

# “Addressing Cardiovascular Risk Factors Prevalent in the Philippines”

02 December 2021



## Diabetes Prevention Beyond Sugar Limitation:


Addressing Factors Associated with Development of Diabetes Mellitus

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A top-down view of various medical supplies for diabetes management. In the upper right, a blue and white glucose meter with a digital display and 'M' and 'S' buttons. To its left is a brown insulin vial with a white cap. Below the vial are several white, oval-shaped pills. In the lower left, an insulin syringe with a scale from 0 to 15 units is visible. In the lower right, several white test strips with yellow markings are scattered. The background is a light, neutral color.

# Why the concern regarding diabetes?

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# PHILIPPINES




**DIABETES: one of the top causes of death worldwide**

**#4 in the Philippines**

Philippine Statistics Authority, 2021

# Diabetes is

# IN THE PHILIPPINES!



# #1

## AS THE CAUSE OF

- End Stage Renal Disease leading to DIALYSIS
- Non-Traumatic LEG AMPUTATIONS
- BLINDNESS in adults (after cataracts)

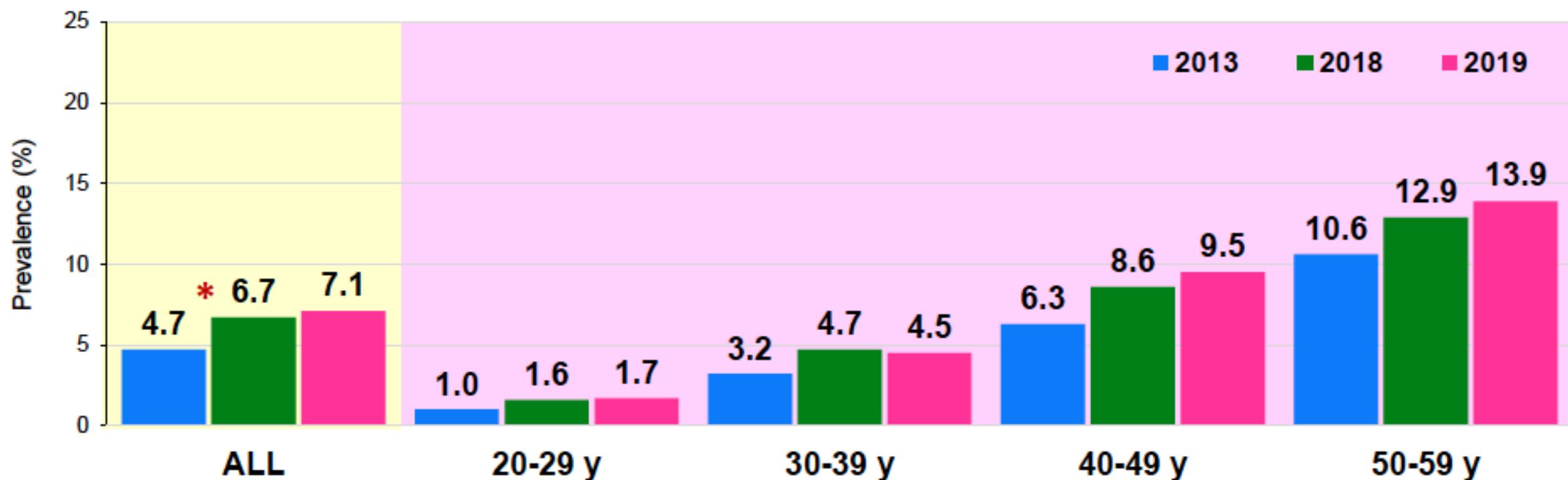


# Risk factors for Diabetes

- Increasing age: Age > 40 years
- History of IGT or IFG (pre-diabetes)
- First-degree relative with type 2 diabetes
- Women with history of GDM or delivery of a baby weighing  $\geq 8$  lbs
- Women with polycystic ovary syndrome (PCOS)
  
- **Physical inactivity**
- **Overweight (BMI  $\geq 23$  kg/m<sup>2</sup>) or obese (BMI  $\geq 25$  kg/m<sup>2</sup>)**
- **Waist circumference  $\geq 80$  cm ( ♀ ) and  $\geq 90$  cm ( ♂ ) or**
- **Waist-hip ratio (WHR)  $> 1$  ( ♂ ) and  $> 0.85$  ( ♀ )**



# High Fasting Blood Sugar among ADULTS, 20-59 years old



\* significantly different at 5% level of significance

## Multivariate analysis of factors associated with Elevated blood glucose (Combined Diabetes and Impaired Fasting Glucose), Philippines.

Variables	<i>p</i> -value	OR	95% CI
Male	<0.0001	1.511	(1.291, 1.769)
Age ≥ 40 years	<0.0001	3.304	(2.699, 4.044)
Age ≥ 35 years	<0.0001	2.650	(1.822, 3.856)
Age ≥ 30 years	<0.0001	5.447	(3.097, 9.582)
Hypertension	<0.0001	1.653	(1.493, 1.831)
Triglycerides ≥ 150	<0.0001	1.691	(1.511, 1.892)
BMI ≥ 23 kg/m <sup>2</sup>	<0.0001	1.468	(1.264, 1.706)
BMI ≥ 25 kg/m <sup>2</sup>	<0.0001	1.412	(1.204, 1.657)
Elevated waist circumference	0.030	1.182	(1.017, 1.373)

OR: adjusted odds-ratio, CI: confidence interval

Male sex; age ≥ 40 years; hypertension with BP > 140/90 mm Hg; TG levels > 150 mg/dL; overweight with BMI > 23 kg/m<sup>2</sup>; abdominal obesity with waist circumference ≥ 90 cm in male and ≥ 80 cm in female adults.



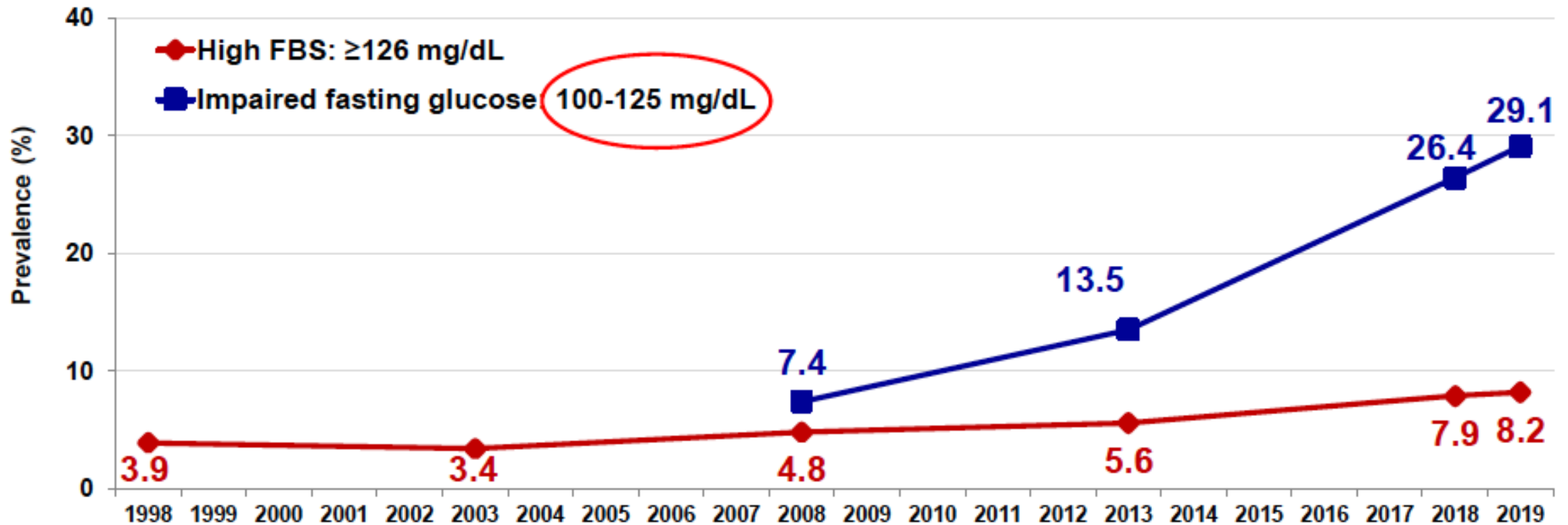
# Other Risk factors for Diabetes

- Presence of Other components of the Metabolic Syndrome
  - Hypertension (BP  $\geq$ 140/90 mm Hg),
  - Serum HDL <35 mg/dL (0.9 mmol/L),
  - Serum triglycerides >250 mg/dL (2.82 mmol/L),
- ASCVD: stroke, peripheral arterial occlusive disease, coronary artery disease
- Acanthosis nigricans
- Schizophrenia and its Treatment
- Tuberculosis, Systemic rheumatologic disorders (Psoriasis, SLE)





# Trend in the Prevalence of High Fasting Blood Sugar among Adults, 20 years old and above, 1998-2019



29.1 % IFG + 8.2% DM = 37.3 % Prevalence of DM + IFG  
[underestimate] 1 out of every 3 has dysglycemia

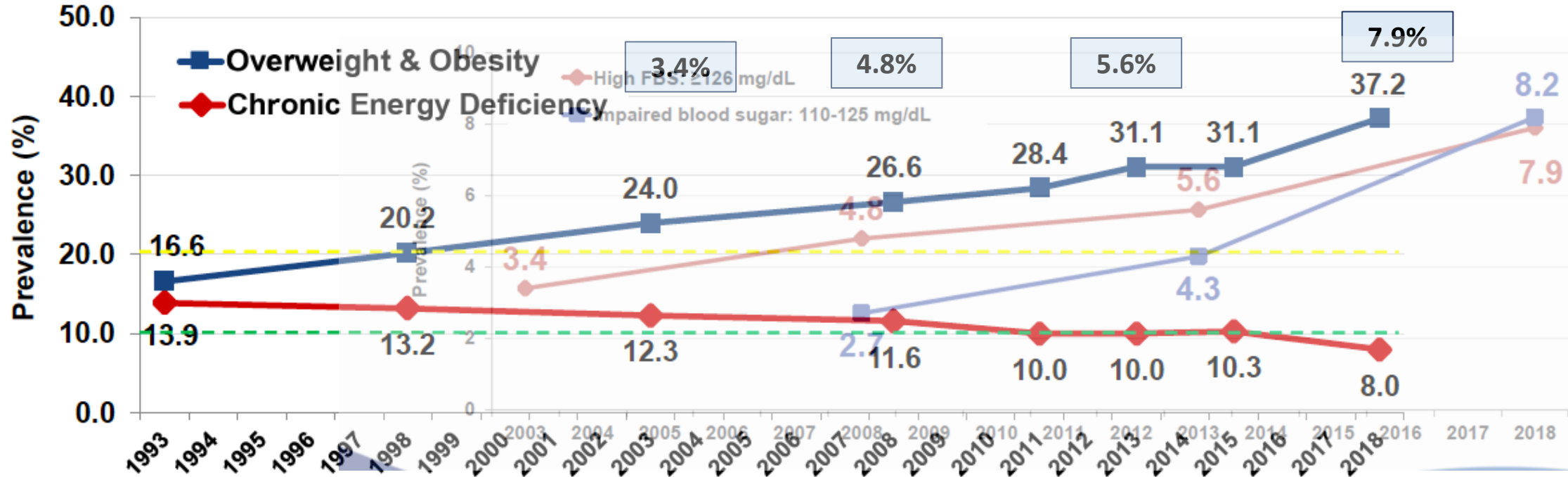


# Insight #1: High Prevalence of Pre-diabetes

- Pre-diabetes in the Philippines is very prevalent
- This presents an opportunity to intervene to prevent diabetes or to normalize the blood sugars.
- The pandemic has halted screening efforts PhilPEN.



# Trends in the Prevalence of Chronic Energy Deficiency and Overweight and Obesity among Adults, 20 years old and above: Philippines, 1993-2018

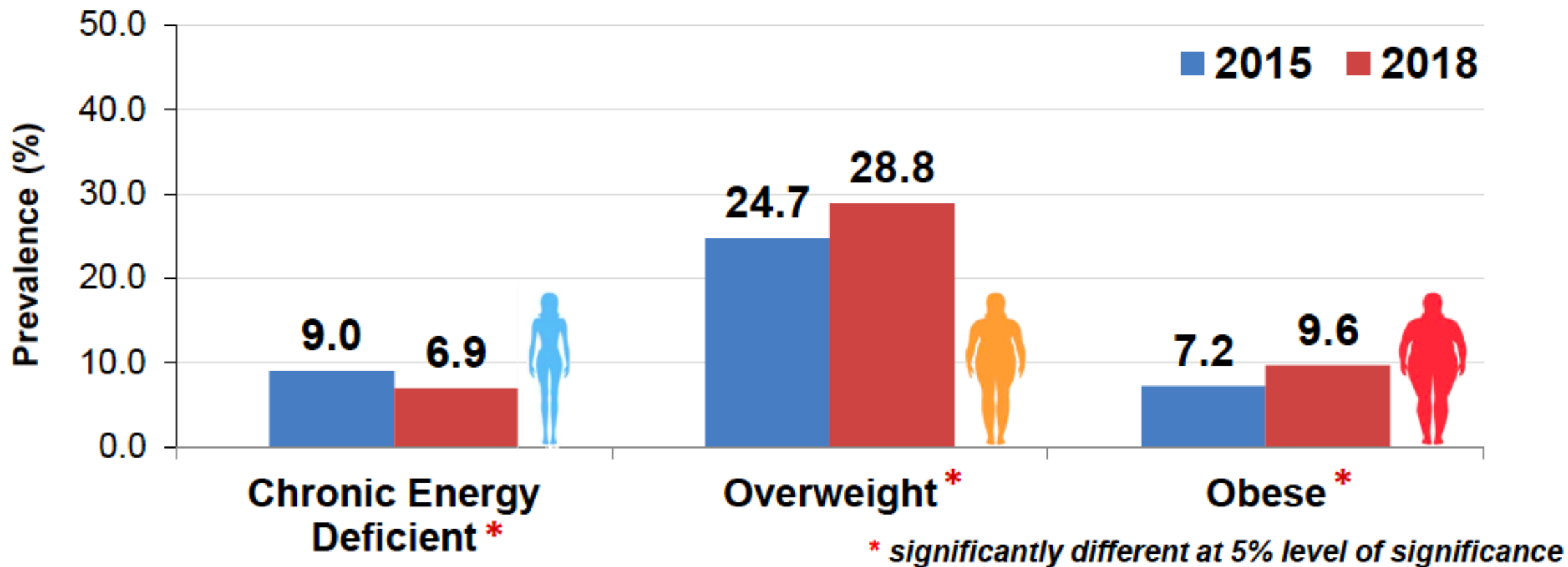


Based on the WHO Body Mass Index (BMI) cut-off points

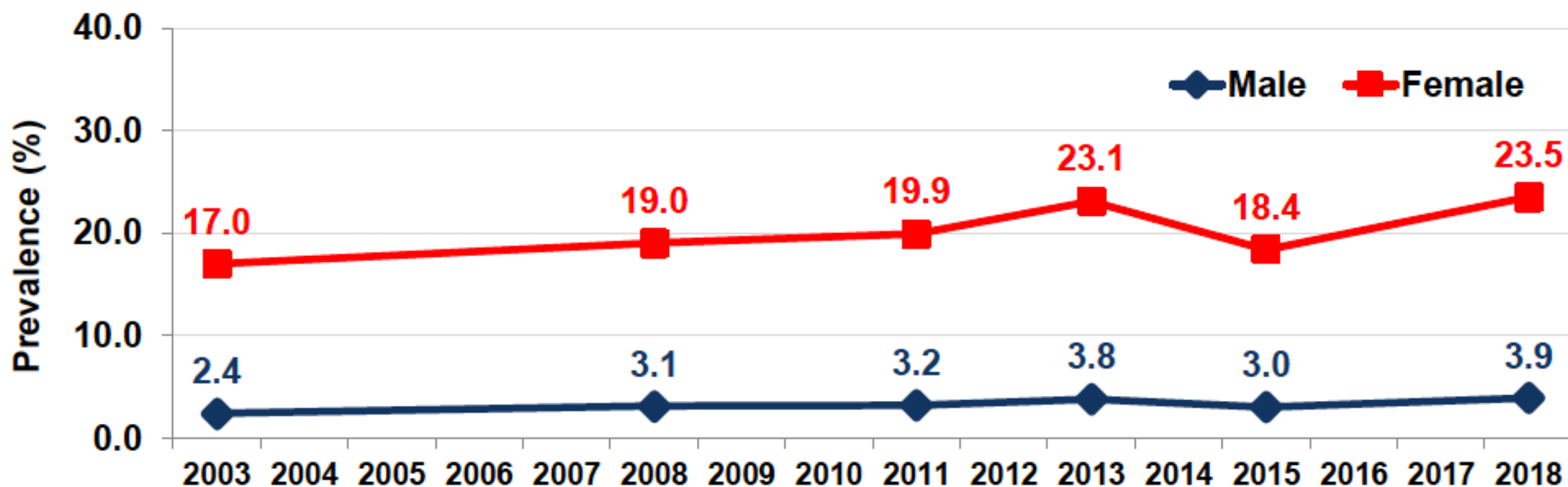
Department of Science and Technology  
FOOD AND NUTRITION RESEARCH INSTITUTE



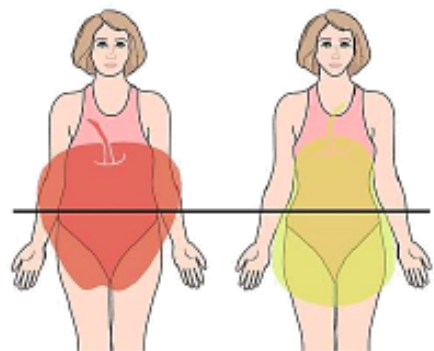
# Nutritional Status of ADULTS, 20-59 years old: Philippines, 2018



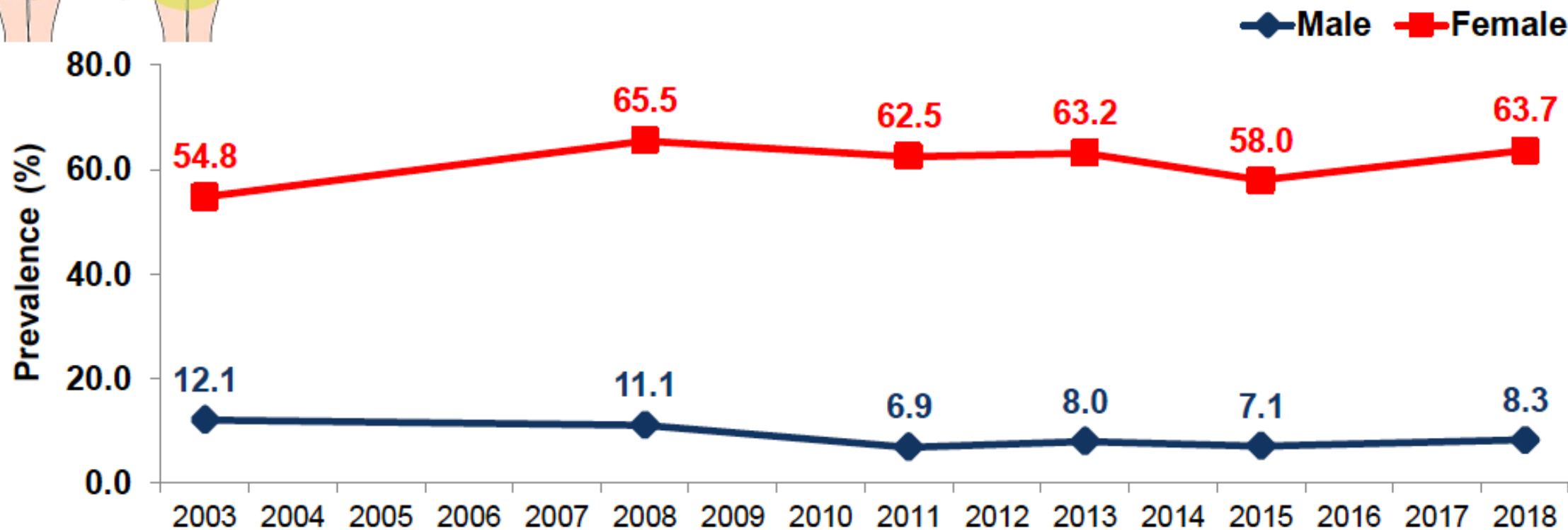
# Trends in the Prevalence of High Waist Circumference (WC)<sup>o</sup> among Adults, 20 years old and above: Philippines, 2003-2018



<sup>o</sup> High WC is  $\geq 102$  cm ( $>40$ in) for males or  $\geq 88$  cm ( $>34$ in) for females



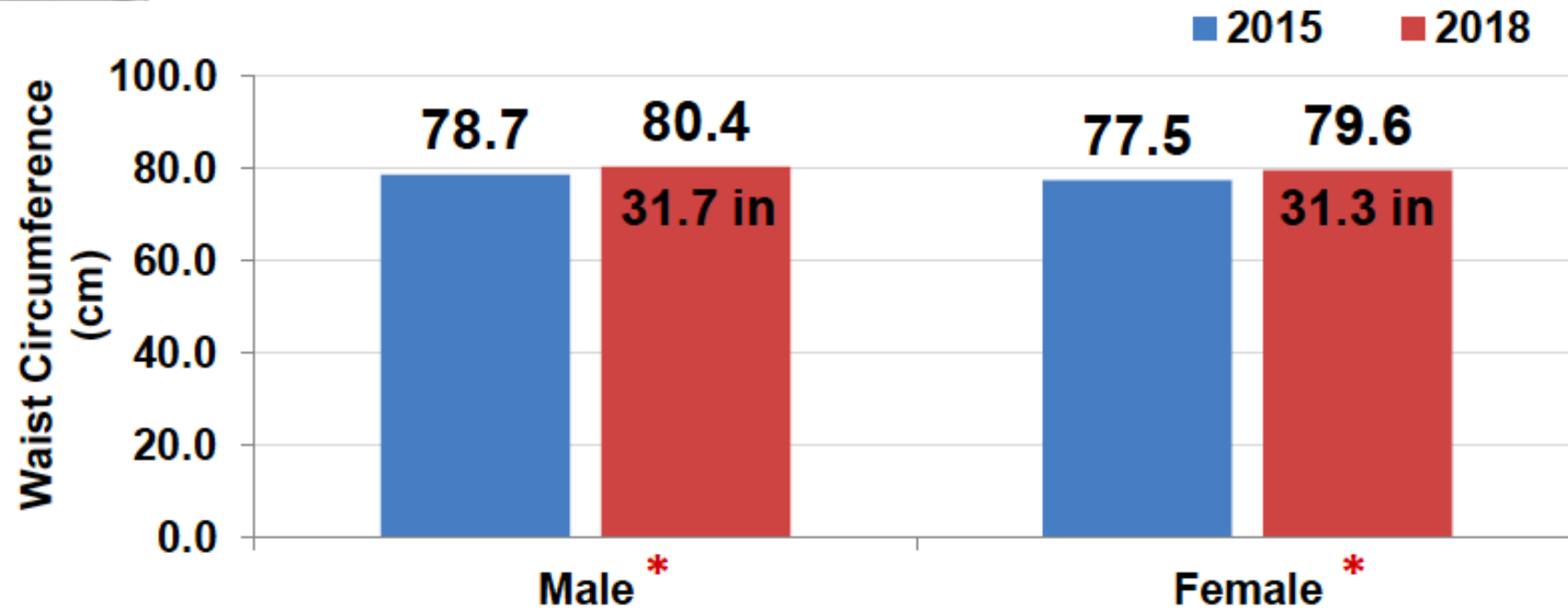
# Trends in the Prevalence of High Waist-Hip Ratio (WHR)<sup>o</sup> among Adults, 20 years old and above: Philippines, 2003-2018



<sup>o</sup> High WHR is  $\geq 1.00$  for males or  $\geq 0.85$  for females



## Mean Waist Circumference (WC) among Adults, 20 years old and above: Philippines, 2015 vs 2018



\* significantly different at 5% level of significance

# Optimal BMI, WC & WHR Thresholds for Filipinos

Anthropometric measures	WHO Asians <sup>2</sup>
BMI Overweight	23(kg/m <sup>2</sup> )
WC cutoff value	90 cm in men 80 cm in women

To determine cut-off levels of body mass index (BMI), waist circumference (WC) and waist-to-hip ratio (WHR) for overweight/ obesity associated with cardiometabolic diseases (CMDs) among adult Filipinos in a **rural community**.

	Male	Female
<b>BMI (kg/m<sup>2</sup>)</b>	24	23
<b>Waist-Hip Ratio (WHR)</b>	0.91	0.85
<b>Waist circumference (cm)</b>	84	77



# Insight #2

- x There is a strong link between obesity and the development of diabetes and metabolic syndrome.
- x Filipinos like many Asians develop the metabolic syndrome at much lower BMI than our international counterparts.
- x By maintaining normal body weight and preventing visceral adiposity, we can prevent diabetes and metabolic syndrome.

# **The link between sugar intake and diabetes mellitus**

# Population Level Data

- Basu, et al (2013): examined people in > 175 different countries found that more sugar in the food supply led to increased diabetes rates.
- For every additional 150 calories of sugar available per day per person, diabetes levels rose by 1 percent.
- This continued even when researchers controlled other factors with links to diabetes, such as obesity, exercise, & overall calorie consumption.

Basu S, Yoffe P, Hills N, Lustig RH (2013). PLoS ONE 8(2): e57873. doi:10.1371/journal.pone.0057873



# Sugar-sweetened beverages & T2DM

- Data from prospective cohort studies published in the years 2000-2011 suggest that sugar-sweetened beverages probably increase the risk of type 2 diabetes. [Nordic countries, adults]
- Sugar-sweetened beverages are more strongly associated with high energy intake and weight gain than any other form of processed food.

Sonestedt E et al. Food & Nutrition Research 2012. 56: 19104 -<http://dx.doi.org/10.3402/fnr.v56i0.19104>

Woodward-Lopez G, Kao J, Ritchie L. Public Health Nutr. 2011 Mar;14(3):499–509. doi: <http://dx.doi.org/10.1017/S1368980010002375>



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# Dietary carbohydrate intake and mortality: a prospective cohort study and meta-analysis

*Sara B Seidelmann, Brian Claggett, Susan Cheng, Mir Henglin, Amil Shah, Lyn M Steffen, Aaron R Folsom, Eric B Rimm, Walter C Willett, Scott D Solomon*

- N = 15,428 adults aged 45–64 years, in 4 US communities, who completed a dietary questionnaire at enrolment in the Atherosclerosis Risk in Communities (ARIC) study (between 1987 and 1989).
- The primary outcome was all-cause mortality.
- ARIC data was combined with data for carbohydrate intake reported from seven multinational prospective studies in a meta-analysis

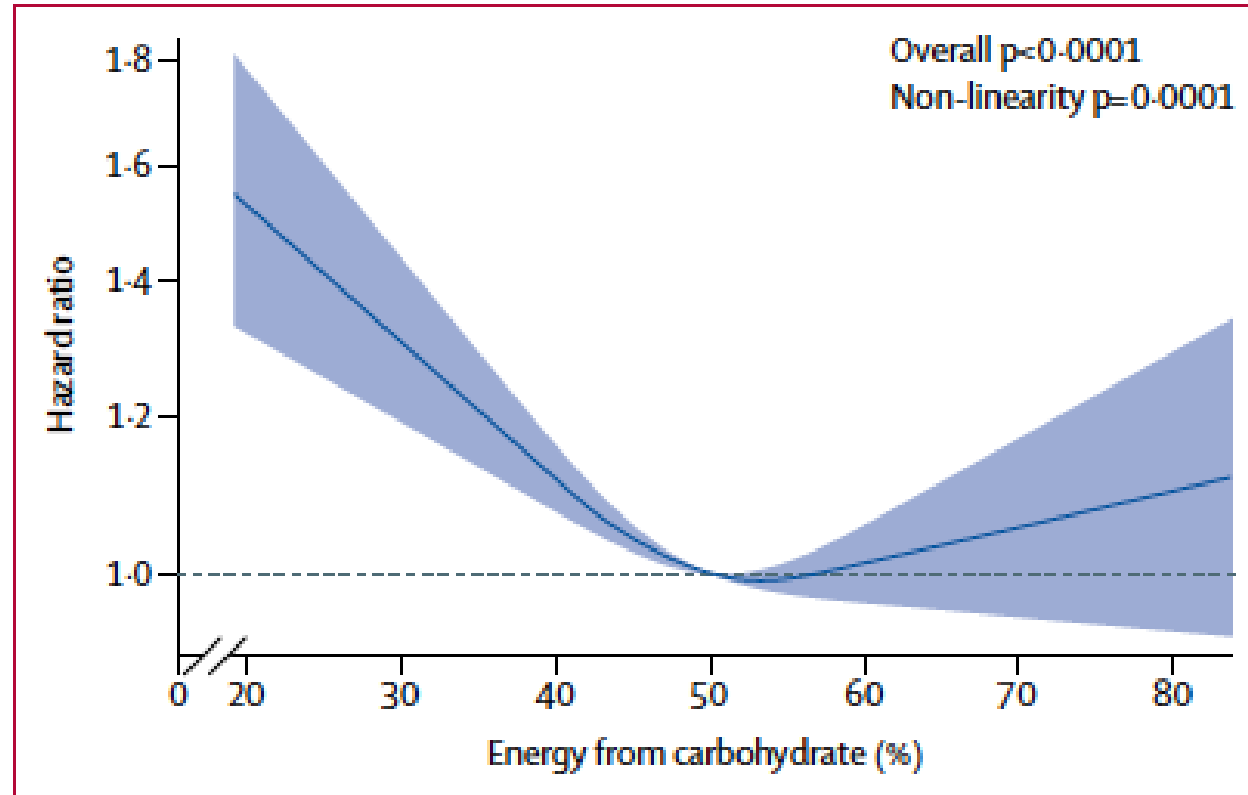
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# Dietary carbohydrate intake and mortality: a prospective cohort study and meta-analysis

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- **Interpretation: Both high & low percentages of carbohydrate diets were associated with increased mortality, with minimal risk observed at 50–55% carbohydrate intake.**
- Low carbohydrate dietary patterns favoring animal-derived protein and fat sources, from sources such as lamb, beef, pork, and chicken, were associated with higher mortality, whereas those that favoured plant-derived protein and fat intake, from sources such as vegetables, nuts, peanut butter, and whole-grain breads, were associated with lower mortality, **suggesting that the source of food notably modifies the association between carbohydrate intake and mortality.**

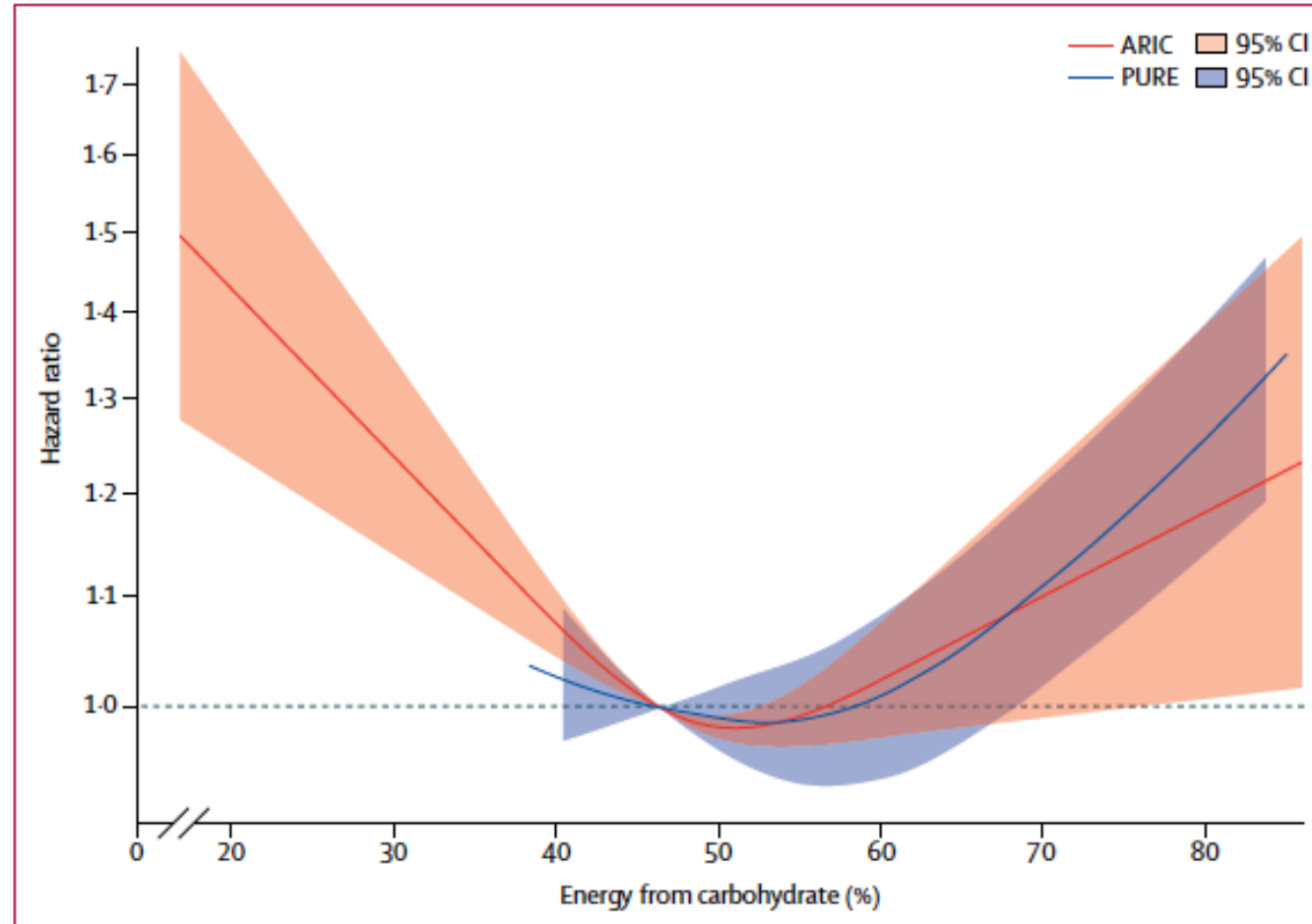
# From the ARIC Study



**Figure 1: U-shaped association between percentage of energy from carbohydrate and all-cause mortality in the ARIC cohort**

The reference level is 50% energy from carbohydrate. Results are adjusted for age, sex, race, ARIC test centre, total energy consumption, diabetes, cigarette smoking, physical activity, income level, and education. ARIC=Atherosclerosis Risk in Communities.

# From the ARIC & PURE Study



**Figure 3: U-shaped association between percentage of energy from carbohydrate and all-cause mortality in the ARIC and PURE cohort studies**

The reference level is 46.4% energy from carbohydrate. ARIC results are adjusted for age, sex, education, waist-to-hip ratio, smoking, physical activity, diabetes, ARIC test centre, and energy intake. PURE results are adjusted for age, sex, education, waist-to-hip ratio, smoking, physical activity, diabetes, urban or rural location, centre, geographical regions, and energy intake.<sup>13</sup> The mean percentage of energy from carbohydrate in ARIC is 49%, and from PURE it is 61%. ARIC=Atherosclerosis Risk in Communities. PURE=Prospective Urban Rural Epidemiology.



	Study	HR (95% CI)
<b>Substitution of carbohydrate for animal protein and fat</b>		
Low-to-moderate carbohydrate consumption	Fung et al <sup>9</sup> (HPFS)	1.31 (1.19–1.44)
Low-to-moderate carbohydrate consumption	Fung et al <sup>9</sup> (NHS)	1.17 (1.08–1.26)
Low-to-moderate carbohydrate consumption	ARIC	1.20 (1.09–1.32)
Low-to-moderate carbohydrate consumption	Combined low-to-moderate cohorts	1.22 (1.14–1.31)
Moderate-to-high carbohydrate consumption	Nakamura et al <sup>24</sup>	1.00 (0.87–1.19)
Meta-analysis (pooled result)	..	1.18 (1.08–1.29); p<0.0001
<b>Substitution of carbohydrate for plant protein and fat</b>		
Low-to-moderate carbohydrate consumption	Fung et al <sup>9</sup> (HPFS)	0.81 (0.74–0.89)
Low-to-moderate carbohydrate consumption	Fung et al <sup>9</sup> (NHS)	0.79 (0.73–0.85)
Low-to-moderate carbohydrate consumption	ARIC	0.86 (0.75–0.99)
Low-to-moderate carbohydrate consumption	Combined low-to-moderate cohorts	0.81 (0.76–0.85)
Moderate-to-high carbohydrate consumption	Nakamura et al <sup>24</sup>	0.92 (0.80–1.09)
Meta-analysis (pooled result)	..	0.82 (0.78–0.87); p<0.0001

Data are for 154 344 participants and 30 959 deaths. HR=hazard ratio. HPFS=Health Professionals Follow-up Study. NHS=Nurses Health Study. ARIC=Atherosclerosis Risk in Communities.

**Table 3: Association between diets that substitute carbohydrates for animal-based or plant-based protein and fat with mortality in multiple cohort studies**

# Macronutrient Intake and MetS

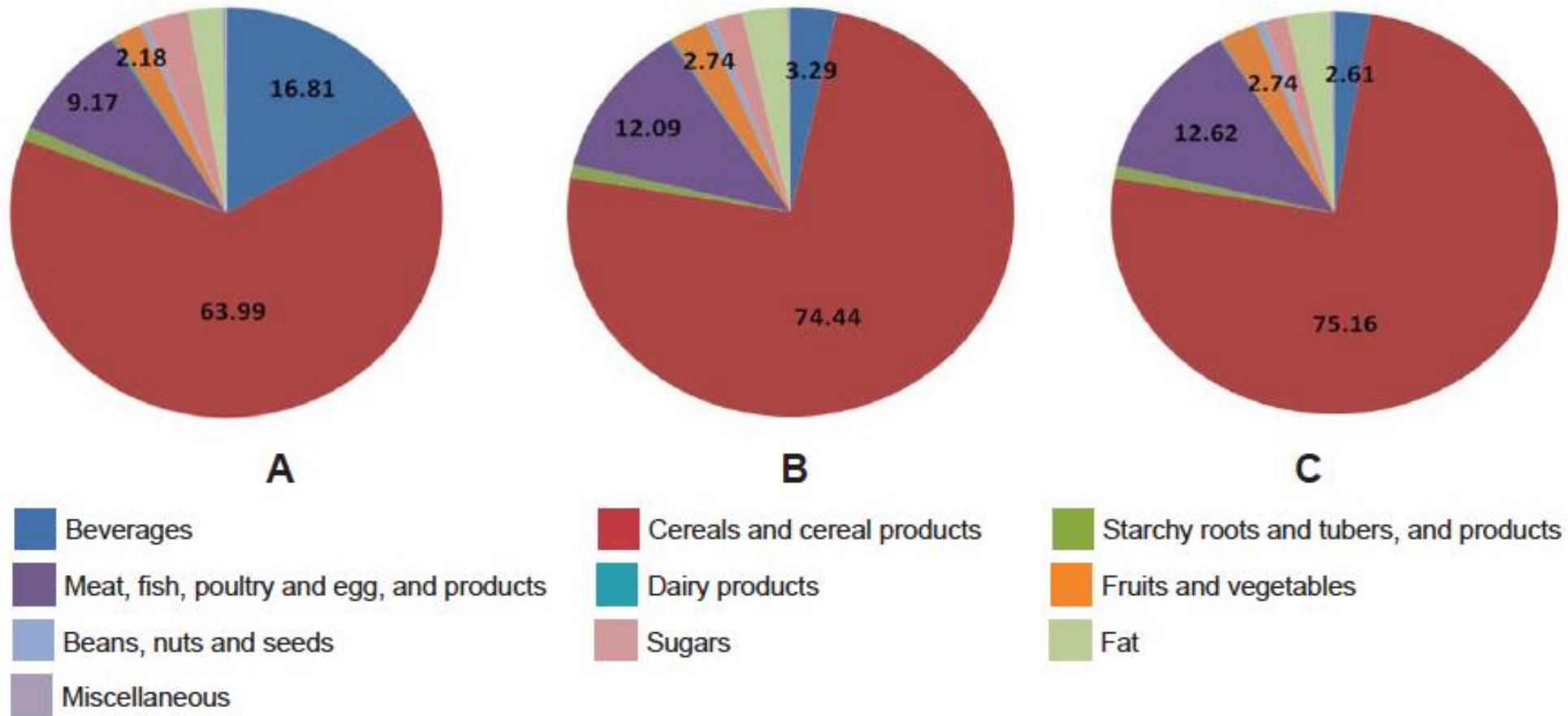
- ↑ Total caloric intake OR 1.608 (1.337-1.935)
- ↑ total protein intake OR 1.794 (1.491-2.159,
- Daily consumption of meat and poultry OR 1.4 (1.16- 1.68)
- Decreased vegetable intake OR 1.3 (1.08-1.57)
  
- ↑ risk for overweight and obesity

**Sample  
Meal Plates  
in Piggang  
Pinoy**



**Illustative  
Meal Plates  
from the  
results of the  
NNS 2013**





**Figure 2.** Percentage (%) contribution of beverage consumption to mean energy intake/day in (A) pre-school children, 6 months to 5 years old, (B) school-aged children, 6 to 12 years old and (C) adolescents, 13 to 19 years old, NNS, Philippines: 2008.

Data from the 7<sup>th</sup> NNS



# Other Nutritional Determinants of Obesity

- Daily consumption of *cereal & cereal products, meat and meat products, as well as, fats and oils* and *sweetened beverages* were significantly associated with BMI  $\geq 25$  kg/m<sup>2</sup>.

	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile	75 <sup>th</sup> percentile
Cereals and cereal products, g	214.23	295.75	407.8
Meat & meat products, grams	33.12	64.68	123
Fats and Oils, grams	2.25	4.29	7.7

Lusica PM, Jimeno CA. Food Intake and Cardiometabolic Diseases. (unpublished)



*Do local data reflect those of foreign studies?*

## **Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study**

*Salim Yusuf, Steven Hawken, Stephanie Ounpuu, Tony Dans, Alvaro Avezum, Fernando Lanas, Matthew McQueen, Andrzej Budaj, Prem Pais, John Varigos, Liu Lisheng, on behalf of the INTERHEART Study Investigators\**

www.thelancet.com Vol 364 September 11, 2004



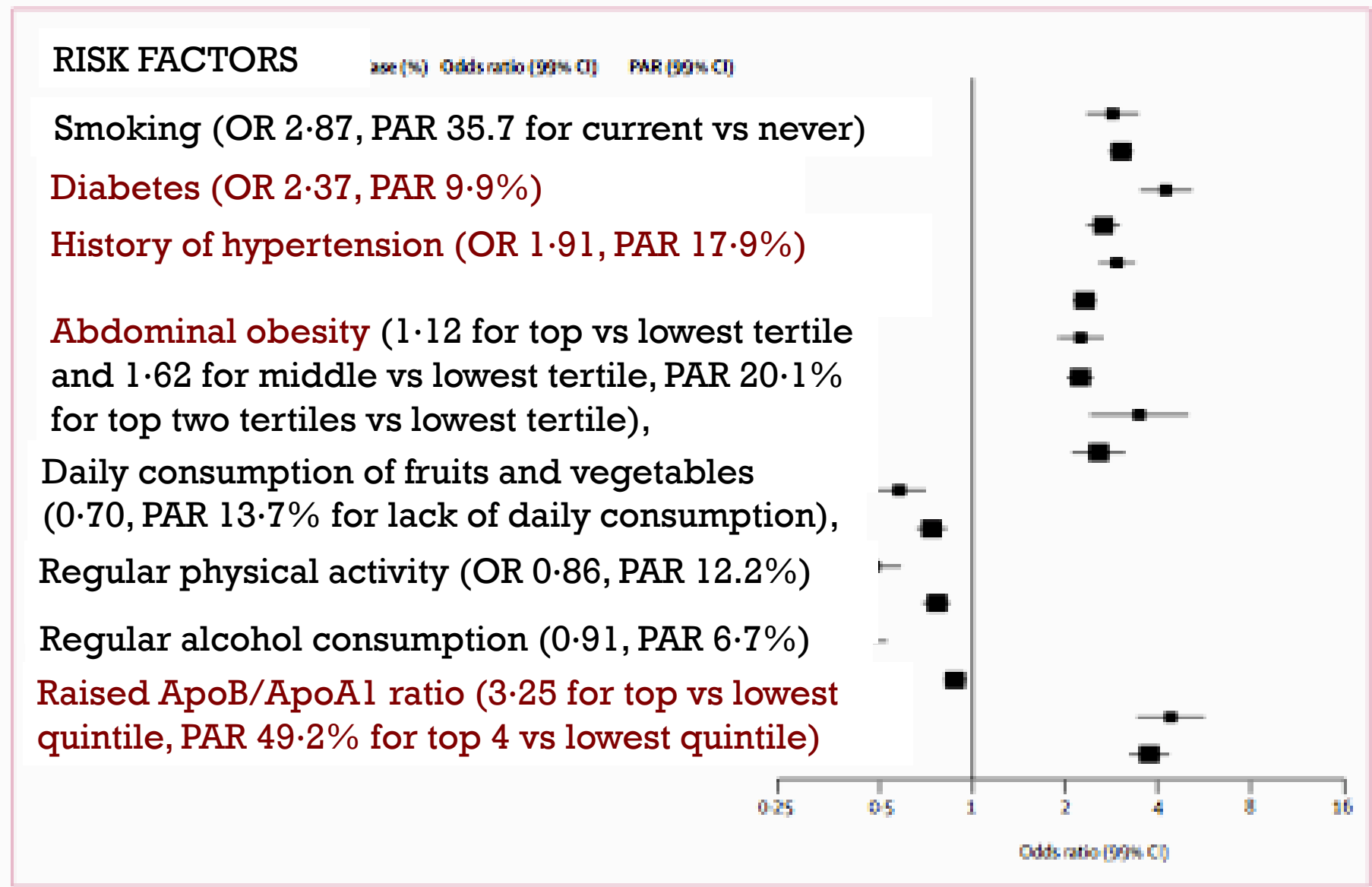


Figure 4: Association of risk factors with acute myocardial infarction in men and women after adjustment for age, sex, and geographic region

\* These associations were noted in men and women, old and young, & in all regions of the world. Collectively, these nine risk factors accounted for 90% of the PAR in men and 94% in women.

# Conclusions

- The reasons for the high prevalence of diabetes & metabolic syndrome in the Philippines are similar to the rest of the world
- High prevalence of overweight & obesity; made worse by the fact that Asians develop MetS as much lower waist circumference and BMI.
- High caloric diets rich meat and meat products, sweetened beverages with low vegetable intake, and low physical inactivity
- Public health interventions are needed to correct these nutrition and lifestyle factors that lead to metabolic syndrome.





# Alcohol Intake and Type 2 Diabetes Mellitus

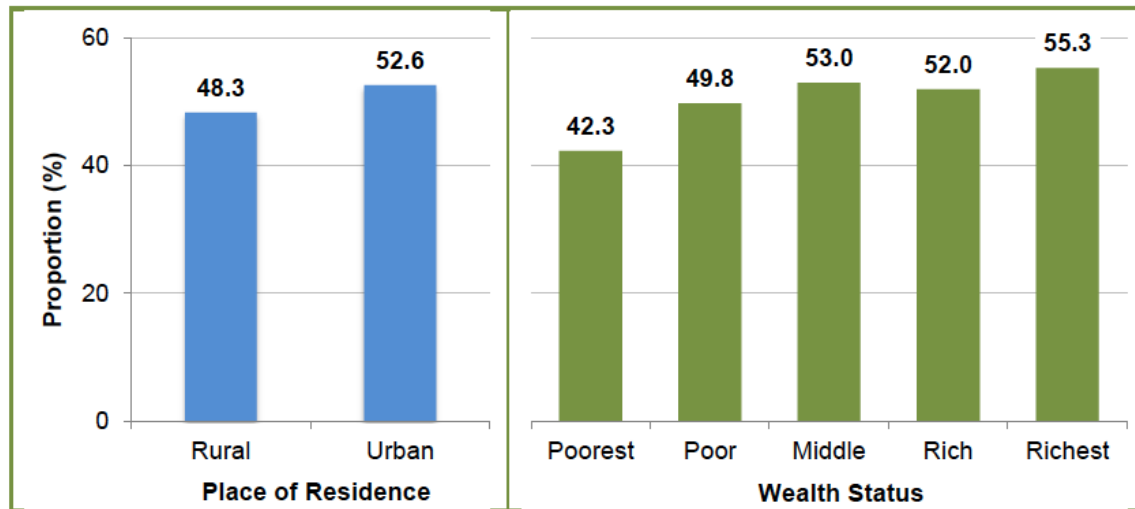


Figure C.21. Proportion of current alcohol drinkers among adults, 20-59 years old, by place of residence and wealth quintile: Philippines, 2018

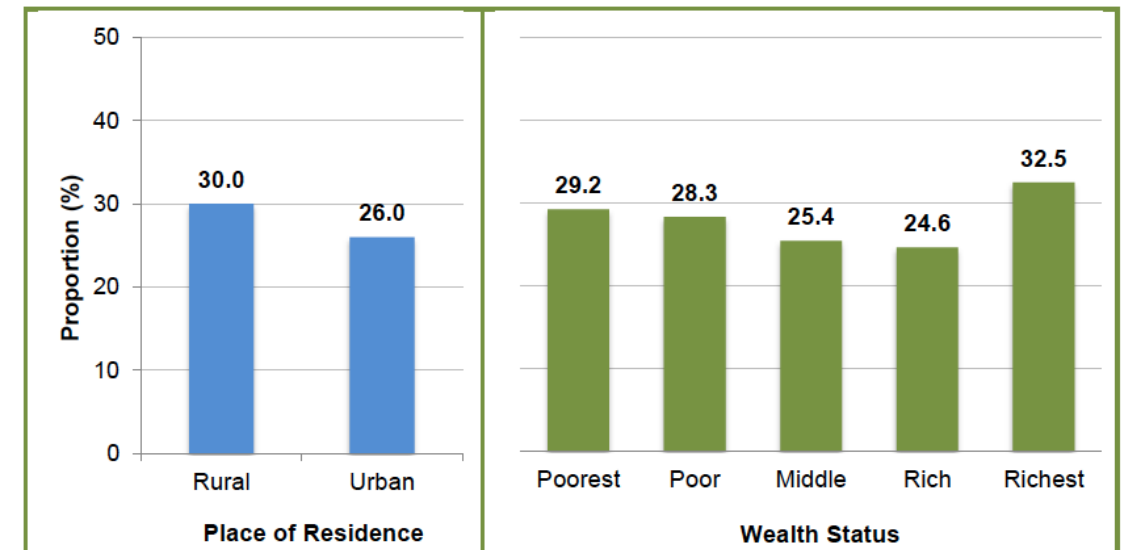
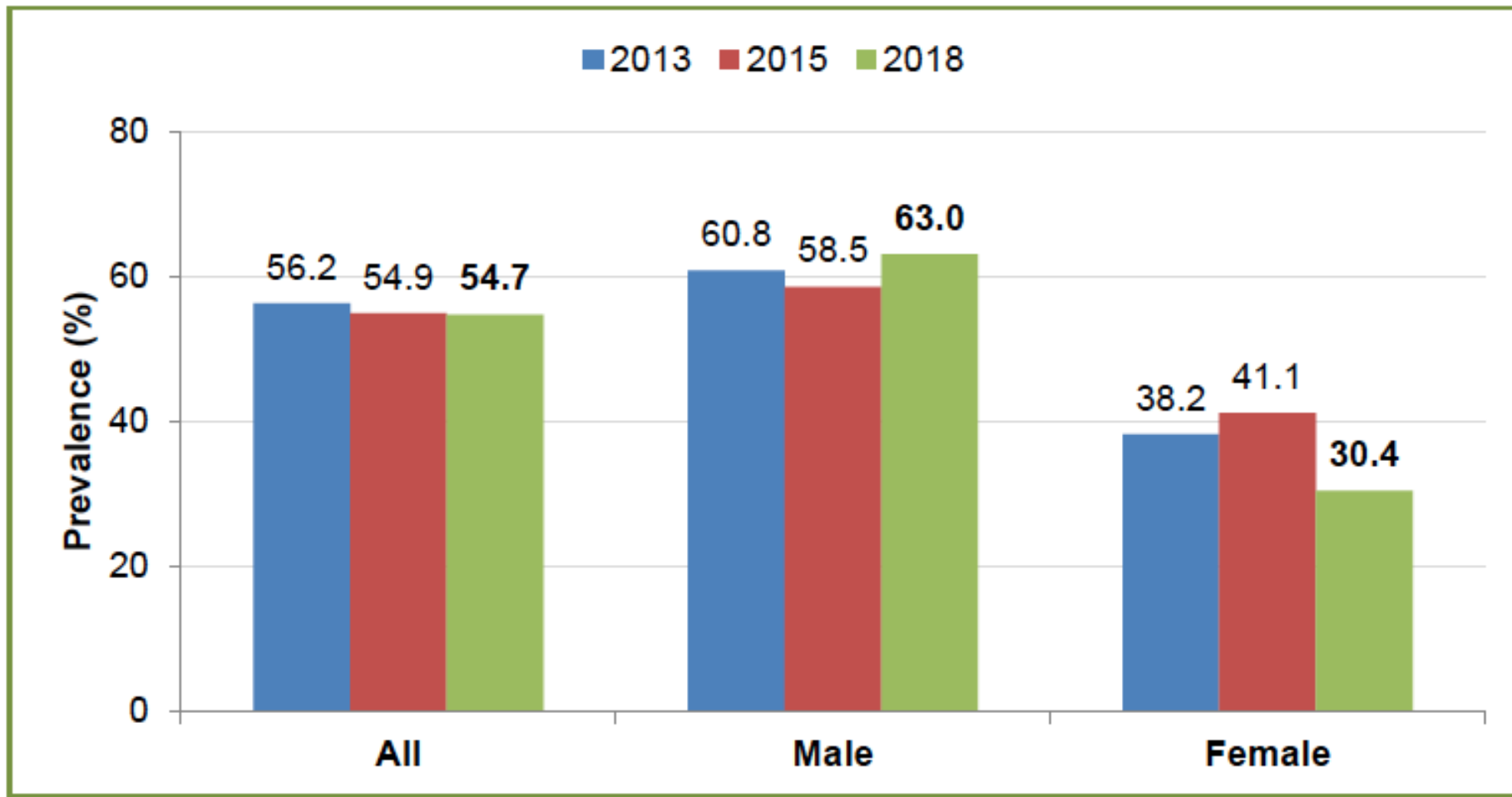


Figure C.23. Proportion of current alcohol drinkers among the elderly, 60 years old and above, by place of residence and wealth quintile: Philippines, 2018

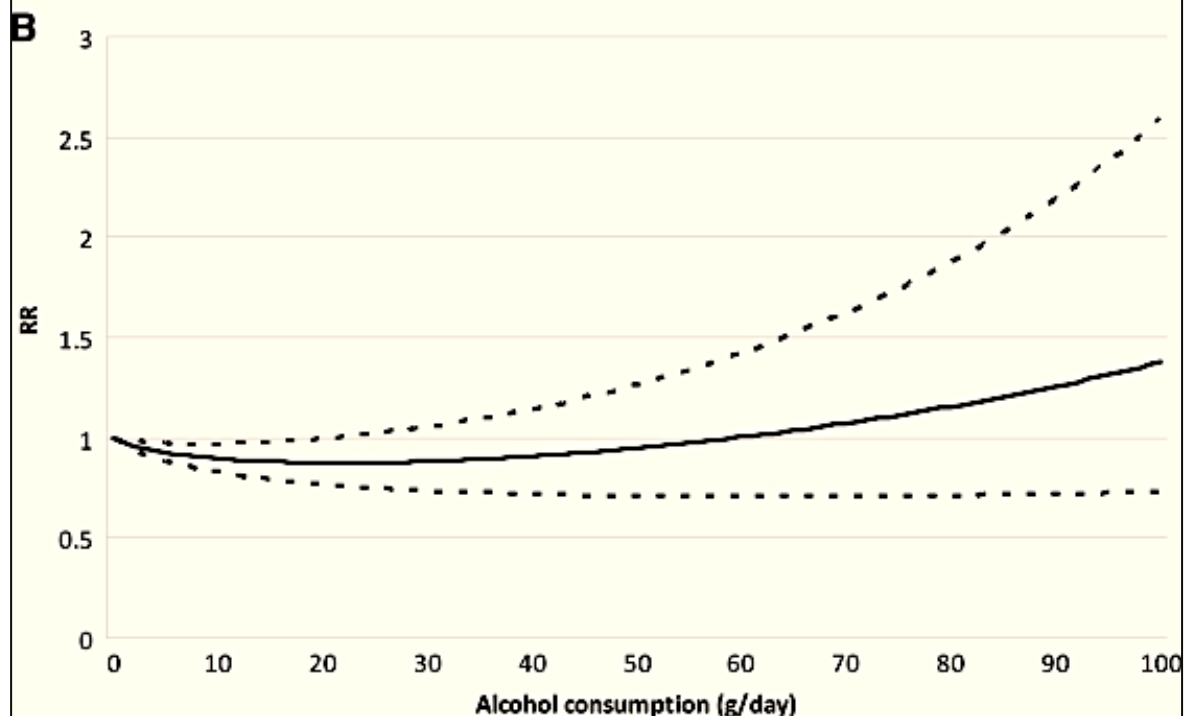
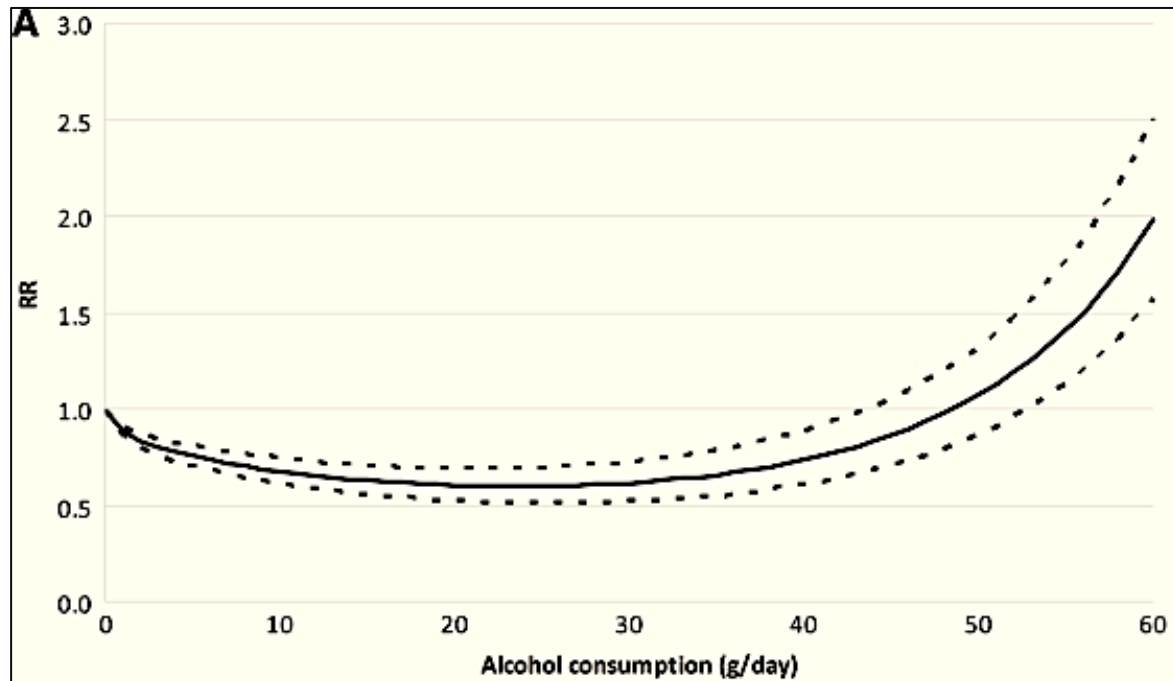
# Binge Drinking & Risk for Diabetes

- Binge drinking or the harmful use of alcohol occurs when females drink four or more standard drinks in a row and males drink five or more standard drinks in a row (WHO, 2005).
- Binge drinking results in a significant health, social, and economic burden on society at large (WHO, 2014a).
- Consistent binge drinking over time leads to increased risks in developing multitude of health problems such as cancer, mental and socio-behavioral health problems including alcohol dependence, chronic diseases (cardiovascular diseases, stroke, etc.), and even infectious diseases such as tuberculosis.





**Figure C.27. Trends in the proportion of binge drinking among currently drinking adults, 20 years old and above (those who reported drinking alcoholic beverages in the past 30 days): Philippines, 2013-2018**

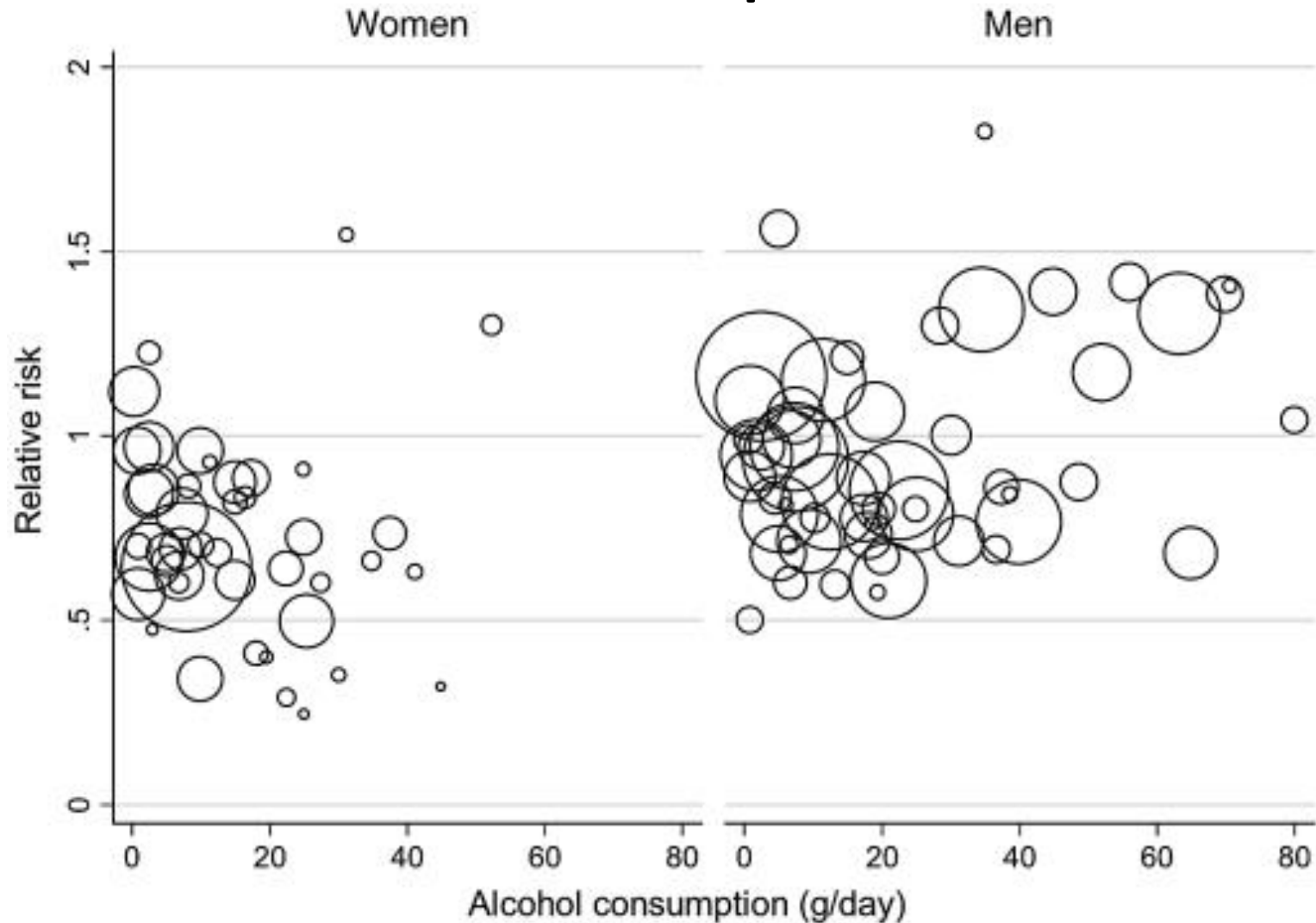


Pooled and fitted RR estimates and 95% CI band. *A*: The highest single alcohol consumption measure for women was 52.35 g/day, thus x-axis is scaled to 60 g/day. *B*: Among men, the single highest alcohol consumption measure was 80.04 g/day.

For both sexes, the relationship was U shaped. For both women and men, the protective effect of alcohol consumption on incident type 2 diabetes was greatest with the consumption of about two drinks per day (20-25 g/day).

Similarly, for both men and women, higher levels of consumption (above ~50 g/day for women and 60 g/day for men) were no longer protective but actually increased the risk for diabetes.

# Alcohol Consumption and Risk of Diabetes



Scatter plot of the RR estimates of type 2 diabetes reported in the 20 studies included in the analyses. Each study provides more than one RR estimate. The area of each circle is proportional to the precision of the RR estimate.



# Physical Inactivity

- Defined as not reaching the current WHO recommendation (doing less than 60 min of daily physical activity of moderate-to-vigorous intensity) or as being active for less than 60 min on 5 days per week.
- Philippines is the country with the highest prevalence of insufficient activity among boys (92.8%) and the Filipino teen was second in the world's least physically active, with a prevalence of 93.4%.



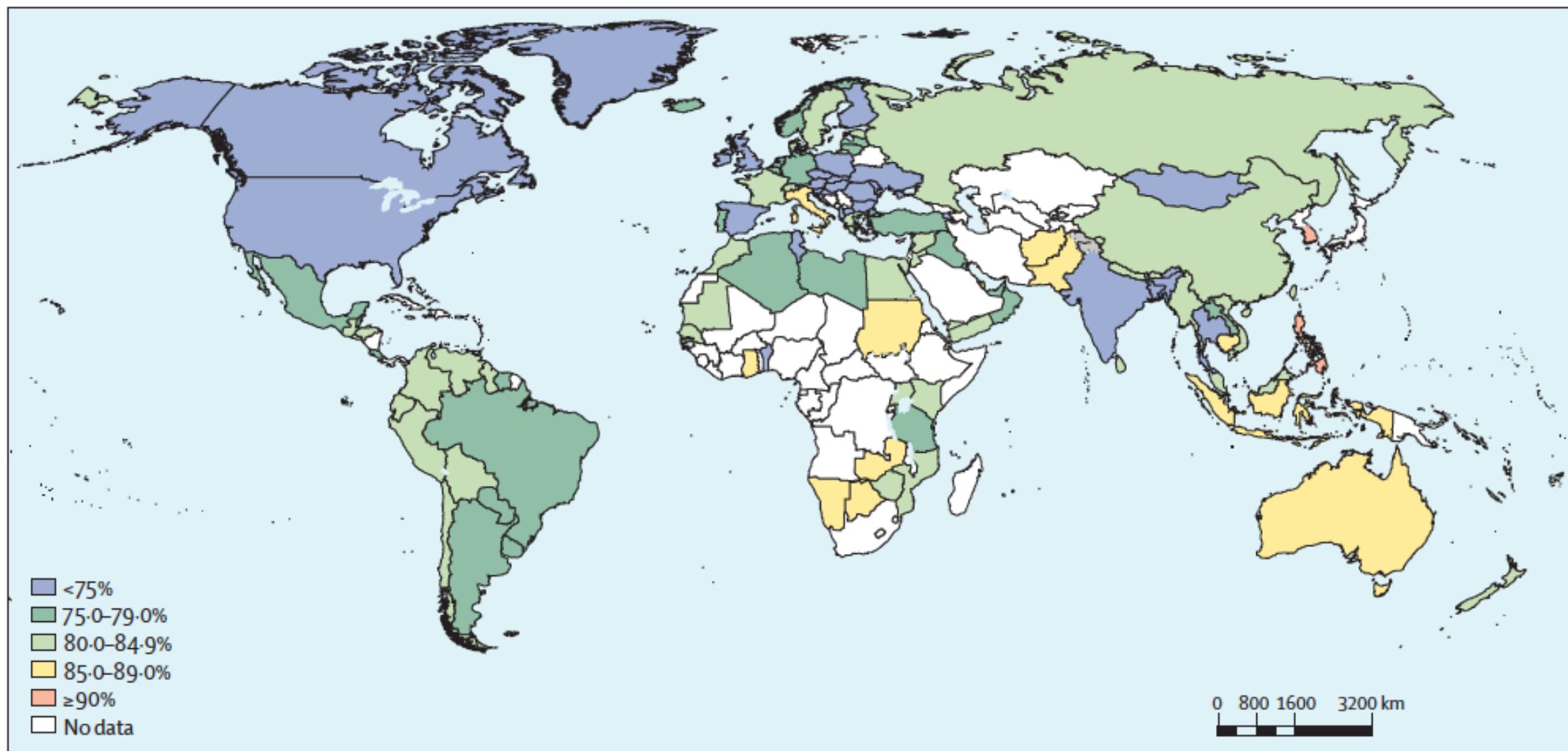


Figure 3: Prevalence of insufficient physical activity among school-going boys aged 11-17 years, 2016

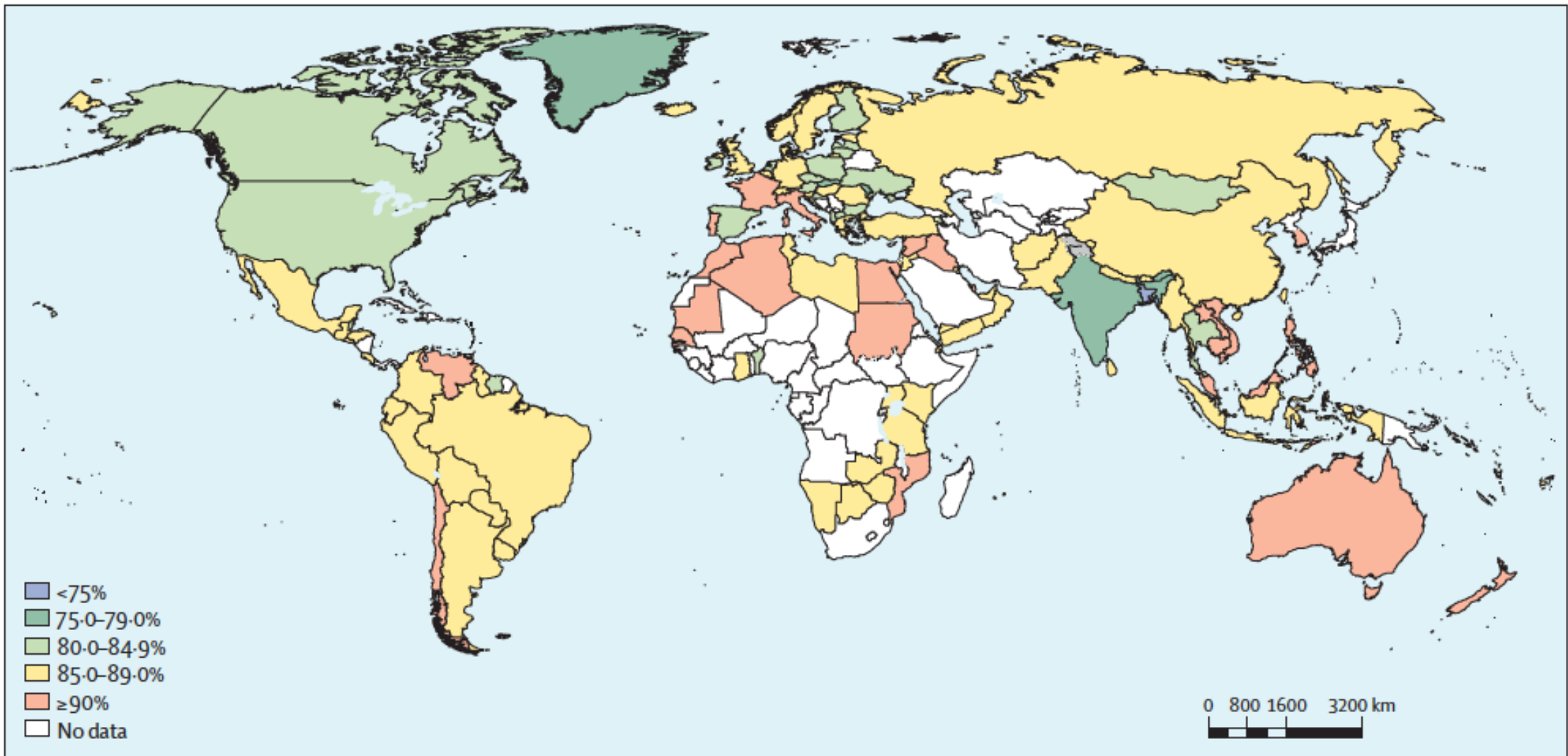
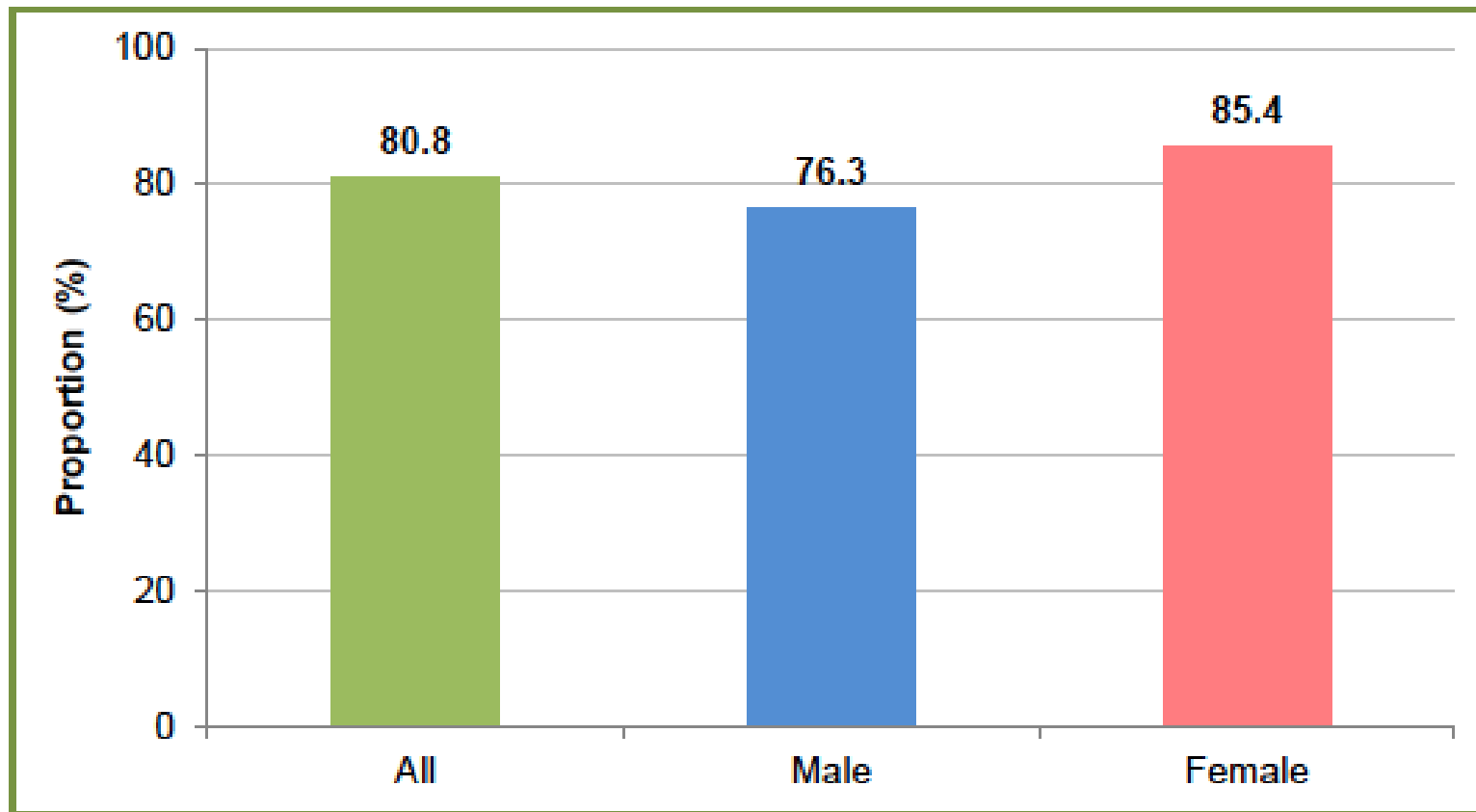


Figure 4: Prevalence of insufficient physical activity among school-going girls aged 11-17 years, 2016





**Figure C.29. Proportion of insufficiently physically active adolescents, 10-17 years old, by sex: Philippines, 2018**

In 2018, majority of adolescents were insufficiently physically active (80.8%). There were significantly more female adolescents (85.4%) who were physically inactive than male adolescents (76.3%)

# Identified Problems

- Increasing prevalence of overweight and obesity among adults,
- Rising risk of obesity among children
- Poor intake of vegetables and fruits
- Physical inactivity
- Binge drinking



# Existing and Emerging Policies

- Sweetened Beverage Tax (Passed December 2017)
- Food (Menu) Labeling Bill (Passed November 16, 2021)
- Physical Education in the New Normal: resolved that this will be retained as a subject in the K to 12 curriculum even after the pandemic



# Sweetened Beverage Tax, Philippines 2017

## **Republic Act 10963 Section 47 (TRAIN Law) signed into law 19 December 2017**

Definition: sweetened beverages were defined as non-alcoholic beverages of any constitution (i.e. liquid, powder or concentrate) that are prepackaged and sealed in accordance with Philippine Food and Drug Administration standards and that contain caloric or non-caloric sweeteners or both added by the manufacturers.

Taxable products: (i) sweetened juice drinks; (ii) sweetened tea; (iii) all carbonated beverages; (iv) flavoured water; (v) energy and sports drinks; (vi) powdered drinks not classified as milk, juice, tea or coffee; (v) cereal and grain beverages; and (vi) other non-alcoholic beverages that contain added sugar.

Exemptions: (i) all milk products, including plain milk, infant formula milk, follow-on milk, growing-up milk, powdered milk, ready-to-drink milk, flavoured milk, fermented milk, soy milk and flavoured soy milk; (ii) 100% natural fruit juices without added sugar or caloric sweeteners; (iii) 100% natural vegetable juices without added sugar or caloric sweeteners; (iv) meal-replacement and medically indicated beverages; and (v) ground coffee, instant soluble coffee and prepackaged powdered coffee products; and (vi) beverages sweetened with coconut sap or stevia glycosides.

Tax rate: 6.00 Philippine pesos<sup>a</sup> per litre for beverages sweetened with caloric or non-caloric sweeteners (except high-fructose corn syrup) and 12.00 Philippine pesos<sup>a</sup> per litre for beverages sweetened with high-fructose corn syrup.

TRAIN: Tax Reform for Acceleration and Inclusion.



# Details of the Tax on SSB

- Tax rate was set to 6.00 Philippine pesos (0.111 United States dollars) per litre of SSB with higher tax rates on beverages containing high-fructose corn syrup, resulting in a differential rate of 12.00 Philippine pesos per litre.
- Local setting: Despite a 12% value-added tax on sugar-sweetened beverages, sales had been sustained by enhanced marketing and product variants being offered in small portions.
- Relevant changes: One month after implementation of the tax in 1 January 2018, prices of taxable sweetened beverages had increased by 16.6 to 20.6% & sales in sari-sari (convenience) stores had declined 8.7%.



# Caveats of the SSB

- An analysis of empirical data on soft drink taxation policies suggested that taxation scheme alone may not be large enough to bring about meaningful behavioral change (Fletcher et al. 2010).
- Taxes may bring about reduction in sales of sweetened beverages, this effect may be insignificant if such beverages remain accessible & available in homes, schools, convenience stores and other outlets.
- Thus, integration of policy and program options coupled with effective education programs, informed media campaigns aimed for parents and children alike may be the most advantageous choice.



# Existing and Emerging Policies

- Sweetened Beverage Tax (Passed December 2017)
- Food (Menu) Labeling Bill (Passed November 16, 2021)
- Physical Education in the New Normal: resolved that this will be retained as a subject in the K to 12 curriculum even after the pandemic
- Compliance with Department of Education (DepEd) Order No. 8 Series of 2007 on healthy foods in school canteens.



# House Committee on Health approves Mandatory Menu Labeling bill

Published November 16, 2021, 6:58 PM  
by [Manila Bulletin](#)

The House of Representatives Committee on Health, under its chairperson Quezon Province Rep. Angelina “Helen” Tan, approved the bill mandating food establishments to display the nutrition facts and information on their menus on Tuesday, November 16.

The committee tackled House Bills 2580, 5319, 5389, 5473, 5823, 5931, 6357 and 7083 that will be consolidated into a substitute bill to be known as the “Mandatory Menu Labeling Act”.

The House bills were introduced by Deputy Speaker Eduardo ‘Bro. Eddie’ Villanueva and Reps. John Marvin ‘Yul Servo’ Nieto, Estrellita Suansing, Florencio Noel, Alfred Vargas, Cristal Bagatsing, Ria Christina Fariñas, Rudys Caesar Fariñas and Alfred Delos Santos.





# School-Based Initiatives

- The Department of Education (DepEd) Order No. 8 Series of 2007 states that “school canteens shall serve as a venue for developing desirable eating habits of pupils/ students”.
- Guidelines stipulate that beverages sold in public elementary and secondary schools shall include milk, and shakes and juices prepared from fruits and vegetables in season and sale of carbonated drinks, sugar-based synthetic or artificially-flavored juices is prohibited.
- This national policy initiative requires support and regulatory actions, i.e. quad-media promotion to increase general awareness and encourage involvement of parent-teacher-children associations and creation of monitoring teams to evaluate and ensure adherence to school nutrition standards.



# Proposed Policies

- Recognition that obesity is a disease and weight loss is an intervention.
- Information campaigns on various platforms, including in schools: more educational approaches to encourage healthy eating.
- Work with local & national food industries to develop foods that are healthier.
- Limits on advertising for alcohol?
- **Involvement of the urban design and transport sector** in healthy community planning should be an integral part of intervention strategies to encourage physical activity.



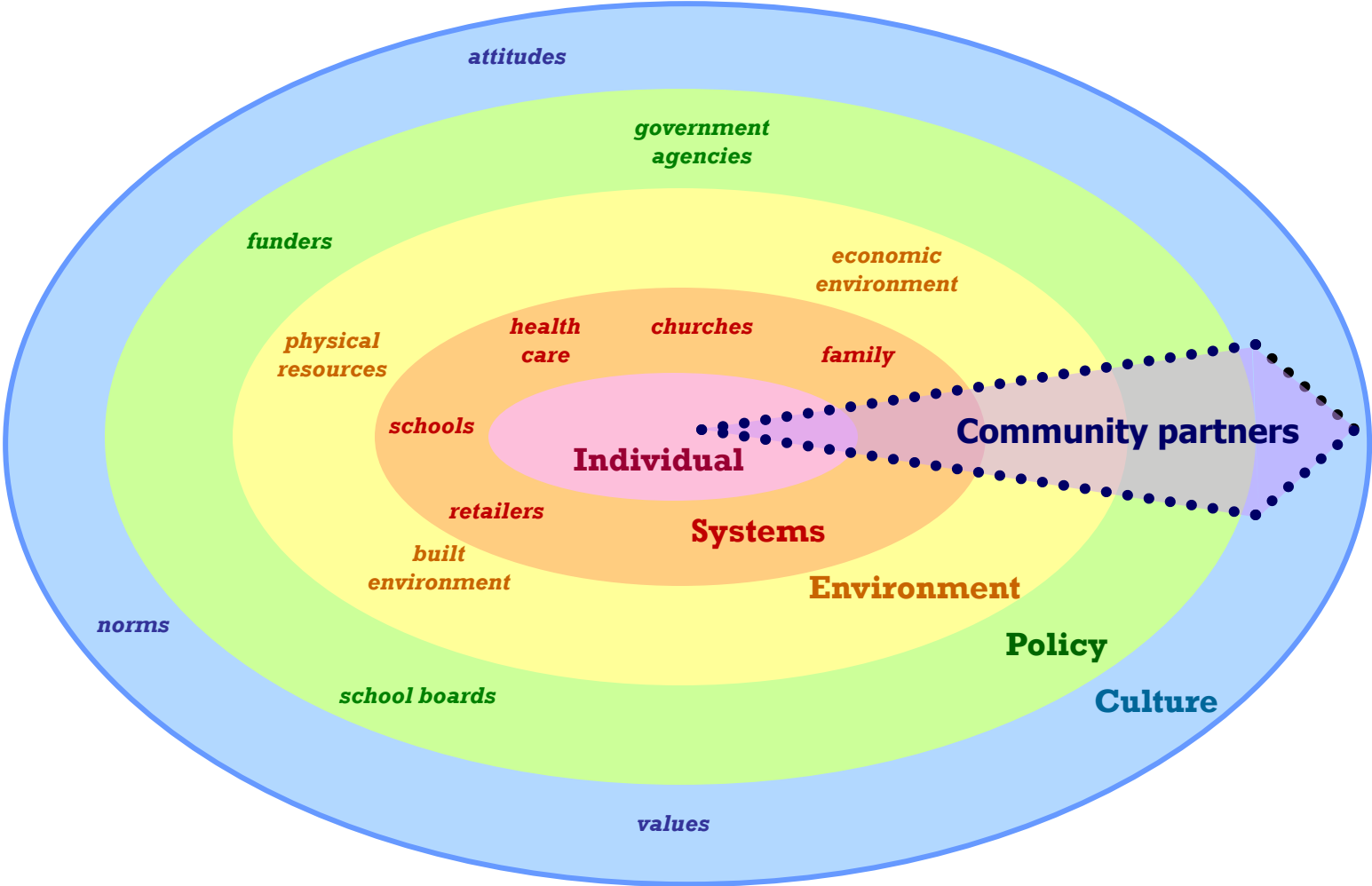
# The Way Forward: Pursue policy agenda on NCD prevention-

(1) Lowering of saturated fat & lower salt content in food offerings; 2) Mandating fast food chains and restaurants to keep public informed of the nutritional value of food offerings; 3) Providing subsidies/tax breaks to encourage manufacture and sale of healthier food options; 4) amendment of the Food Fortification Law; (5) legislation of graphic health warnings on tobacco packages, etc .....

DR. YOLANDA E. OLIVEROS, Director IV, National Center for Disease Prevention and Control, Department of Health



# Ecological model of intervention

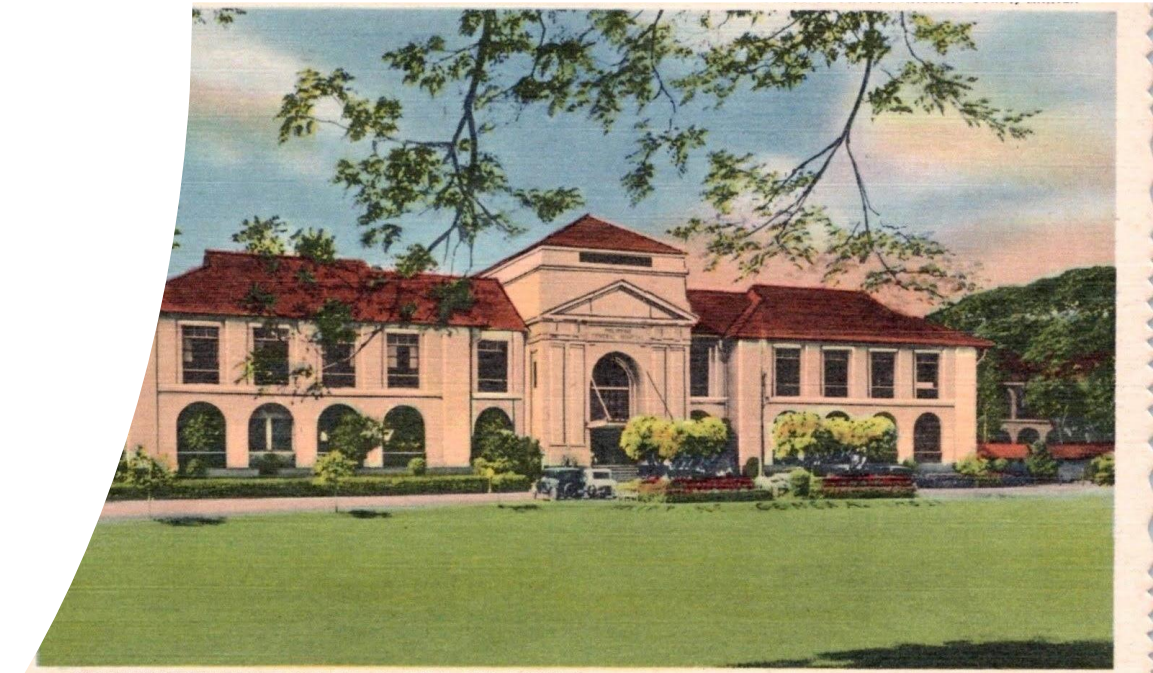


## Academic Discipline

- Behavioral sciences**
- Clinical medicine**
- Health promotion**
- Education**
- Social work**
- Economics**
- Public health**
- Public policy /law**
- Architecture/ Urban design**
- Marketing & media**

THANK YOU  
VERY MUCH!

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