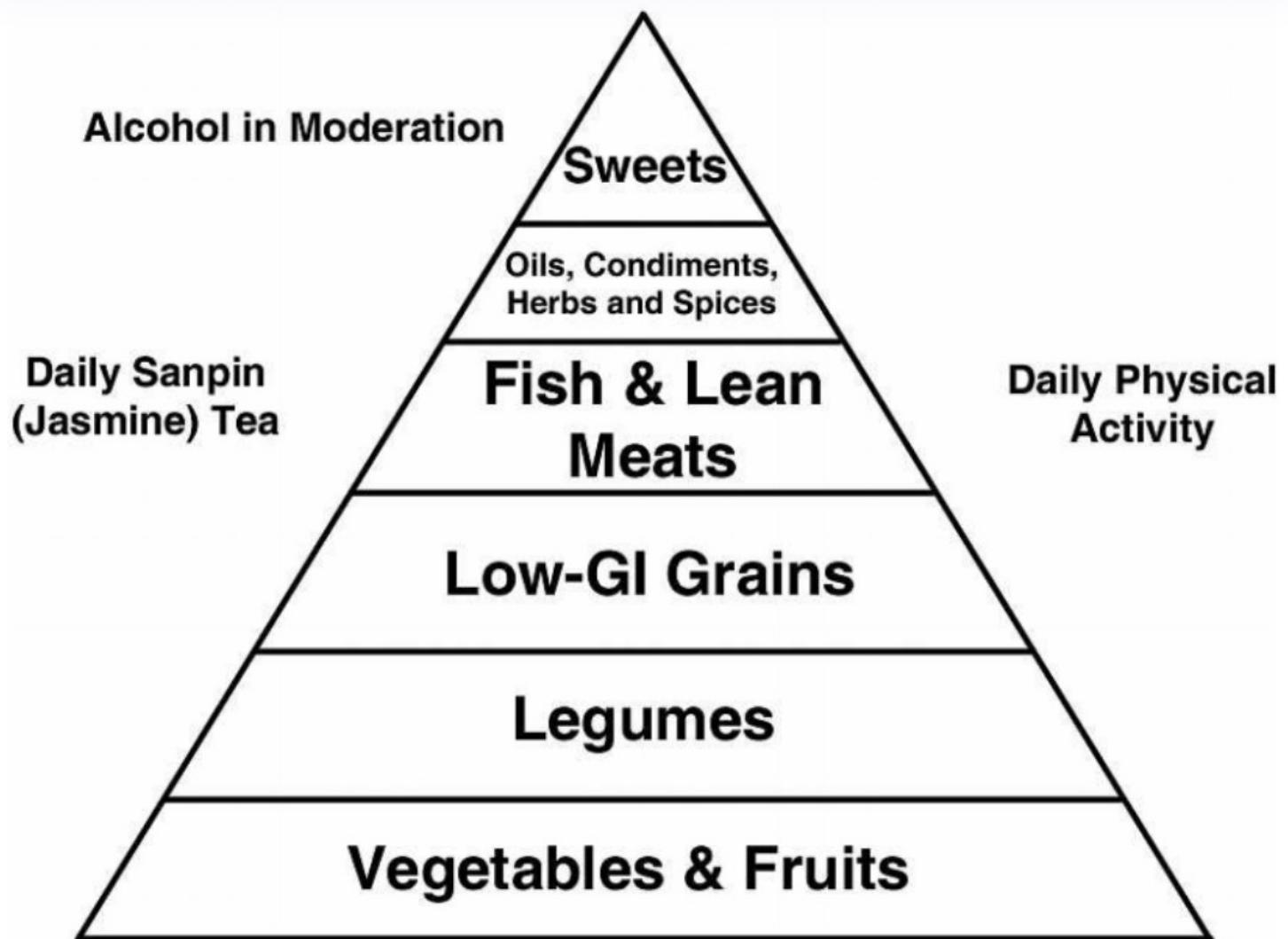


Fig. 2. Traditional Okinawan diet food pyramid.

Plaza-Diaz J. Nutrition, Microbiota and Noncommunicable Diseases. Nutrients. 2020 Jul;12(7):1971.

Aims to investigate the gene–environmental interactions on NCDs in Japan

Collected the extensive data on medical histories, lifestyle habits, psychological factors and genomic information.

Table 1 Details of the self-administered questionnaire for KOPS

Measurement	Measurement lists
Basic information	
Demographics	Sex, age at baseline, height, weight and weight at the age of 20 years
Lifestyle characteristics	
Alcohol consumption	Alcohol drinking status, age at the start of habitual drinking, type and amount of alcohol and drinking frequency
Smoking	Smoking status, age at the start of habitual smoking and number of cigarettes smoked per day
Sleeping	Hours of sleep and subjective assessment of sleep
Physical activities	Frequency and hours of physical activities in leisure time (light, moderate and hard), commuting, work and household chores
Dietary information	Food Frequency Questionnaire
Clinical characteristics	
Medical history	Personal and family disease history and information on drugs
Psychological stress	Self-reported stress and stress management
Female reproductive history	Menstruation status, age at the start of menstruation, and information on pregnancy and childbirth

Table 5 Biological tests in KOPS

Biological samples	Specific biological tests
Whole blood	White blood cell, red blood cell, haemoglobin, haematocrit, platelet count, fasting blood glucose, glycated haemoglobin
Serum	Serum creatinine, uric acid, aspartate aminotransferase, alanine aminotransferase, gamma-glutamyl transferase, glycated albumin, fasting serum insulin, total cholesterol, high-density lipoprotein cholesterol, triglycerides, low-density lipoprotein cholesterol, high-sensitivity C reactive protein
Urine	Urine protein, glucose, occult blood

Secret #3: Moai

Mo•ai (/mo,eye/) Japan

noun

1. A group of lifelong friends
2. A social support group that forms in order to provide varying support from social, financial, health, or spiritual interests

Experience Less Stress

Be Happier

Be Happier



Ayurveda for the Management of Non Communicable Diseases

"One who carefully observes the rules regarding diet and behavioural practices, consumes healthy and wholesome food, observes beneficial practices, carries himself thoughtfully in daily activities, does not succumb to passion and greed, who cherishes a selfless noble generous nature, has equal respect for every living being in all conditions, speaks and relies on the truth, maintains a forgiving attitude and reposes faith in knowledgeable, experienced and elderly persons is successful in maintaining healthy living and a healthy body and in leading a disease-free, peaceful, healthy and happy life"

-- Vaghata from Ashtanga Hridaya

The efficiencies of such practices in providing long lasting effect on such NCDs need to be compared, documented and published in standard journals, rather than obscure journals that will facilitate in involving traditional practices in the management of NCDs.

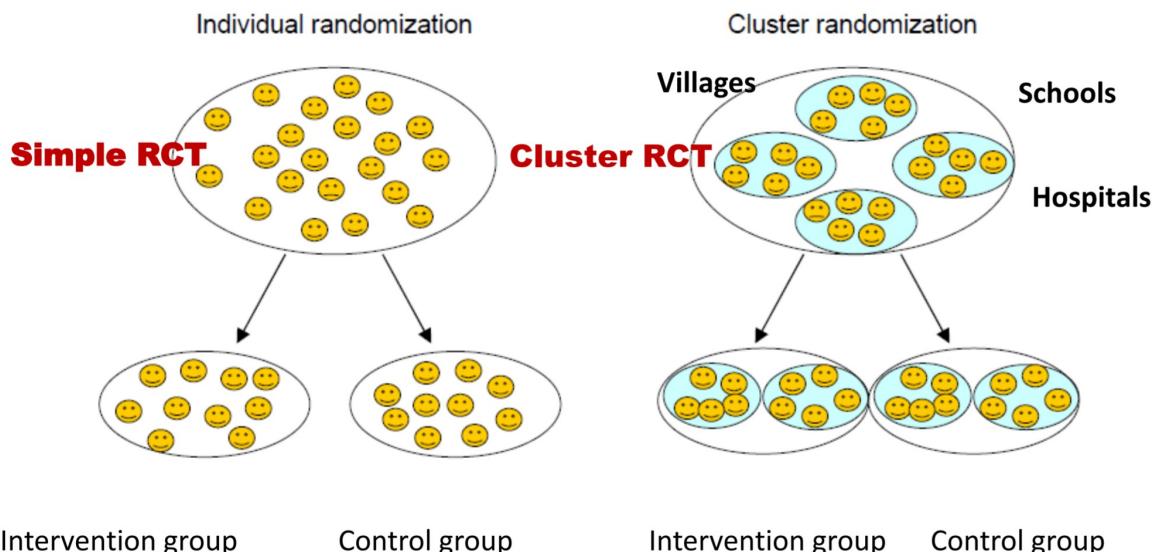
Various Ayurvedic modalities for NCD Management

- Dincharya
- Changes to Aahar & Vihar
- Rituanusar Shodhanakarma
- Triyaupasthambha
- Rasayana
- Aacharrasayana
- Sadvrta
- Vajikarana

How to Generate Evidence: Data Science Approach

Need for Innovation in Research

- Needs to evolve.
- Cluster Randomized Trials vs Randomized Clinical Trials
- Larger study populations and numerous variables
- Need to establish Salience and Individualized care
- Using EHR



Framework for Research

Leveraging EHR for Generating Evidence



Centralized Hospital Management System

Centralised Electronic Medical Records

Centralized Public Health Management System

Comprehensive Healthcare Web Portal

Administrative Modules

Government Commitment: Health ID

The screenshot shows the homepage of the Ayushman Bharat Digital Mission Health ID website at <https://healthid.ndhm.gov.in>. The page features the National Health Authority logo and navigation links for Home, Login, Generate ID, Facility, Contact, and FAQ. A prominent graphic on the right illustrates a digital health ecosystem with a computer monitor displaying a patient profile, surrounded by icons for heart rate, medical data, and a doctor.

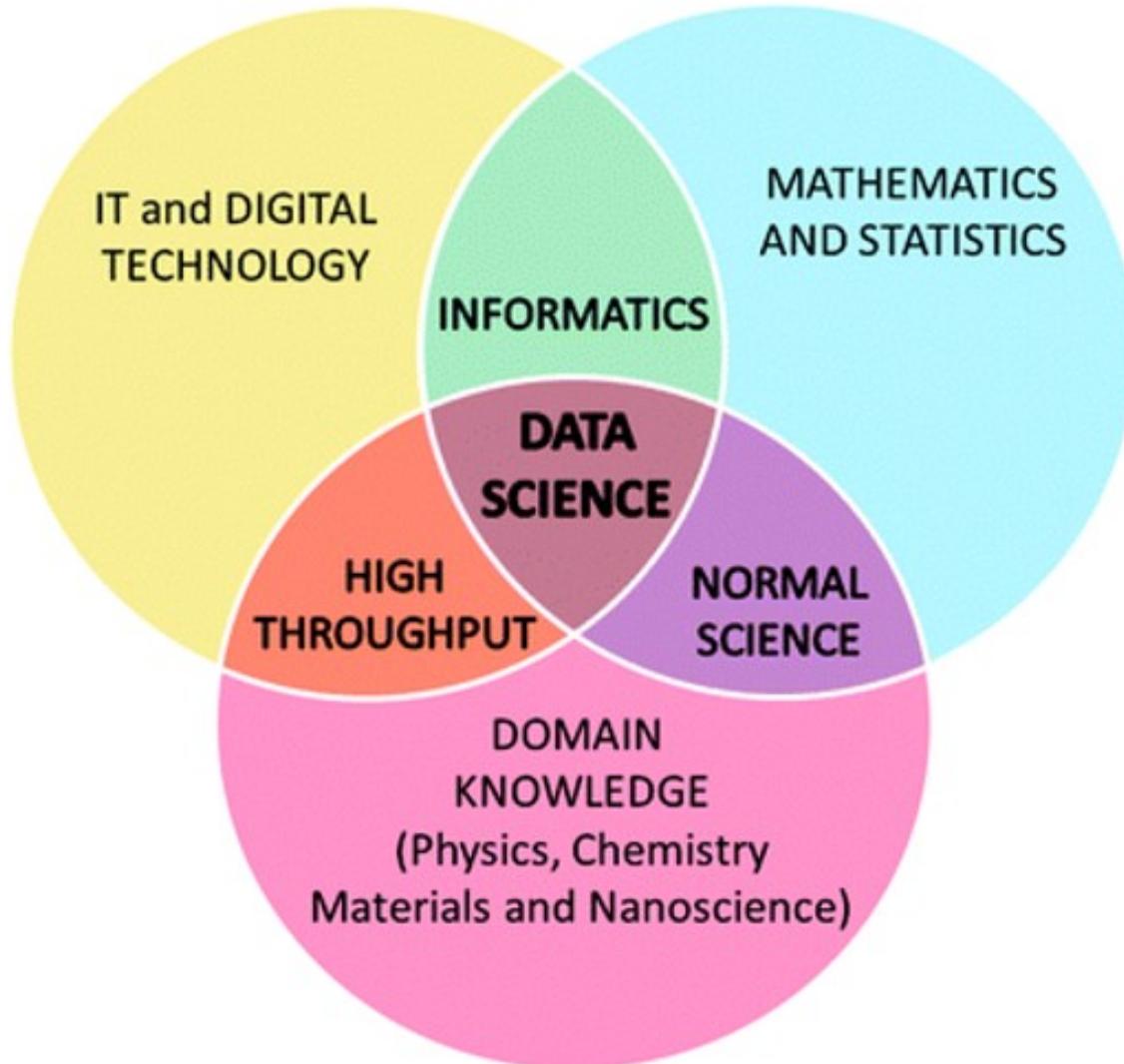
Ayushman Bharat Digital Mission

Creating India's Digital Health Ecosystem

Health ID - Key to your digital healthcare journey

Need for meticulous documentation

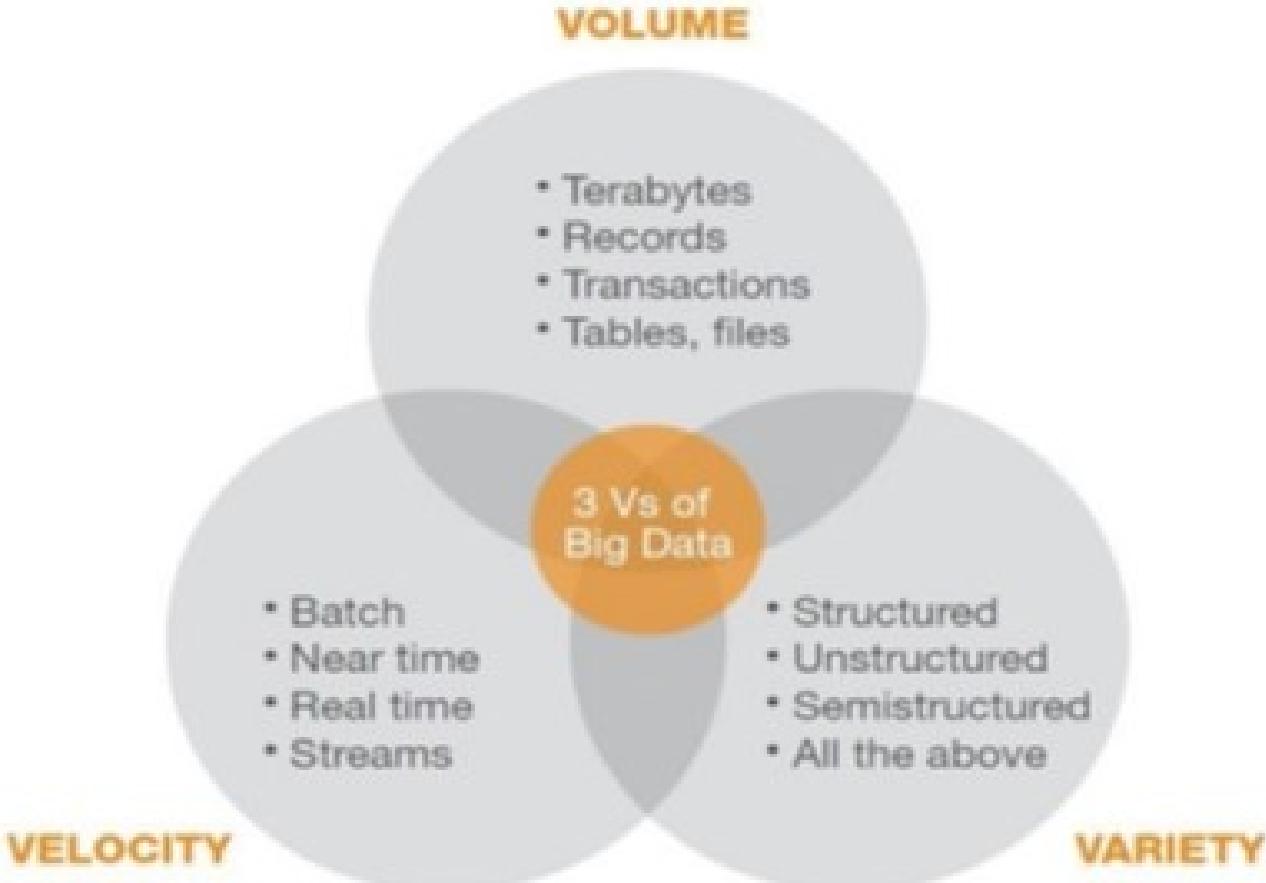
- Homeopathic research need to be more rigorous
- Huge data with high throughput rates need to be harnessed
- Difficulties in comprehension and analysis
- Traditional ways have limits
- Data science is the way forward



Big Data and Ayurveda

What is Big Data?

- Volume
- Velocity
- Variety
- “Some” vs. “All”
- “Clean” vs. “Messy”
- “Causation” vs. “Correlation”
- Concerns of statistical significance



Data Science approach for generating evidence



Big Data Research in Ayurveda

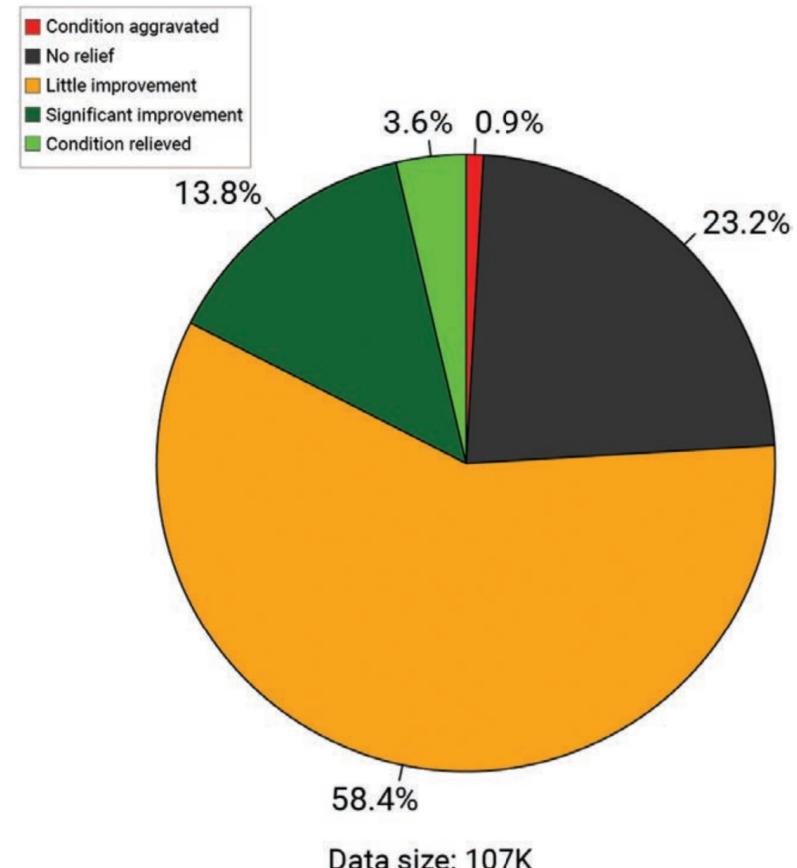
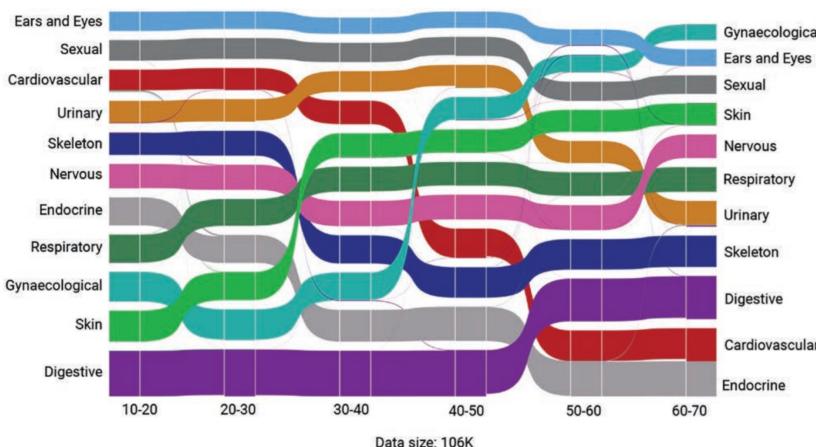
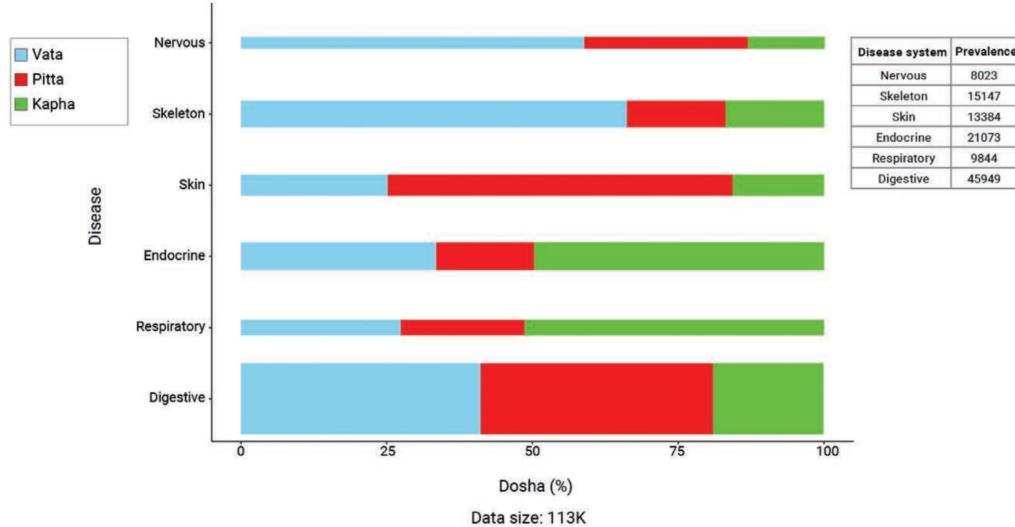
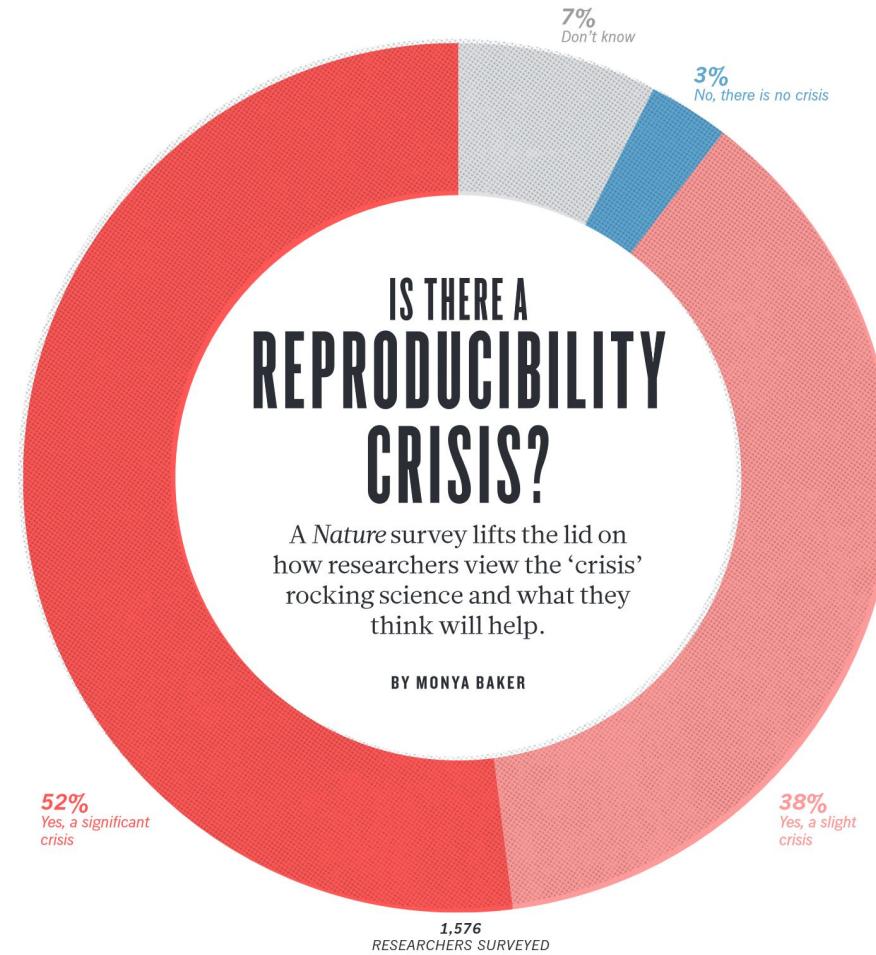


Fig 12. Distribution of follow-up relief—Overall. Pie chart represents the population with their percentage of outcome relief marked in terms of little improvement, significant improvement, condition relieved and no relief. In total, 0.9% has aggravated or have side effect, more than 75% have got relief.

Reproducible Research

Research is considered to be reproducible when the exact results can be reproduced if given access to the original data, software, or code.

- The same results should be obtained under the same conditions
- It should be possible to recreate the same conditions



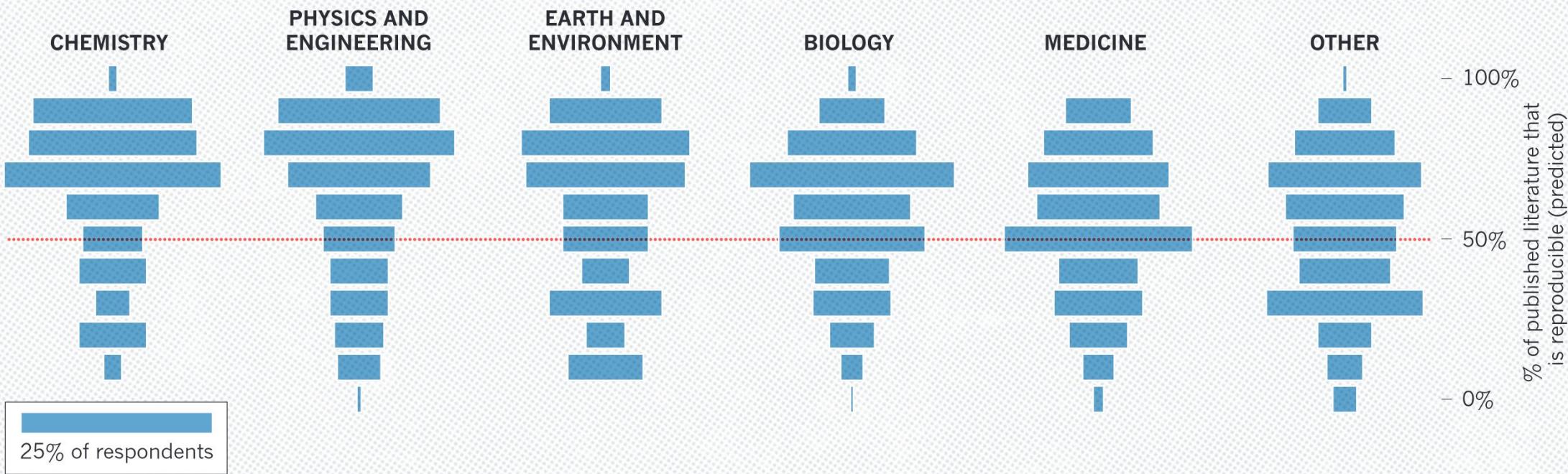
Reproducibility Crisis

A 'CRISIS' IN NUMBERS

Nature surveyed 1,576 scientists online to get their thoughts on reproducibility in their field and in science in general. See go.nature.com/2vjr4y for more charts and access to the full data.

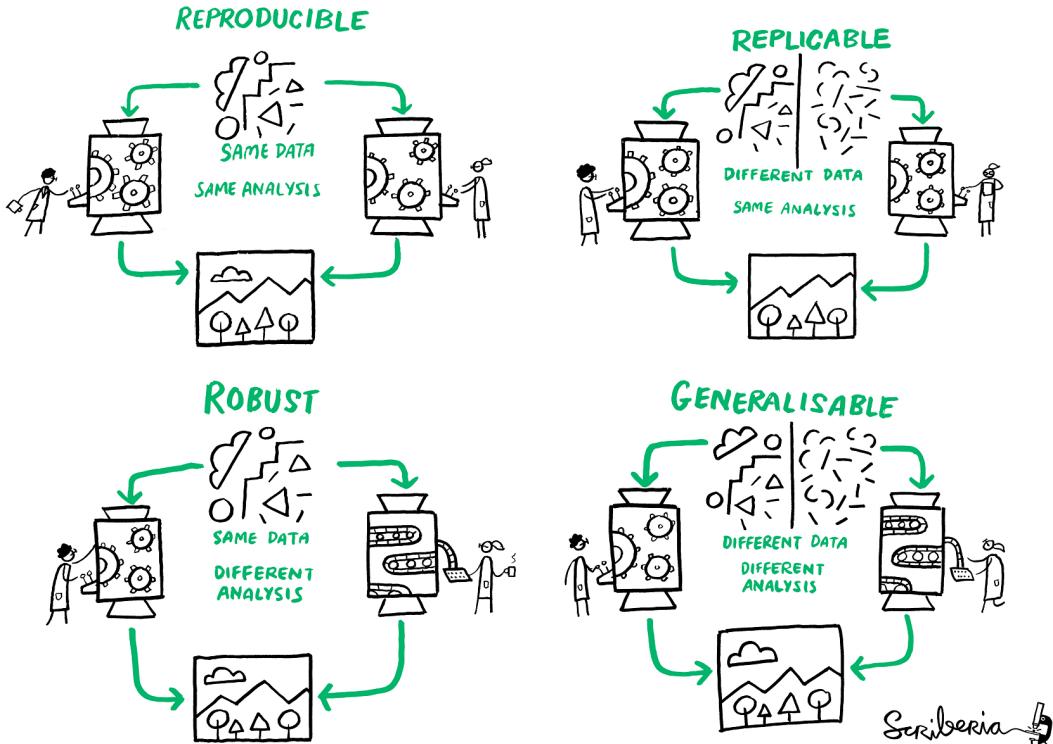
HOW MUCH PUBLISHED WORK IN YOUR FIELD IS REPRODUCIBLE?

Physicists and chemists were most confident in the literature.



What is Reproducibility?

Reproducible | Replicable | Robust | Generalisable

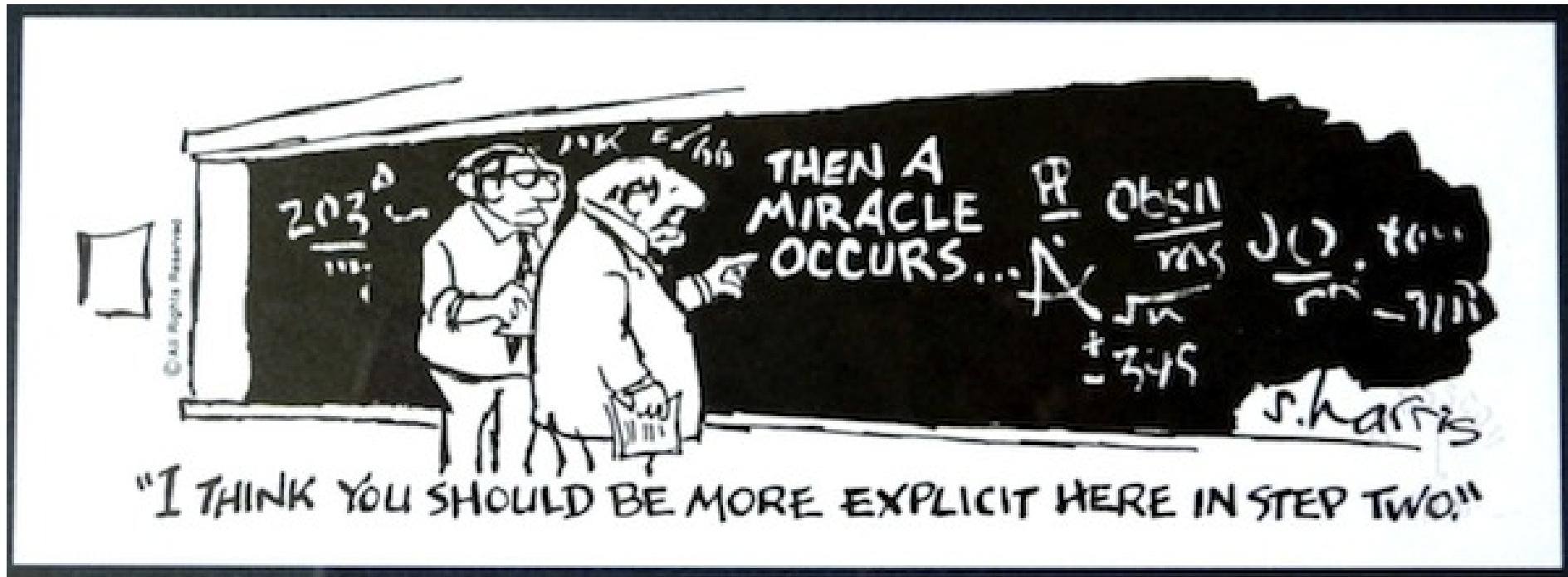


Threats to Reproducibility

What are the good practices of reproducible research?

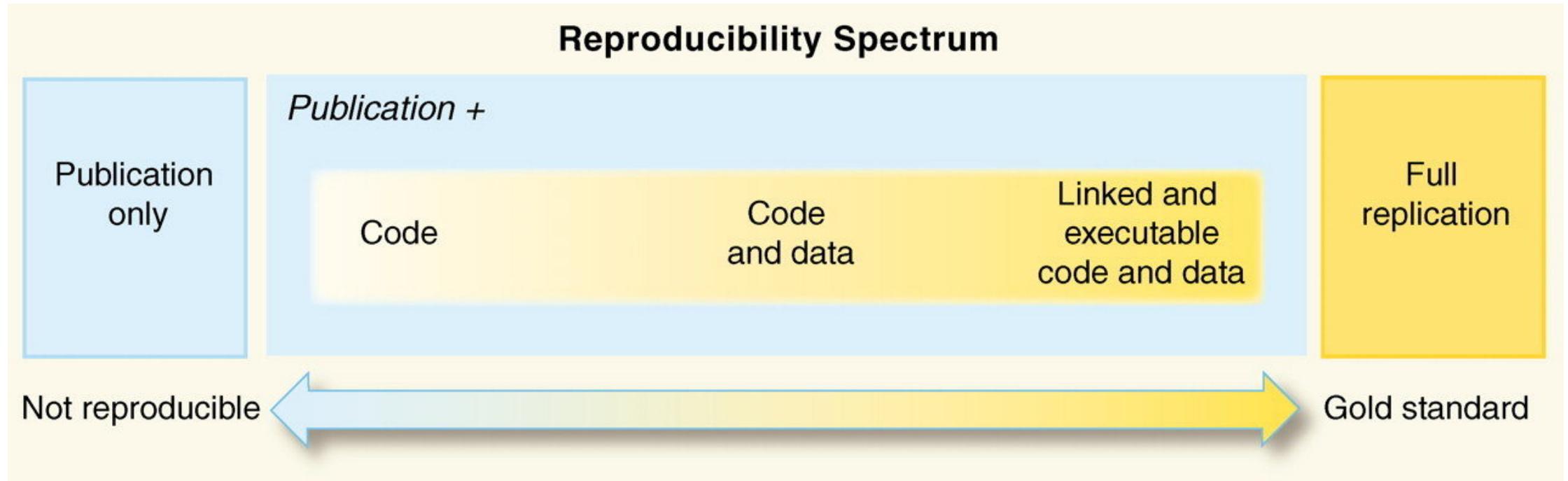
How to make your work reproducible?

Reproducible workflows give you credibility!



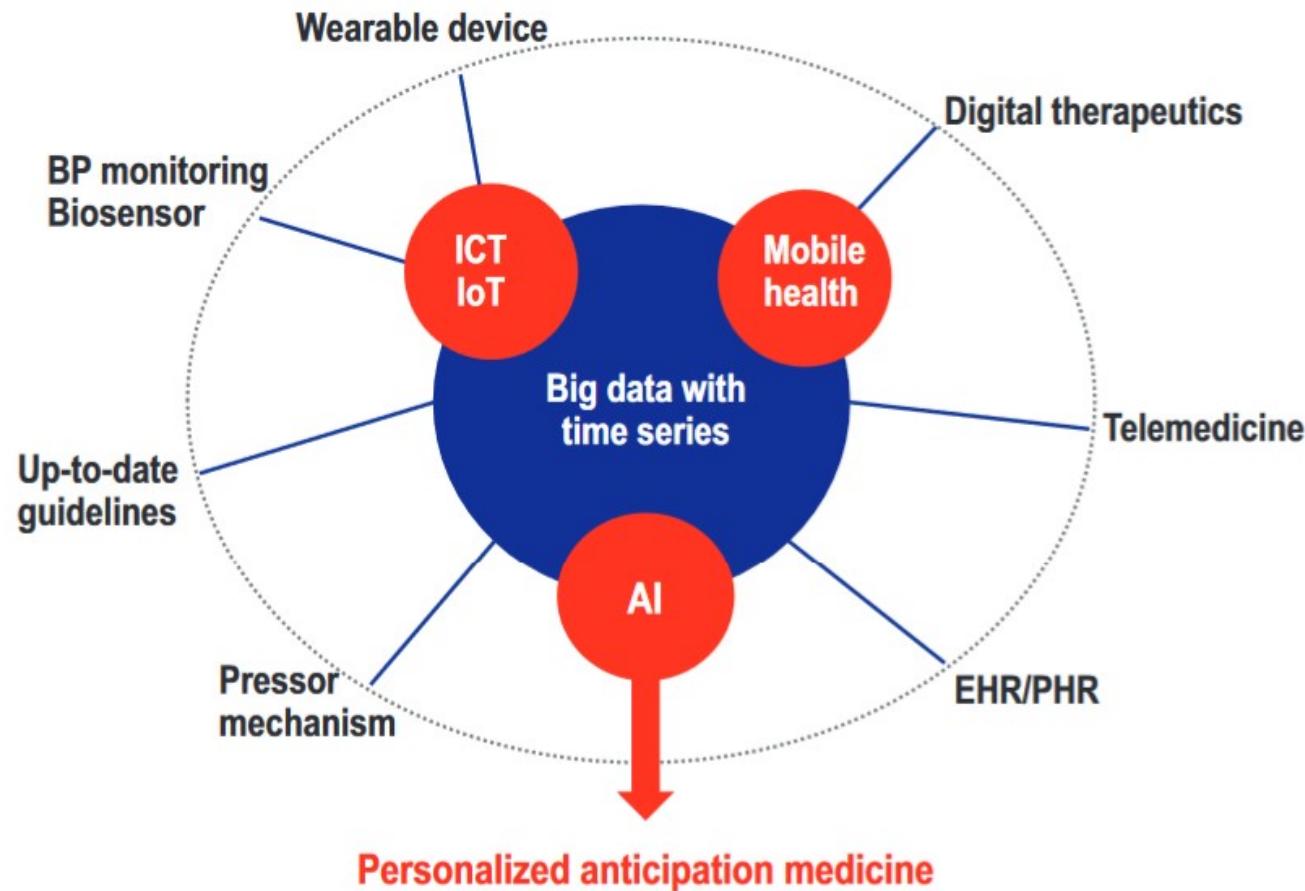
Research Pipeline

Reproducibility spectrum for published research



The Way Forward

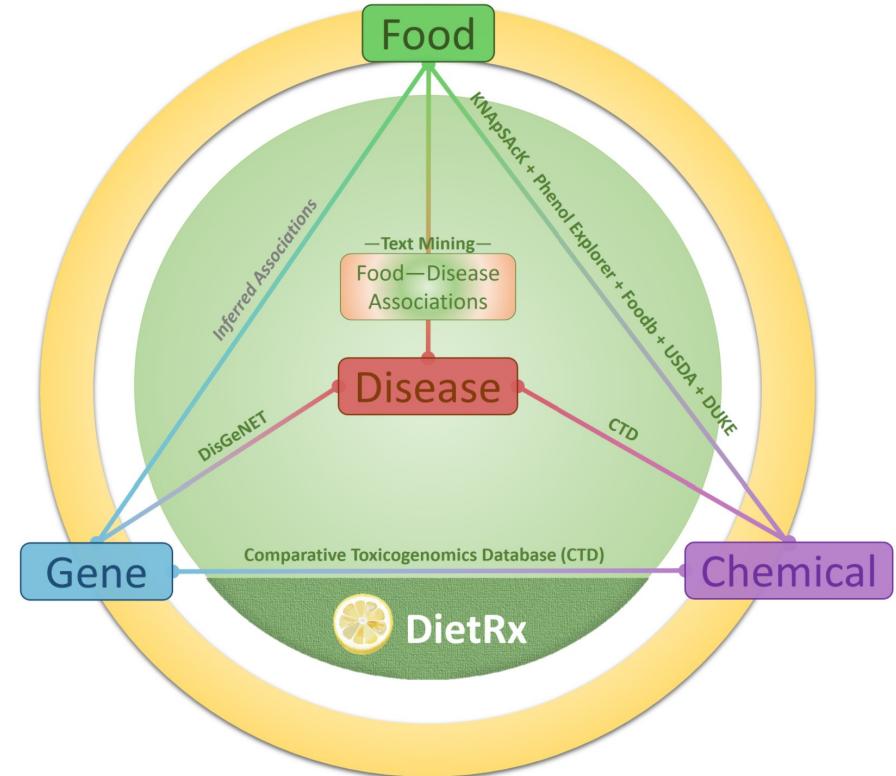
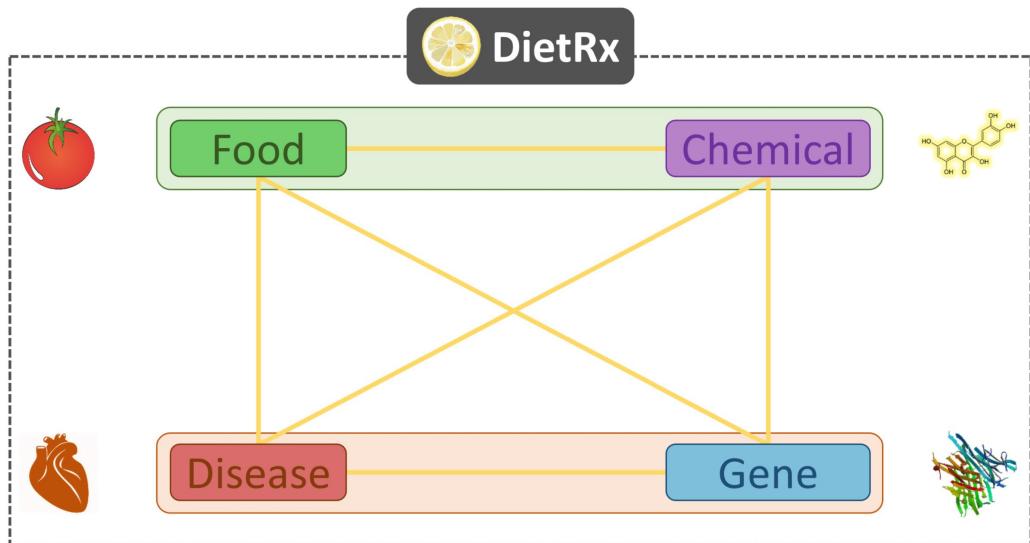
Digital Management of HTN



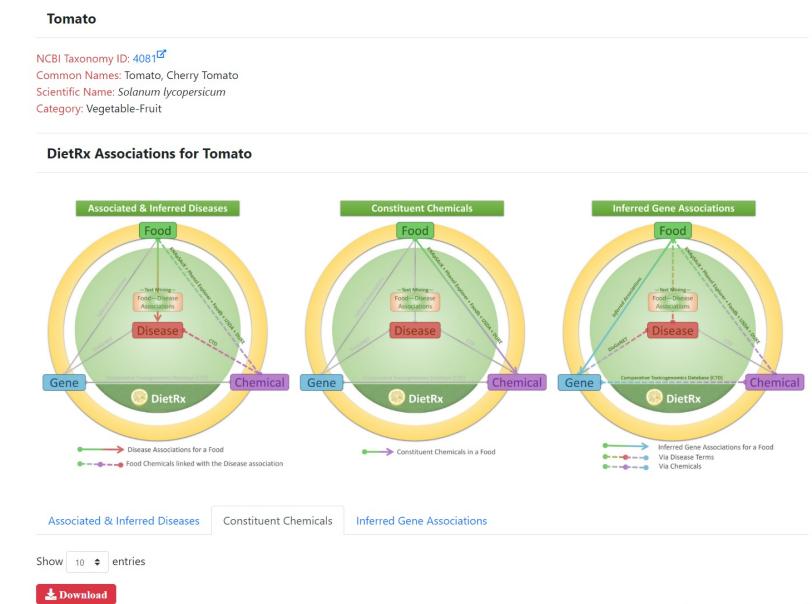
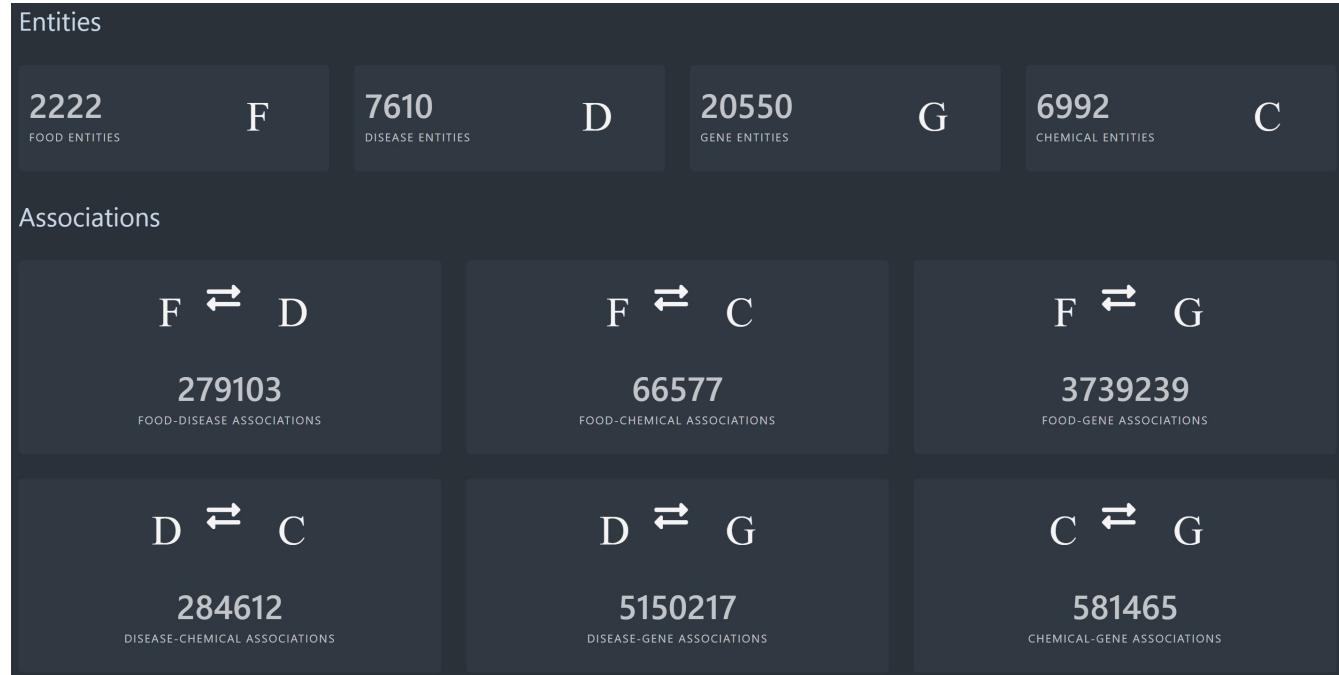
DietRx: Innovation by IIIT-Delhi



$$f(\text{Food} \otimes \text{Person}) = \text{Stethoscope}$$



DietRx: Innovation by IIIT-Delhi



PubChem ID	Common Name	Functional Group	Content	Source
101220898 🔗	null		0.00100 - 0.00300 mg/100g	FooDB
102460656 🔗	Maneb	Cation, Anion, Thiocarbamic acid deriv., Thiocarbamic acid	Detected but not quantified	FooDB
10256 🔗	Indole-3-Carboxaldehyde	Carbonyl compound, Aldehyde, Aromatic compound, Heterocyclic compound	Detected but not quantified	FooDB
10448 🔗	Methionol	Hydroxy compound, Alcohol, Prim. alcohol, Thioether	Detected but not quantified	FooDB

Health Data Science at AMCHSS

Data Analysis Workshops: ~100 Health Professionals across India

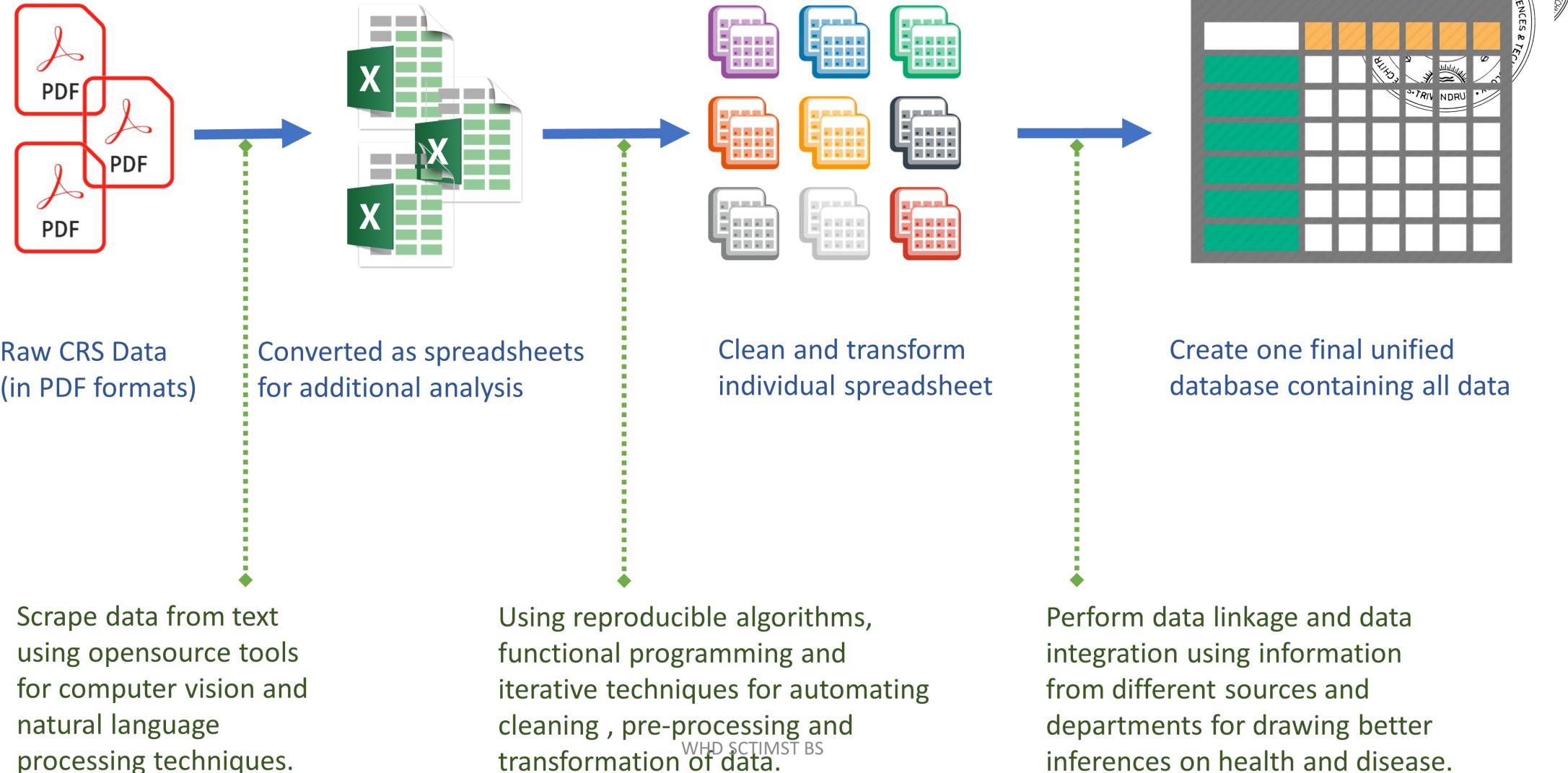
- National Centre for Disease Control, New Delhi
- Centre for Disease Control, US Embassy
- National Institute of Epidemiology, Chennai
- Armed Forces Medical College, Pune
- All India Institute of Medical Sciences, New Delhi, Bhopal, Raipur, Jhodpur

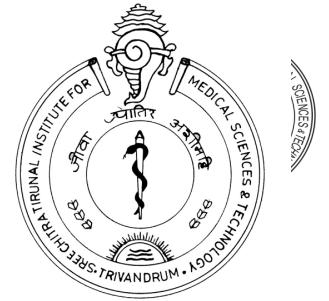
Developing Course Modules in Health Data Science: University of Norway,
University of South Korea

Mapping Stroke Centers in India: University of Chicago

Analysing COVID-19 Testing Data: ICMR, DHR, MoHFW

The data science approach



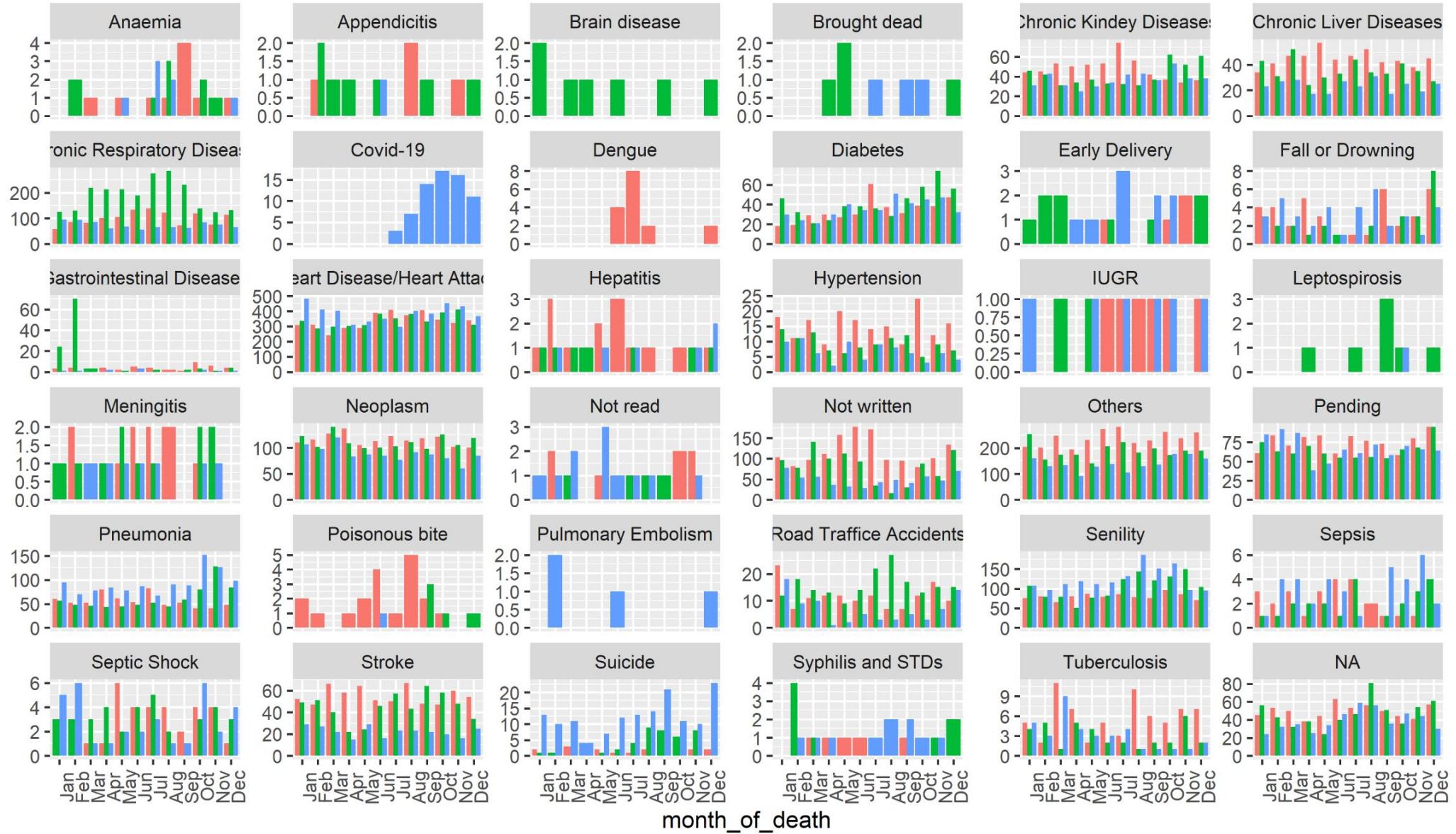


Some Quick Summaries

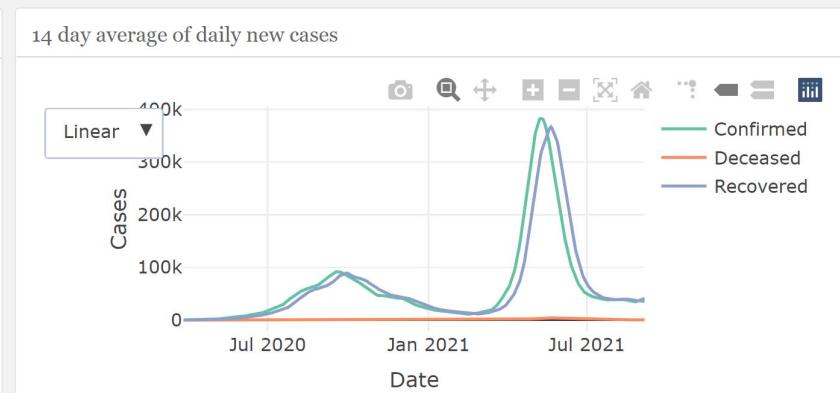
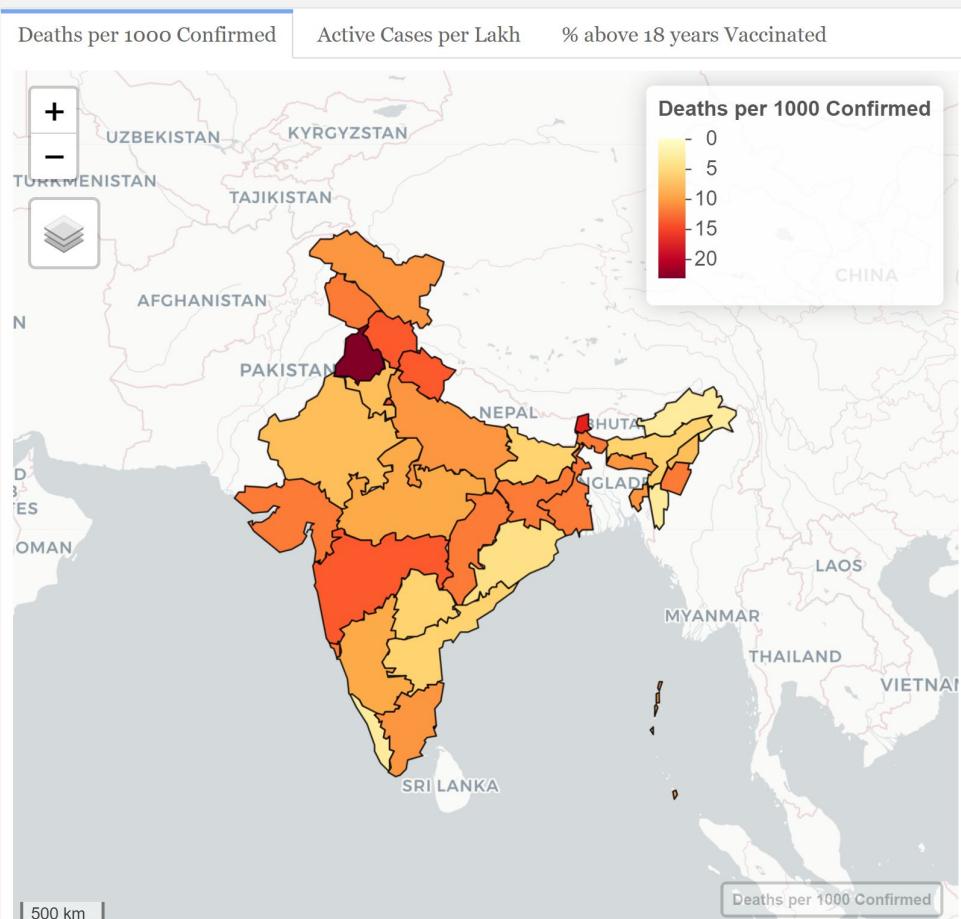
Cause of Death	Age Distribution of the Deceased						
	N	Mean	Std.Dev	Histogram	Median	IQR	Boxplot
NCDs	12868	61.18	16.16		63.0	53 - 72	
Heart Disease/Heart Attack	11449	65.50	14.53		66.0	57 - 75	
Miscellaneous	11040	52.19	24.67		58.0	38 - 70	
Infections	3067	65.82	15.70		68.0	58 - 76	
Senility	897	81.20	9.36		82.0	76 - 88	
Road Traffic Accidents	308	45.01	17.72		46.5	30 - 59	
MCH issues	36	35.28	30.34		35.0	4 - 62	
Suicide	18	46.22	16.03		47.0	38 - 56	

WHD SCTIMST BS

Cause of Death	Number of Deaths		
	2017	2018	2020
Heart Disease/Heart Attack	3712	3693	4033
Others	2829	2233	1651
Pneumonia	668	727	1101
Neoplasm	1236	1179	843
Chronic Respiratory Diseases	1038	2087	712
Diabetes	371	473	416
Chronic Kidney Diseases	551	467	398
Senility	237	389	269
Chronic Liver Diseases	517	403	242
Stroke	640	515	212







Background

It has now been over one year since the first case in Kerala and India has seen over 33 million cases as of 05 September 2021. India's approach to containing the first wave of the epidemic was spearheaded by the implementation of a strict nation-wide lockdown along with closure of schools and prohibition of mass gatherings. Rapid response from the public health department in contact tracing and testing has enabled the flattening of the curve and given the healthsystem the much needed time and opportunity to prepare and plan the mitigation strategies. However, with the second wave of COVID-19 infections in India commencing, the earlier strategy of lockdowns may not be viable this time around.

The dashboard would be updated on a weekly basis

Last updated on **2021-09-05**



Percentage Change in Mobility

Overview

Epidemic Curve

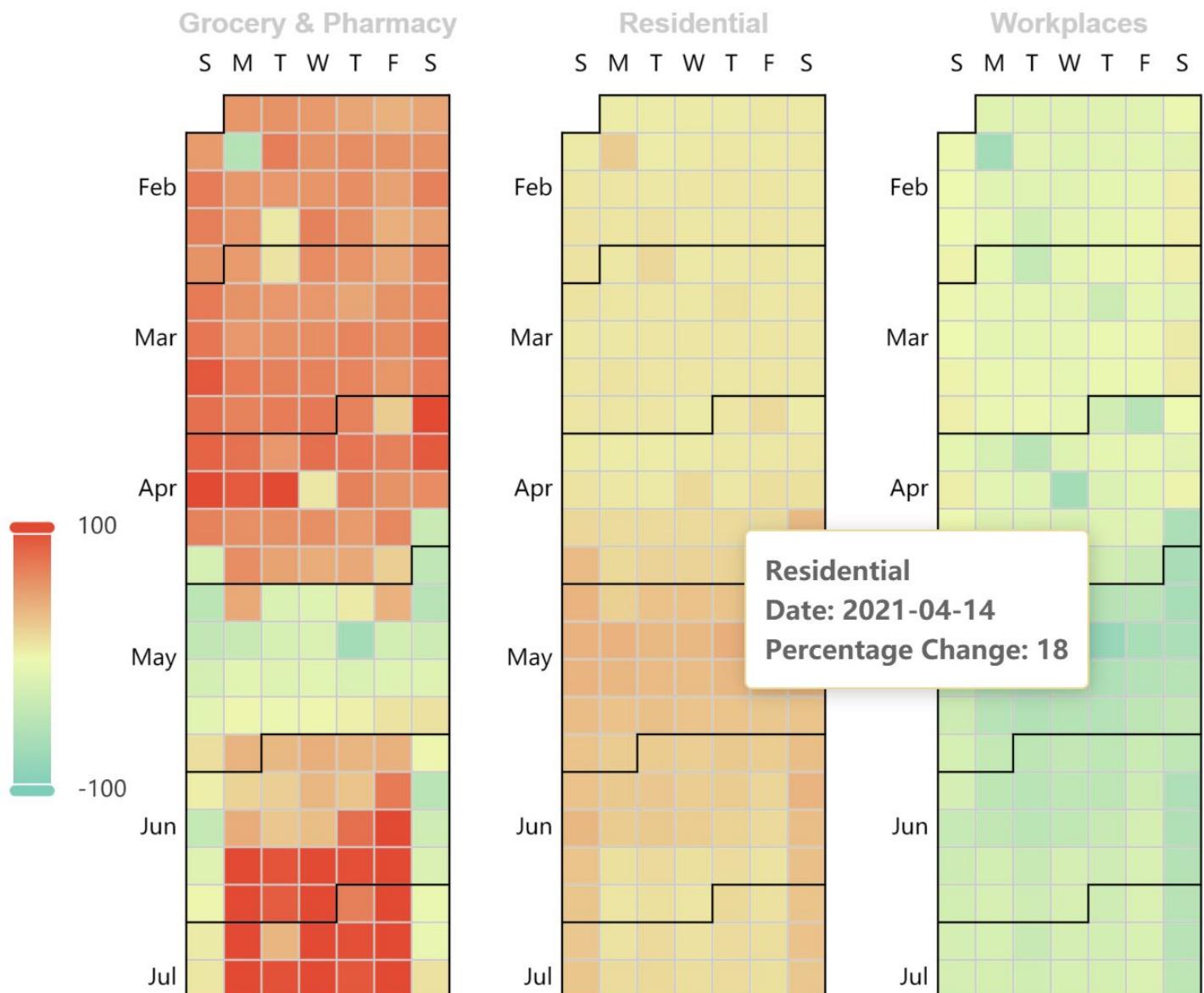
Epidemiological Parameters

Mortality

Vaccinations

Google Mobility

Projections



A report on the COVID-19 situation in Wayanad, Kerala

Achutha Menon Centre for Health Science Studies, SCTIMST, Trivandrum.

Disclaimer: This report is prepared as a discussion paper intended for the sole purposes of initiating discussions. It is merely a visualization of data made available to the researchers at AMCHSS and the findings and interpretations are personal observations of the researchers. It does not represent the official position of AMCHSS or SCTIMST, Trivandrum.

Overview

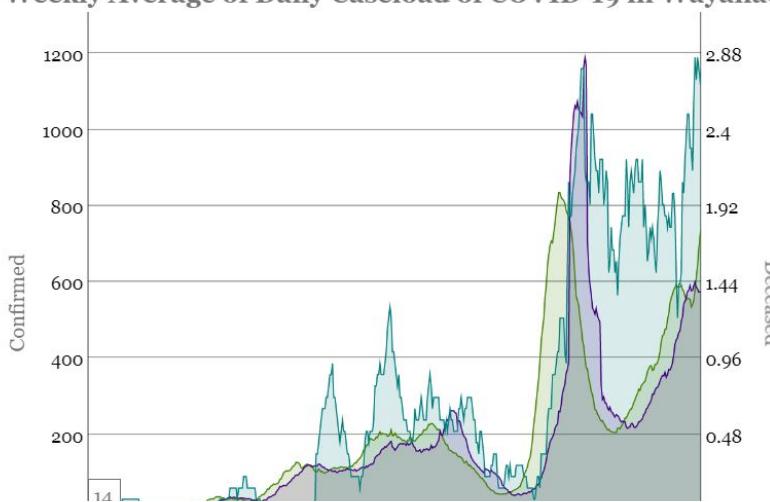
This document is a report on the COVID-19 situation in Wayanad district in Kerala, using publicly available data. It is an attempt to demonstrate the applications of data analytics and data visualization in offering insights into the COVID-19 outbreak as well as its utility in aiding public health efforts by providing actionable and timely evidence for informed decision making.

Wayanad is one of the districts of Kerala with a population of around 8 lakhs (as of 2018) with over 20% of its population being tribals.

Epidemic Curve

The importance of epidemic curves in epidemiology in understanding and visualising the onset and progression of an epidemic is immense. It provides key insights in terms of the magnitude of the disease, the mode of transmission, trends over time and the incubation period.

Weekly Average of Daily Caseload of COVID-19 in Wayanad

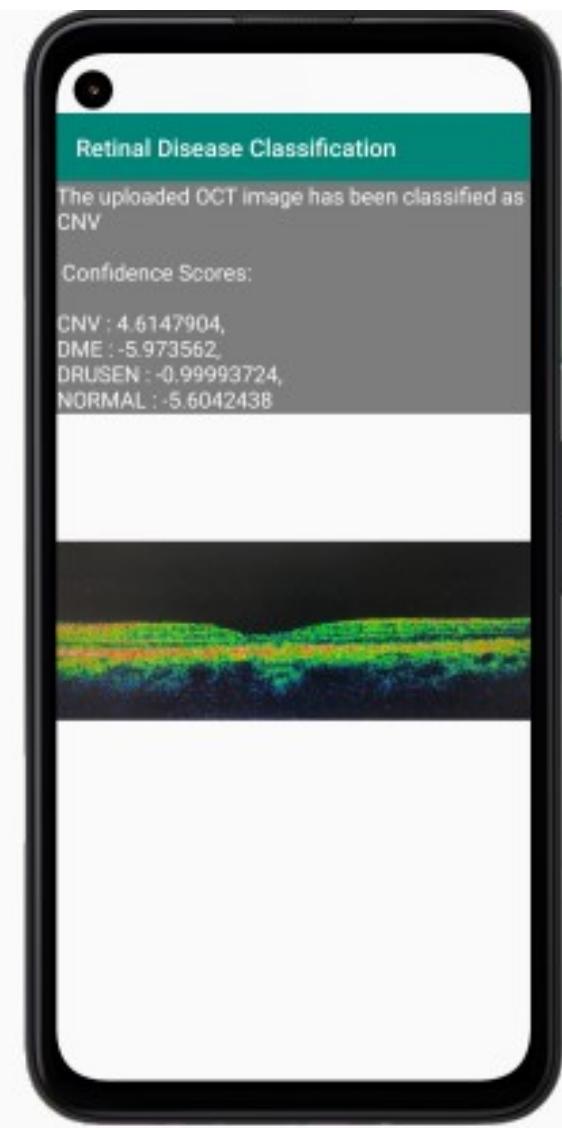


The plot to the left is an interactive version of the epidemic curve of COVID-19 in Wayanad. By default, the weekly average of daily cases, recovered and deaths is presented in the plot.

One can input the duration of estimation of the moving average which is set by default at 14 days.

The slider at the bottom of the plot allows for the user to select the desired timeframe for visualization.





Public Health Implications

- Encourage Data-use policy
- Improve data processing, validation, and efficiency of the system
- Integrate Data from different sources
- Timely and actionable evidence for public health interventions
- Spatial and temporal analysis are possible
- Semi-automated Report Generation



- Panchayati Raj Act
- Decentralised Planning Kerala
- Athiyannur Sree Chitra Action

Thank You

arunmitra@sctimst.ac.in

<https://amchss.github.io/RIntro2022/>

<https://www.sctimst.ac.in/>