

IMPORTANCE OF SUPPLEMENTATION & ITS ECONOMIC IMPACT

By Abhinav Srivastava
Amway
12 April 2019

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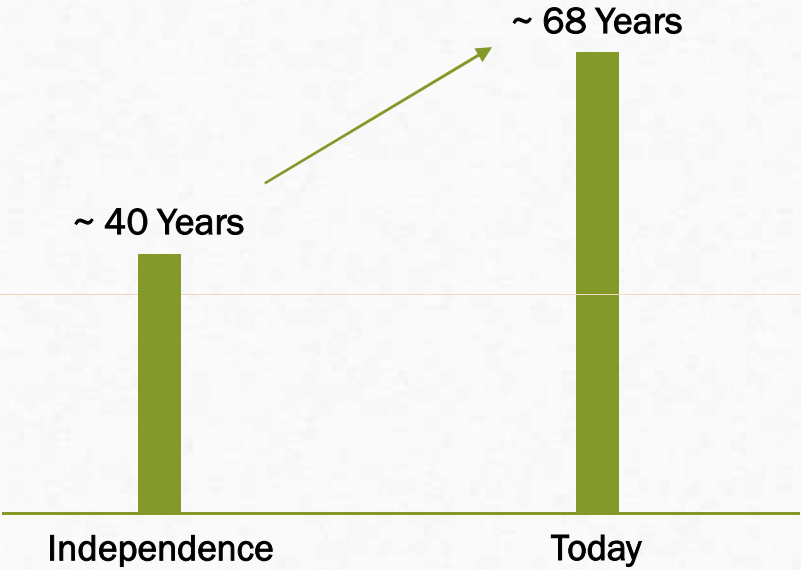
☐ How well we Live?

☐ Possible reasons

☐ Global Reading (Economic Value of Supplementation) & Indian Perspective

☐ Way Forward

Life should be Lived Well



= 28 Years Added

Life Expectancy 

Quality of Life 

At what age do you feel 65?

Lancet Study: Measured Age Related Disease Burden against the Global Average of 65 Years Old



NCDs - 10 Years Early Onset for Indians (Lancet Study)

India's escalating burden of non-communicable diseases



India's burden of non-communicable diseases (NCDs) is escalating. NCDs typically present in individuals aged 55 years or older in many developed countries, but their onset occurs in India a decade earlier (≥ 45 years of age).^{1,2} Exacerbating this problem are the issues of multiple chronic conditions and the fact many remain undiagnosed due to lack of awareness and insufficient health-care access. At the same time, infectious and parasitic diseases still pose substantial challenges to the public health system in India, resulting in a double burden of disease and an important share of the global burden of disease.

Although the NCD burden has grown, India still does not have sufficiently detailed data on NCDs for

What new insights do these papers report on the mortality burden of India and its states? They offer a more fine-grained picture of long-term trends of cardiovascular diseases, respiratory diseases, and diabetes mortality in India. The India GBD Collaborators found that leading cardiovascular diseases—ischaemic heart disease and stroke—made the largest contribution to the total burden of mortality in India in 2016, at 28.1% (95% uncertainty interval [UI] 26.5–29.1).³ Furthermore, the contribution of cardiovascular diseases to mortality increased by 34.3% (26.6–43.7) from 1990 to 2016, which is not surprising given rapid population ageing and significantly increasing levels of the main risk factors for cardiovascular diseases—high systolic

Published Online:

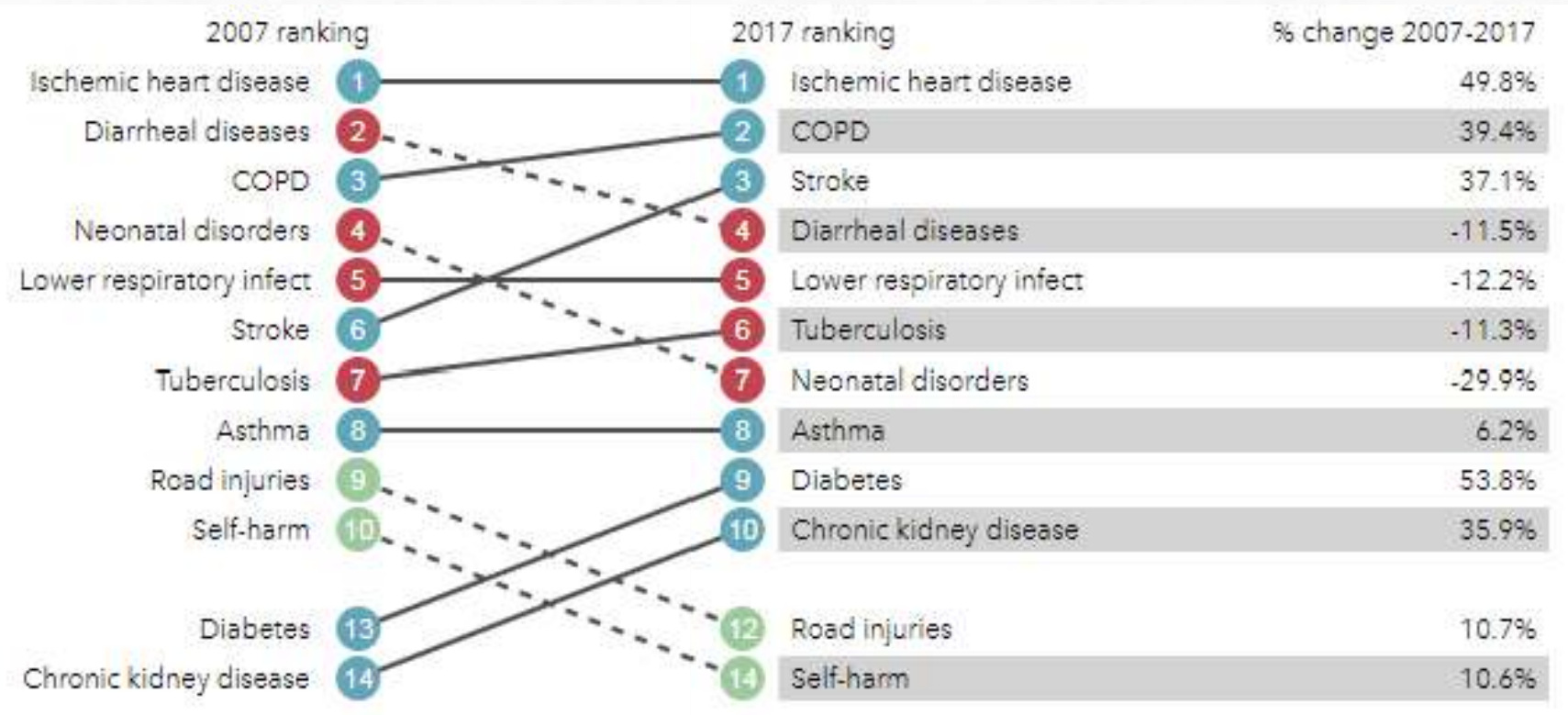
October 3, 2018

[http://dx.doi.org/10.1016/S2468-2667\(18\)30443-0](http://dx.doi.org/10.1016/S2468-2667(18)30443-0)

ISSN: 2468-2667

See [Articles](#) page e1355, e1352, and e1353

Health Problems causing the most death in India (similar for disability too)



Top 10 causes of death in 2017 and percent change, 2007-2017, all ages, number

The Loss



8 – 10
Years of
Life

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☐ How well we Live? **Not so well seems**

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Risk Factors Driving the most death and disability in India



Top 10 risks contributing to DALYs in 2017 and percent change, 2007-2017, all ages, number

Let's Further Assess

DO WE EAT
SUFFICIENT

?


DO WE GET
ENOUGH
FROM WHAT
WE EAT

?

DOES IT
IMPACT US

?

Lacking Diets – Globally



World Health Organization

Publications Countries Programmes Governance About WHO

e-Library of Evidence for Nutrition Actions (eLENA)

Increasing fruit and vegetable consumption to reduce the risk of noncommunicable diseases

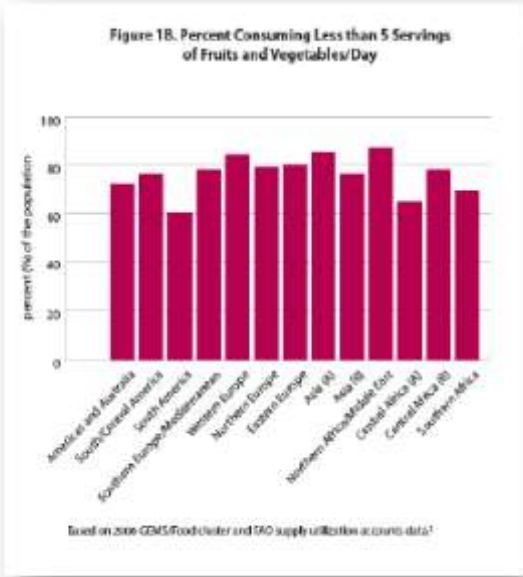
Biological, behavioural and contextual rationale

WHO technical staff
September 2014

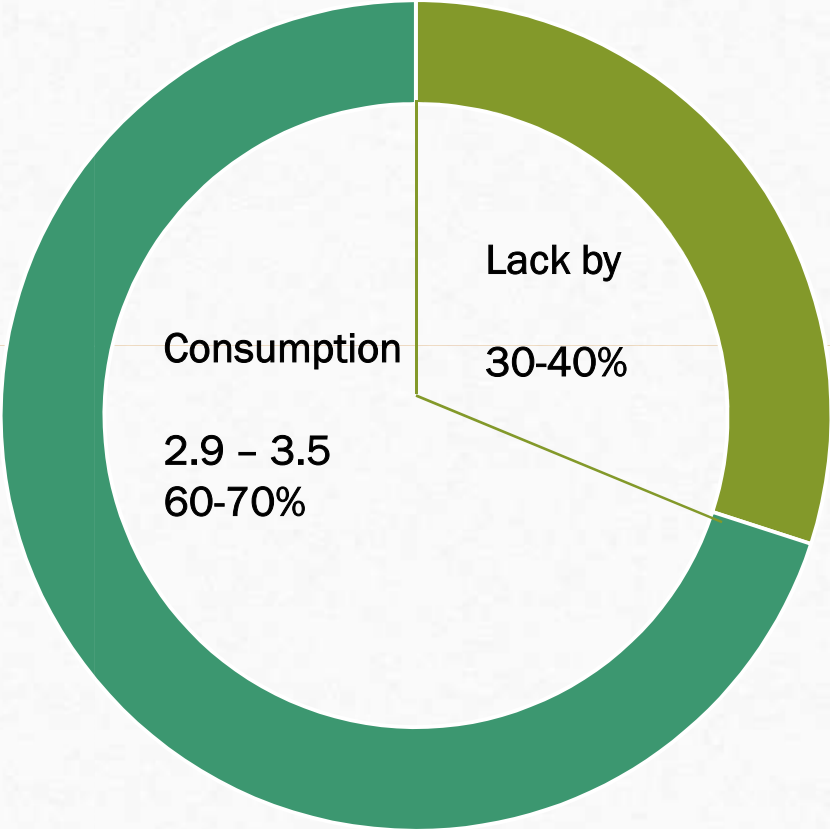
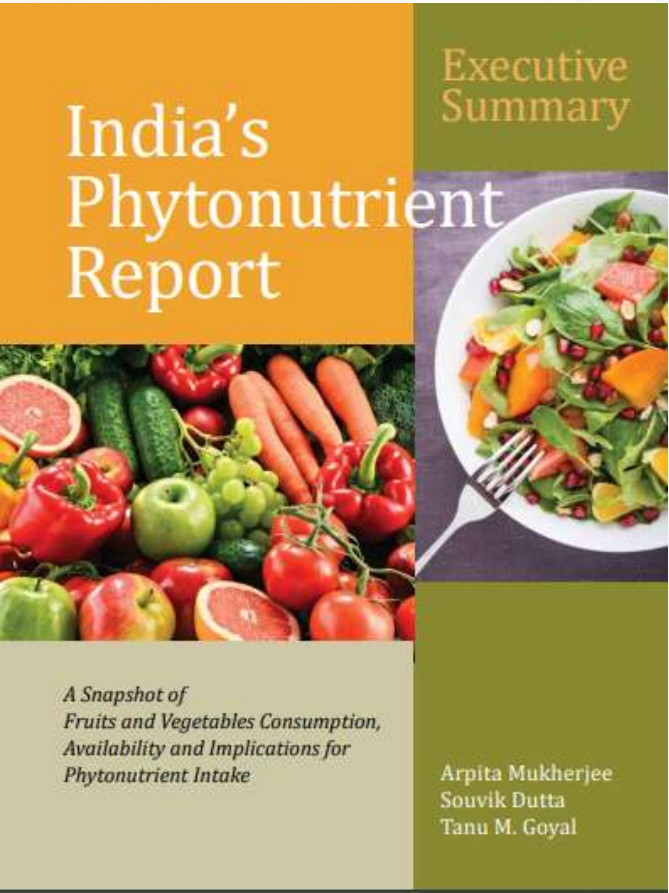
Fruits and vegetables are important components of a healthy diet. Reduced fruit and vegetable consumption is linked to poor health and increased risk of noncommunicable diseases (NCDs). An estimated 6.7 million deaths worldwide were attributed to inadequate fruit and vegetable consumption in 2010 (1).

Current evidence indicates that fruits and vegetables consumed as part of the daily diet can help reduce the risk of coronary heart disease (2-4), stroke (4-6) and certain types of cancer (7,8). More limited evidence suggests that when consumed as part of

75%
people globally that
fall short of WHO
Fruit & Vegetable
recommendation



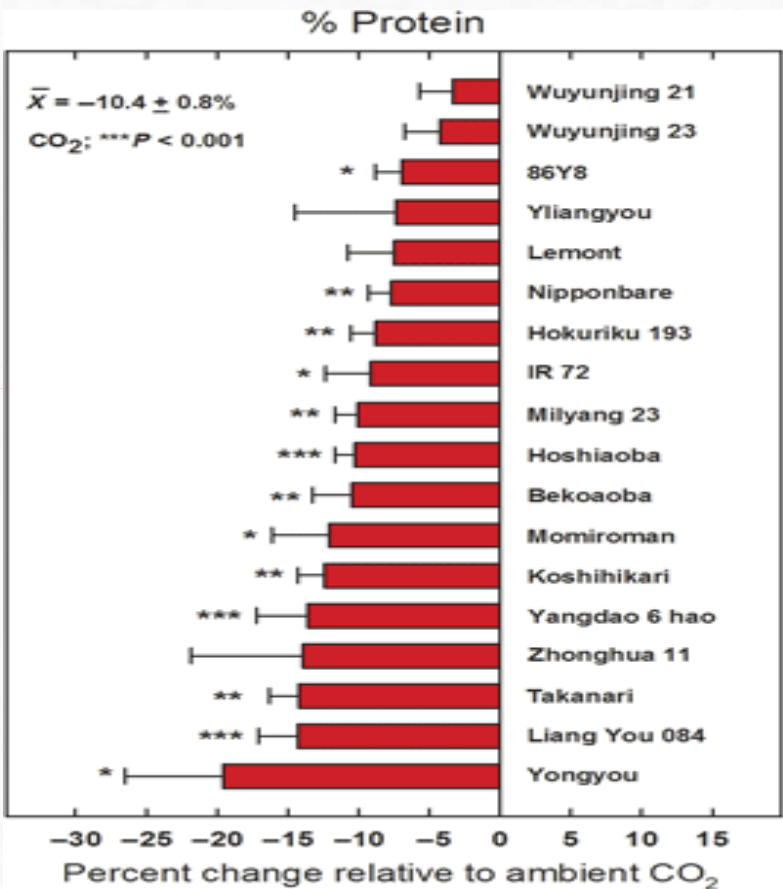
India is No Different - ICRIER Survey



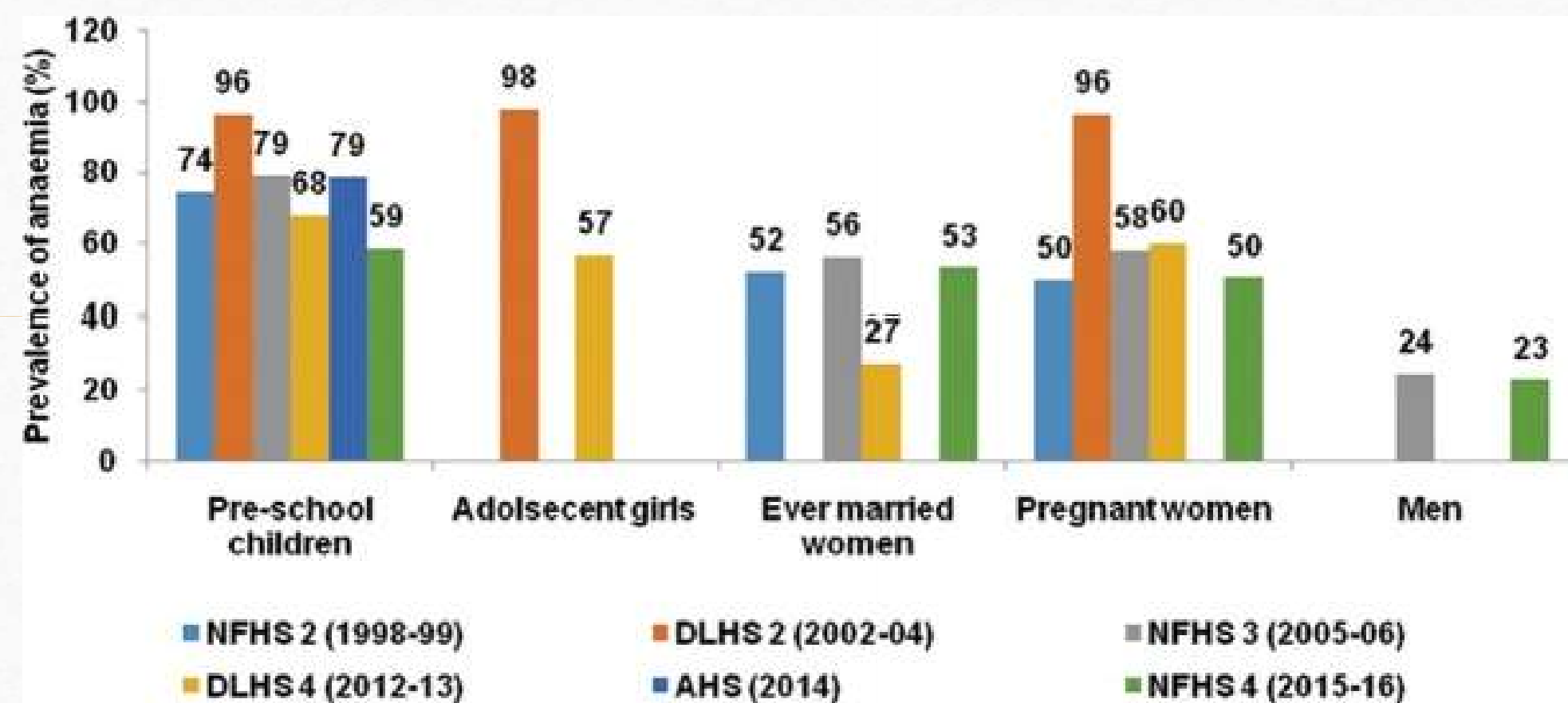
Nutrient Loss – Global Warming

RICE SUPPLIES ~25% OF
ALL GLOBAL CALORIES
(2 Bn People)

- (-) 10% Protein
- (-) 8% Iron
- (-) 5% Zinc
- (-) 13 to 30% Vitamins B



Impact - Anemia Still Affects over 50% of School Children in India



Impact - Vitamin B 12 Deficiency

Some recent surveys carried out in India to assess the prevalence of vitamin B₁₂ deficiency

Study	Study area	Study design	Cut-off used for serum vitamin B ₁₂	Prevalence (%)
Chakraborty et al, 2018 ²¹	NCR Region and Haryana	Community-based cross-sectional study: School-going adolescents (n=2402) (11-17 yr)	•148 pmol/l	22.4 Rural: 42.9; Urban: 20.1
Gonmel et al, 2018 ²²	New Delhi	Community-based cross-sectional study: Elderly aged 60 and above (n=77) residing in slums	•100 pg/ml	26.4
Gupta et al, 2017 ²³	Himachal Pradesh	Community-based cross-sectional study: Schoolchildren (n=215) aged 6-15 yr	•100 pg/ml	7.4
Verma 2017 ²⁴	Maharashtra	School-based cross-sectional study: Adolescents (n=372) aged 11-15 yr	•100 pg/ml	72.7
Mittal et al, 2017 ²⁵	New Delhi	Hospital-based cross-sectional study: Term exclusively breastfed infants (n=100) aged 1-6 months	•100 pg/ml	Infants-67.0 Mothers-66.0
Goyal et al, 2017 ²⁶	Rajasthan	Hospital-based descriptive study: SAMI children (n=50)	•100 pg/ml	27.5
Surana et al, 2017 ²⁷	Gujarat	Hospital-based cross-sectional study: Adolescents (n=211) aged 11-15 yr	•160 pg/ml	69.5
Gonmel et al, 2017 ²⁸	New Delhi	Community-based cross-sectional study: Women (n=60) aged 60 and above residing in slums	•100 pg/ml	28.0
Shrivastava et al, 2016 ²⁹	Telangana	Community-based cross-sectional study: Adults (n=600) aged 21-65 yr	•100 pg/ml	28.0
Garima et al, 2016 ³⁰	-	Pregnant anemic women (n=257)	•100 pg/ml	67.0
Gupta Bansal et al, 2015 ³¹	New Delhi	Community-based study: Adolescents (n=794) aged 11-15 yr	•100 pg/ml	Anemia-58.7, 62.3 among anemic adolescents
Farmer et al, 2015 ³²	Gujarat	Hospital-based cross-sectional study: Individuals (n=2660) aged 0-95 yr	•100 pg/ml	66.6 •20 yr - 21.5 20 to 60 yr - 29.2 •60 yr - 62.5
Kapil et al, 2015 ³³	NCT Delhi	Community-based cross-sectional study: Children (n=470) aged 12-59 months	•100 pg/ml	28.4
Chahal et al, 2014 ³⁴	Himachal Pradesh	Observational study: Adults (n=153) aged 18-62 yr	•100 pg/ml	62.6
Kapil and Bhadoria 2014 ³⁵	NCT Delhi	School-based cross-sectional study: Adolescents (n=167) aged 11-15 yr	•100 pg/ml	72.5
Shardanj et al, 2013 ³⁶	Himachal Pradesh	Community-based cross-sectional study: Adolescents (n=125) aged 11-15 yr (n=200 for blood sample)	•100 pg/ml	100.0
Shobha et al, 2011 ³⁷	Karnataka	Elderly (n=175) aged 60 and above	-	16.0
Moon et al, 2011 ³⁸	Maharashtra	Community-based cross-sectional study: Tribal and rural women of reproductive age (n=105)	•148 pmol/l	24.0

SAMI, severe acute malnutrition; NCT, National Capital Territory

With respect to vitamin B₁₂ deficiency, studies have indicated deficiency as high as 70-100 per cent.

This may also be because about 29 per cent of the Indian population is vegetarian.

Impact - Folate Deficiency

Surveys carried out in India to assess the prevalence of folate deficiency

Study	Study area	Study design	Cut-off used for serum folic acid	Prevalence (%)
Bhade and Kar 2018 ²⁰	Maharashtra	Hospital-based study: Women (n=594) in early pregnancy	<3 ng/ml	24.0
Verma 2017 ²⁴	Maharashtra	School-based cross-sectional study: Adolescents (n=373) aged 11-18 yr	<3 ng/ml	40.2
Goyal et al, 2017 ²⁶	Rajasthan	Hospital-based descriptive study: SAM children (n=80)	<3 ng/ml	8.8
Gonmel et al, 2017 ²⁸	New Delhi	Community-based cross-sectional study: Women (n=60) aged 60 and above residing in slums	<4 µg/ml	12.0
Gupta et al, 2017 ²³	Himachal Pradesh	Community-based cross-sectional study: Schoolchildren (n=215) aged 6-18 yr	<4 ng/ml	1.5
Sivaprasad et al, 2016 ²⁹	Telangana	Community-based cross-sectional study: Adults (n=930) aged 21-85 yr	<3 ng/ml	12.0
Gupta Bansal et al, 2015 ³¹	New Delhi	Community-based study: Adolescents (n=794) aged 11-18 yr	<4 ng/ml	Anemia - 58.7 5 among anemic adolescents
Kapil et al, 2015 ²²	NCT Delhi	Community-based cross-sectional study: Children (n=470) aged 12-59 months	<4 ng/ml	43.2
Kapil and Bhadoria 2014 ³³	NCT Delhi	School-based cross-sectional study: Adolescents (n=147) aged 11-18 yr	<3 ng/ml	39.8
Bhardwaj et al, 2013 ²⁵	Himachal Pradesh	Community-based cross-sectional study: Adolescents (n=885) aged 11-19 yr (n=100 for blood sample)	<2.7 ng/ml	0
Menon et al, 2011 ³⁵	Maharashtra	Community-based cross-sectional study: Tribal and rural women (n=109) of reproductive age	<6.8 nmol/l	2.0

The prevalence of folate deficiency is not high as compared to vitamin B12 deficiency; however, studies carried out in New Delhi and Maharashtra among preschool children and adolescents have indicated deficiency of around 40 to 60 per cent

Impact - Vitamin D Deficiency

Vitamin D deficiency in India

P. Aparna,¹ S. Muthathal,¹ Baridalyne Nongkynrih,¹ and Sanjeev Kumar Gupta¹

• Author information • Copyright and License information [Disclaimer](#)

This article has been [cited by](#) other articles in PMC.

Abstract

Go to:

Vitamin D is a fat-soluble vitamin playing a vital role in human physiology. Vitamin D deficiency is prevalent worldwide. This deficiency has many consequences which are still being explored, apart from the well-known skeletal complications. With this review, we aim to summarize the existing literature on Vitamin D status in India and understand the enormity of the problem. The prevalence of Vitamin D deficiency ranged from 40% to 99%, with most of the studies reporting a prevalence of 80%–90%. It was prevalent in all the age groups and high-risk groups alike. With the consequences of Vitamin D deficiency, namely, autoimmune diseases, cardiovascular diseases, cancer, and tuberculosis being explored, we can imagine the burden it would cause in our country. We need to create awareness among the public and healthcare providers about the importance of Vitamin D and the consequences of deficiency. Our Indian diet generally fails to satisfy the daily requirement of Vitamin D for a normal adult. This stresses on the need for fortifying various food with Vitamin D, through the national programs. This silent epidemic should be addressed appropriately with concrete public health action.

Keywords: Fortification, India, prevalence, Vitamin D deficiency

Sources of Vitamin D3

Go to:

The major source of Vitamin D is the endogenous synthesis in skin on exposure to sunlight, namely, ultraviolet B (UV-B) radiation of wavelength 290–320 nm. Main dietary sources are fish, fortified food, and supplements. Vegetables and grains are poor sources.

Synthesis of vitamin in skin on exposure to UV-B is also affected by latitude, solar zenith angle, atmospheric pollution, ozone layer, and melanin pigmentation [6]

Vitamin D status	The serum level of Vitamin D in ng/ml
Deficiency	<20
Insufficiency	21-29
Sufficiency	>30
Toxicity	>150

Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6060930/>



DO WE EAT
SUFFICIENT?

NO

DO WE GET
ENOUGH
FROM WHAT
WE EAT?

NO

DOES IT
IMPACT US?

YES

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- ❑ How well we Live? **Not so well seems**

- ❑ Possible reasons – We eat Less; We get Less, Impact – Not Great

- ❑ Global Reading (Economic Value of Supplementation) & Indian Perspective

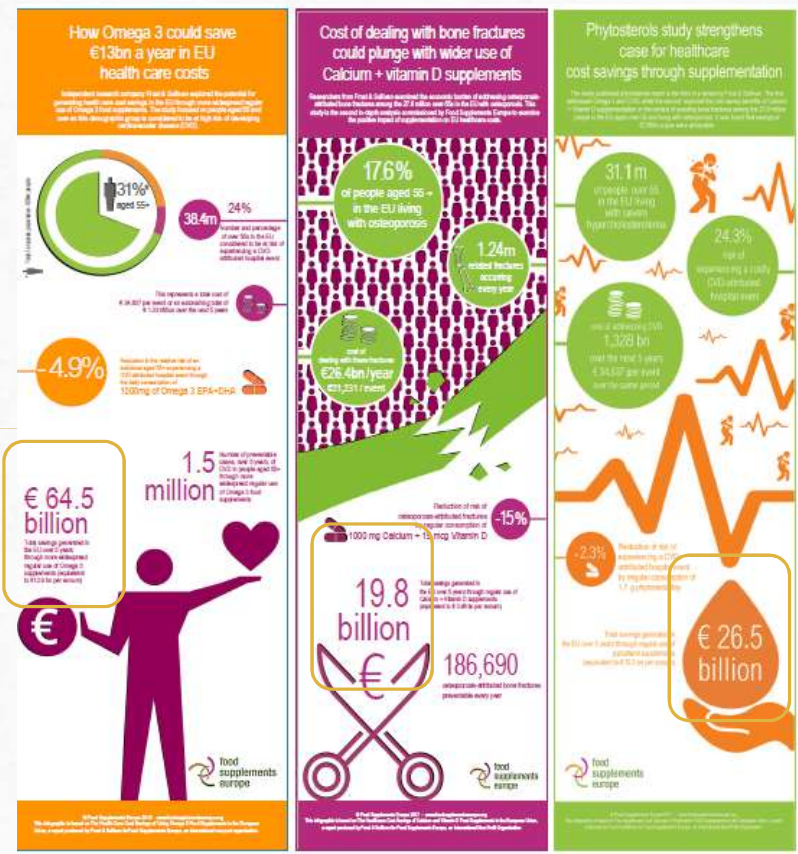
- ❑ Way Forward

Health Care Cost Saving Studies

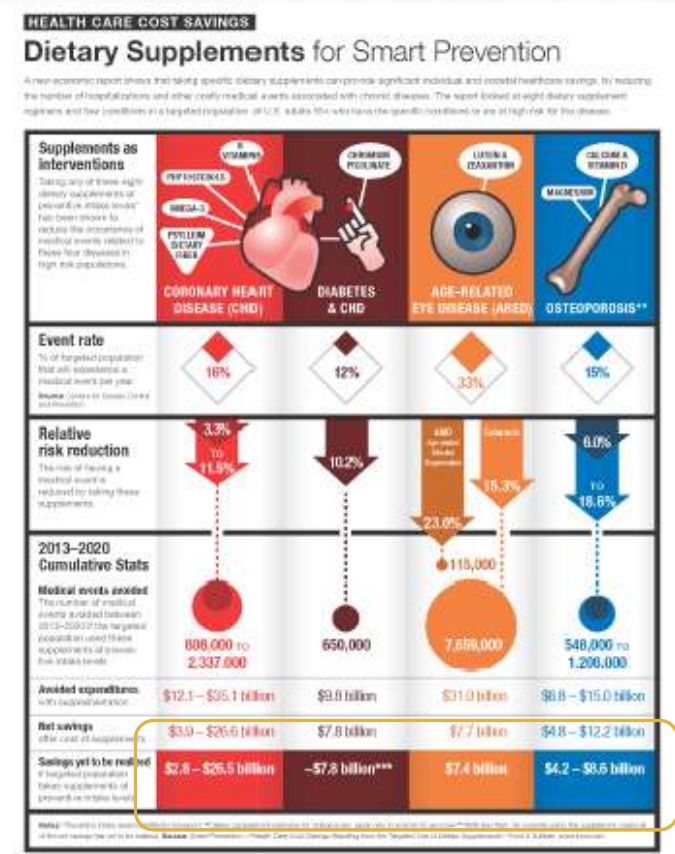
Studies have been conducted in a number of countries to investigate if use of targeted food supplements among consumers at a high risk of experiencing a costly disease related event could reduce risks and health care cost

SOURCE: FROST & SULLIVAN

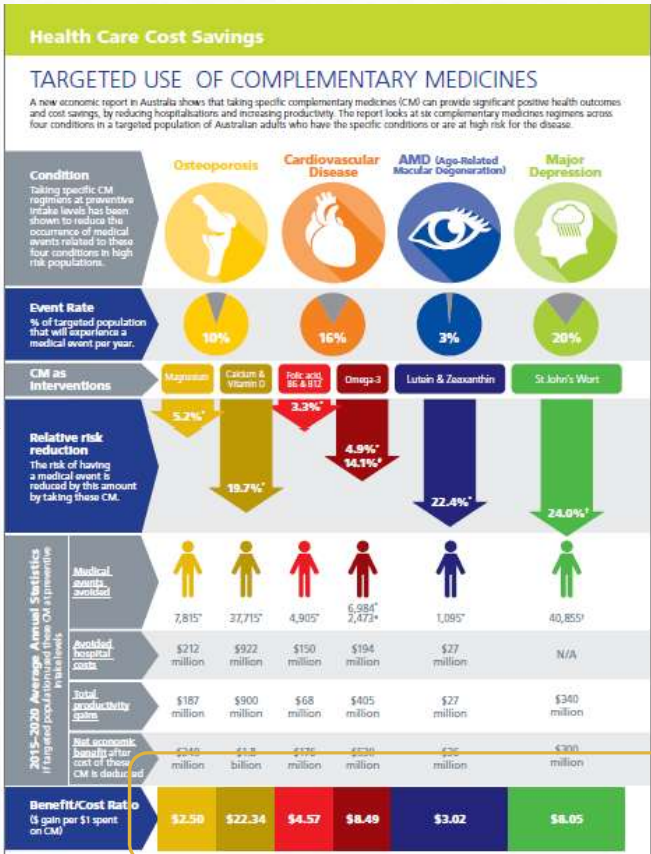
Infographics – EU, USA, Australia



Over 5 Years

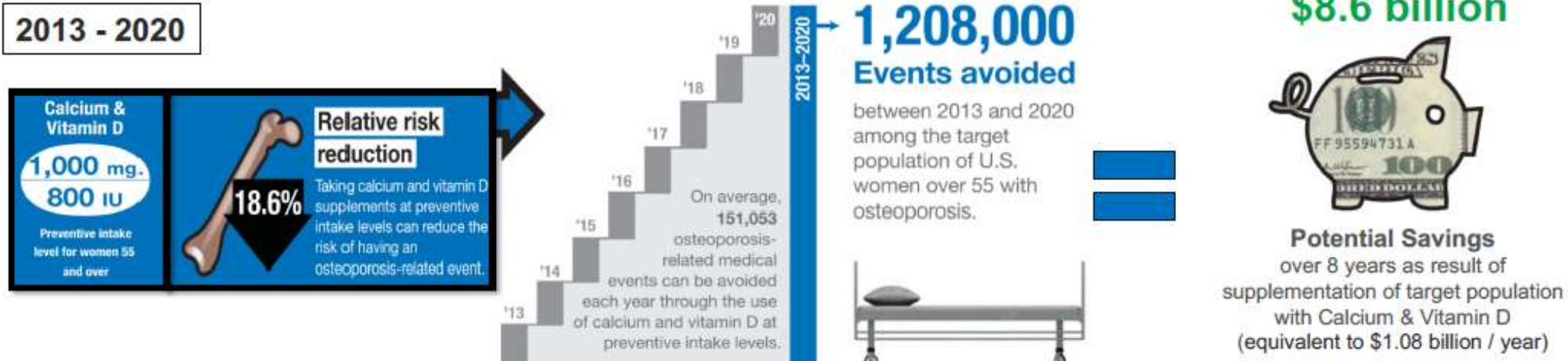
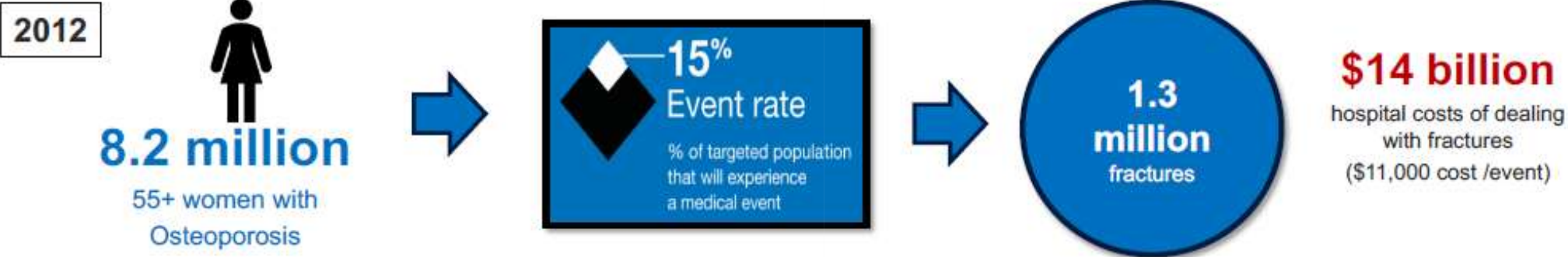


Over 8 Years



Over 6 Years

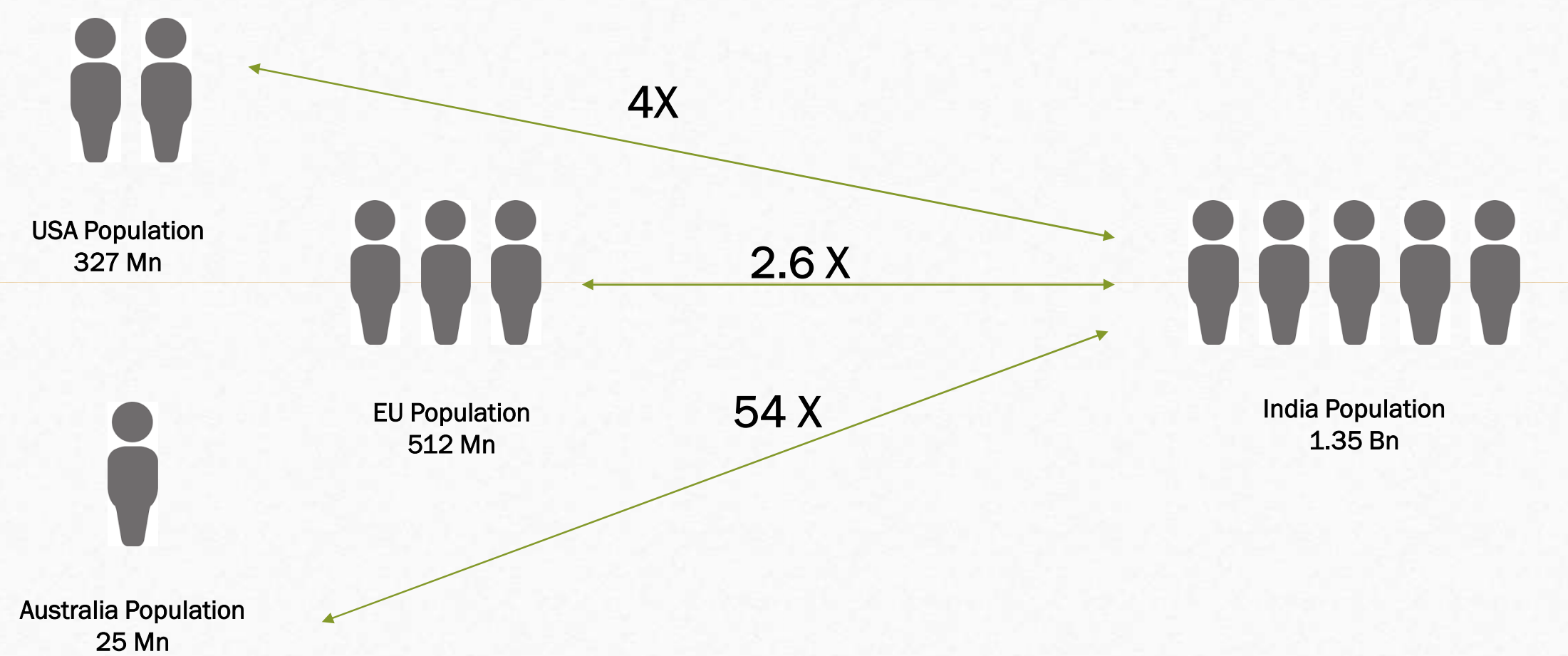
USA: Calcium and Vitamin D Supplementation and Osteoporosis



EU: The Effect of Calcium and Vitamin D Supplementation



India Perspective: Cost Saving Potential – Much Higher



Rising Cases of NCDs – Bigger Possibilities for Us

15% of deaths in India were due to heart diseases in 1990; now up to 28%

The number of people affected by cardiac diseases has doubled

Diabetes is India's fastest growing disease: 72 million cases recorded in 2017, figure expected to nearly double by 2025

IndiaSpent Apr 14, 2018 11:40:11 AM



As India's economic development has increased, lifestyle has changed, a factor behind rise of diabetes

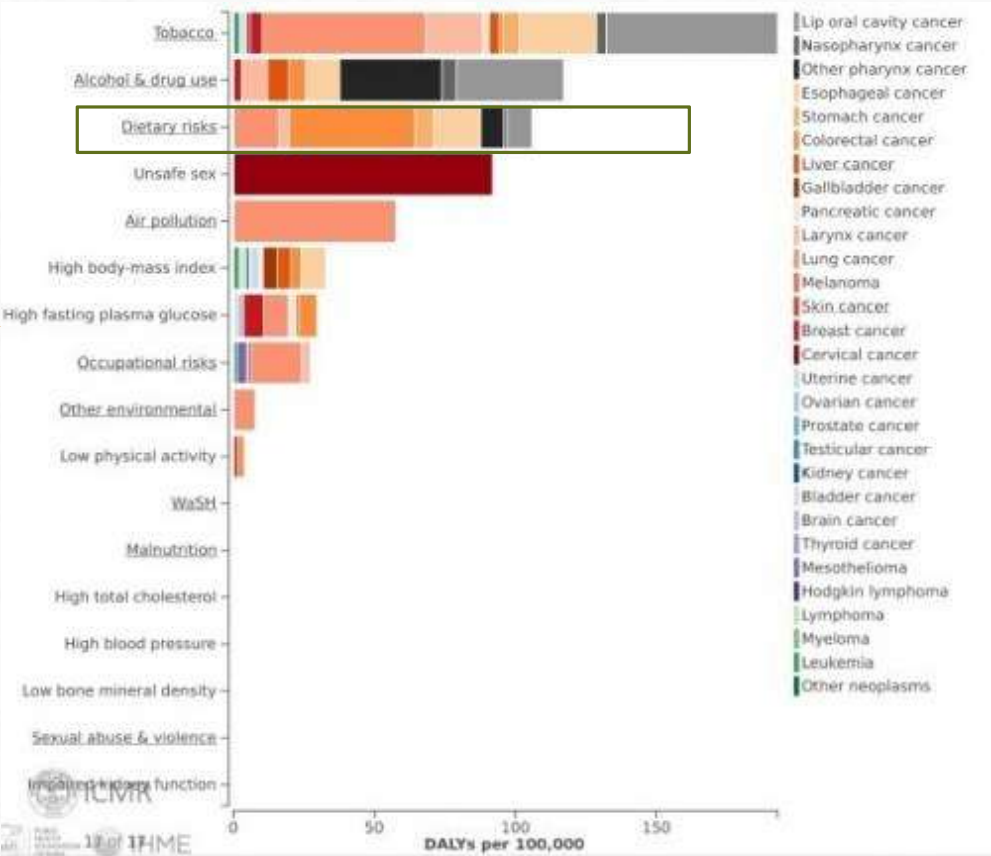
Rising Cases of NCDs – Bigger Possibilities for Us

HEALTH

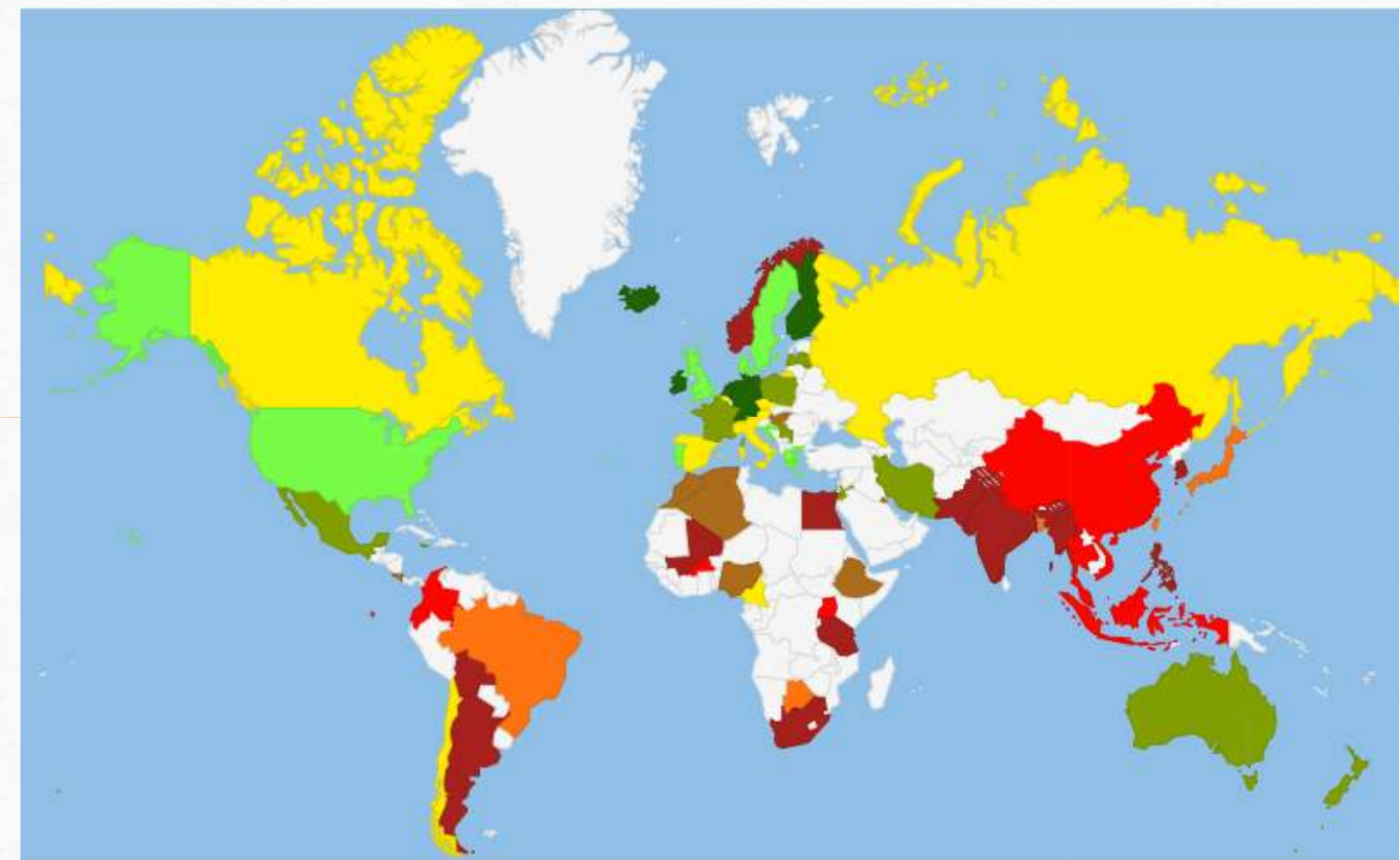
9.6 million people will die of cancer this year

Two reports released on the same day say that cancer is the second biggest killer in India, while cancer deaths in the world this year

Risk Factors for Cancer - Lancet



RDA 400 IU (Vitamin D 10 mg / Day)



Average dietary calcium intake (mg/d)

< 400 400-500 500-600 600-700 700-800 800-900 900-1000 > 1000

India

Calcium intake (mg/d): 429
Country color: ■
Population group: adult
National representativeness: Yes

United States

Calcium intake (mg/d): 934
Country color: ■
Population group: adult
National representativeness: Yes

Canada

Calcium intake (mg/d): 787
Country color: ■
Population group: adult
National representativeness: Yes

Finland

Calcium intake (mg/d): 1098
Country color: ■
Population group: adult
National representativeness: No (age)

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- ❑ Possible reasons – We eat Less; We get Less, Not so positive impact
- ❑ Global Reading (Economic Value of Supplementation) & Indian Perspective – **Bigger Possibilities**
- ❑ Outlook



Diet for 10 Mn Bn People by 2050 - Eat Lancet Commission



- ☐ Transformation to healthy diets by 2050 will require substantial dietary shifts.
- ☐ A diet rich in plant-based foods and with fewer animal source foods confers both improved health and environmental benefits.
- ☐ Supplements have a big role to play

Global consumption of fruits, vegetables, nuts and legumes will have to double, and consumption of foods such as red meat and sugar will have to be reduced by more than 50%.

Compressed Phytonutrients – Colorful Fruits & Vegetables in Convenient Formats



Levers for Next Level

☐ Innovation

☐ Regulation

☐ Awareness

Thank You



- Approximately one third of cancers can be prevented.
- Up to 80% of heart disease, stroke and diabetes type 2 deaths are preventable.

