

A world map with a light blue background. The landmasses are shown in white. The region of Southeast Asia, including the Philippines, Indonesia, and Malaysia, is highlighted in a dark red color. The title text is centered over the map.

# Cardiovascular Epidemiology in the Philippines and Southeast Asia

**Rody G. Sy, M.D.**  
**UP College of Medicine**

# Disclosure

None for this lecture

# Outline

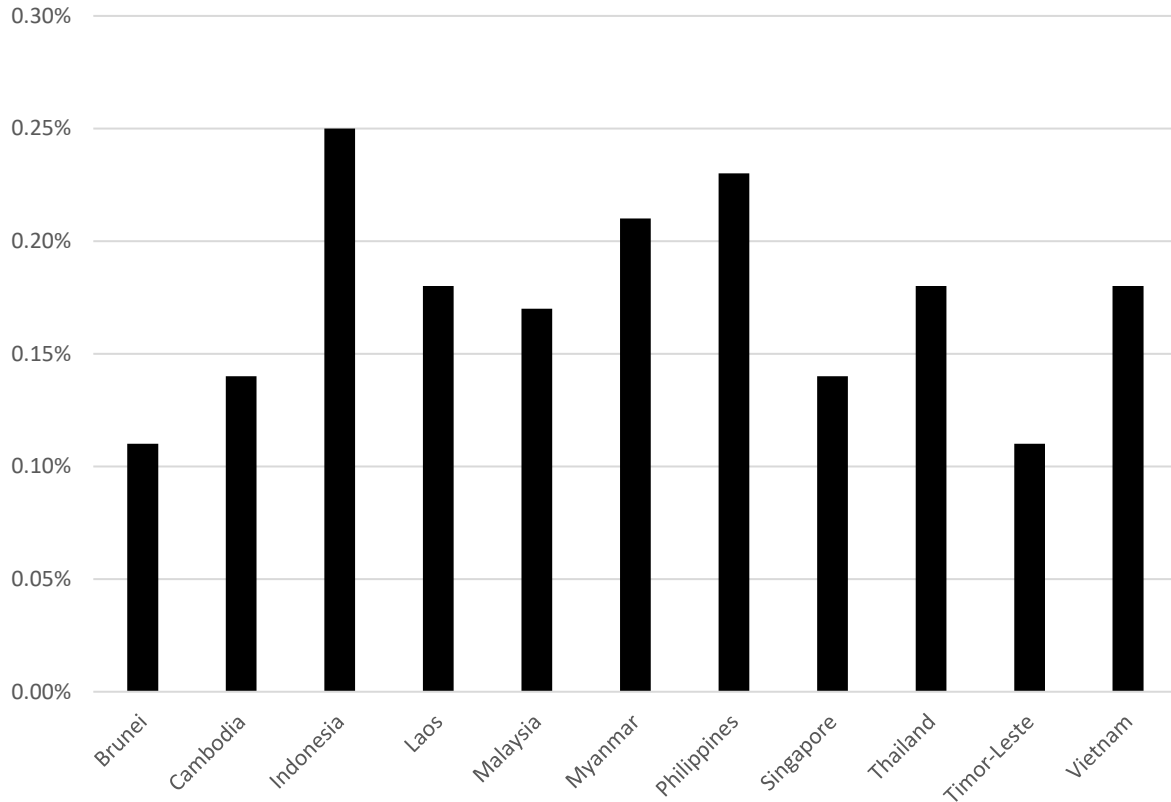
- Cardiovascular (CV) mortality data of different regions of the world (based on WHO Global Burden of Disease data)
- Prevalence of CV risk factors in the Philippines with trends from the last few surveys
  - Food and Nutrition Research Institute (Expanded National Nutrition Survey)
  - Philippine Heart Association – Council on Hypertension
  - LIFE CARE Study Group (cohort in MM and 4 nearby provinces)

# Global Burden of Disease Study (GBD)

- Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study (Lancet 2020; 396:1204-22.)
- Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Study 2019 (Lancet 2020; 396:1223-49.)
- GBD Study started in 2002

# Cardiovascular Disease Mortality in All Ages in Southeast Asia - 2016

% of Population



**Average for SouthEast Asia: 0.17%**

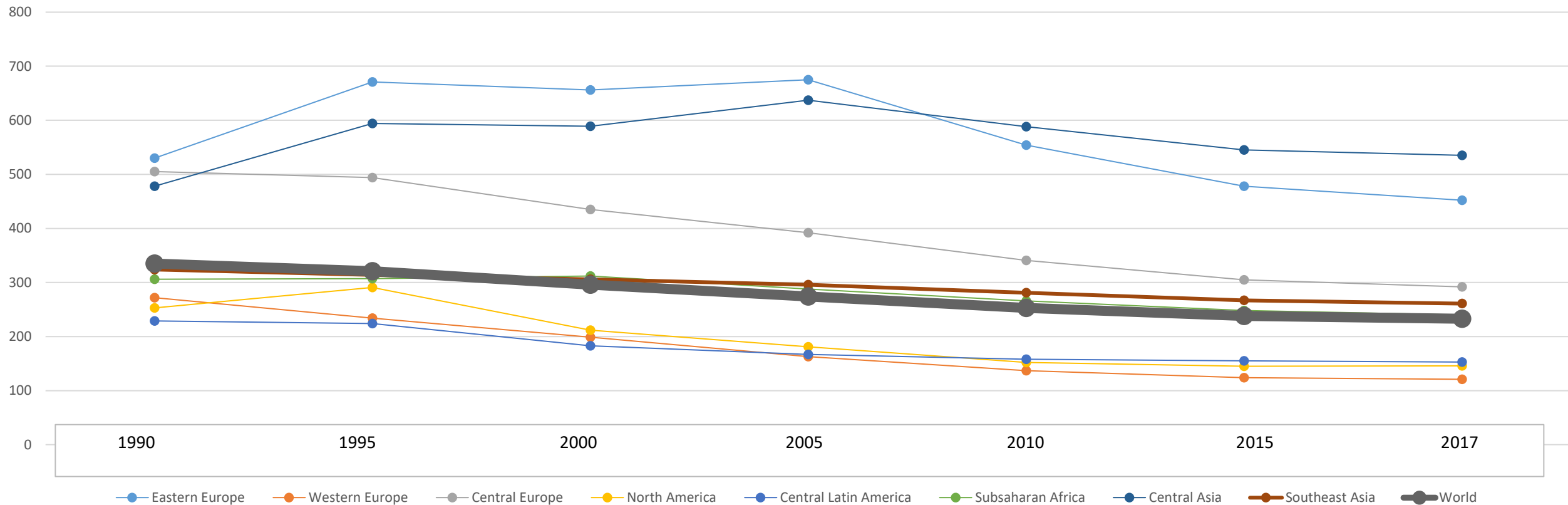
**Philippines: 0.23%**

Country	Number	Population (2016)
Brunei	500	423,000
Cambodia	22,500	15,762,000
Indonesia	655,000	261,000,000
Laos	12,700	6,758,000
Malaysia	54,000	31,187,000
Myanmar	108,000	52,885,000
Philippines	233,000	103,300,000
Singapore	8,200	5,622,000
Thailand	124,700	68,864,000
Timor-Leste	1,300	1,269,000
Vietnam	172,300	94,569,000

\*including: RHD, Hypertensive heart disease, Ischemic heart disease, Stroke, Cardiomyopathy

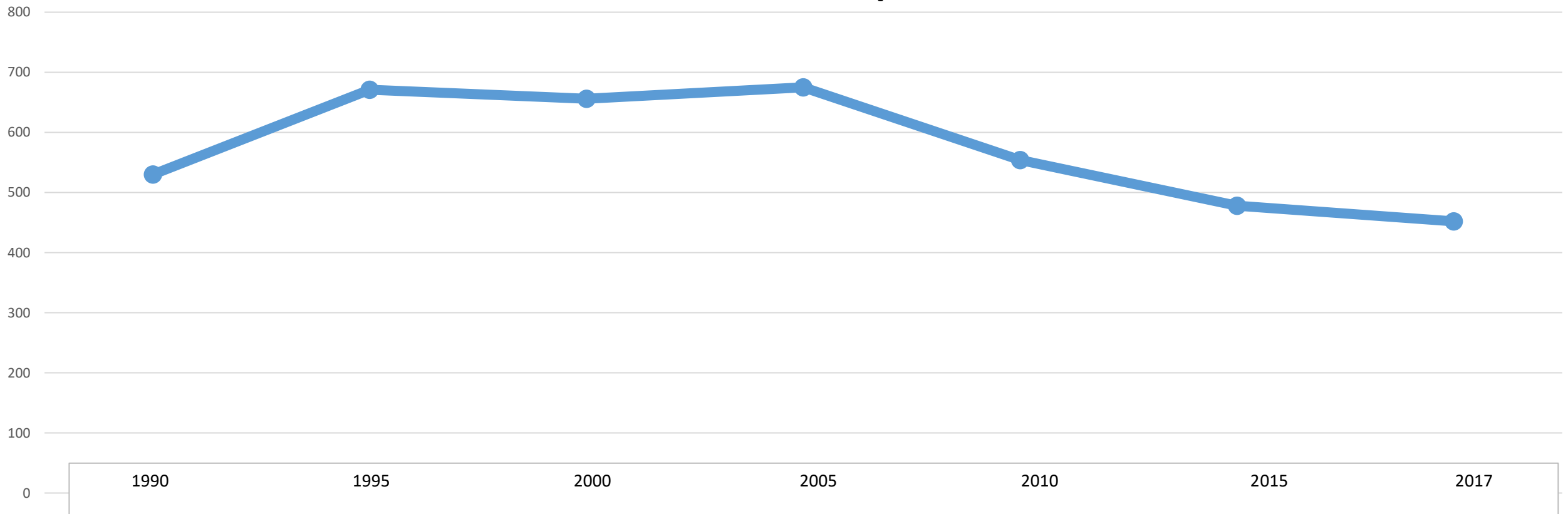
# Cardiovascular Deaths per 100,000 individuals

## World



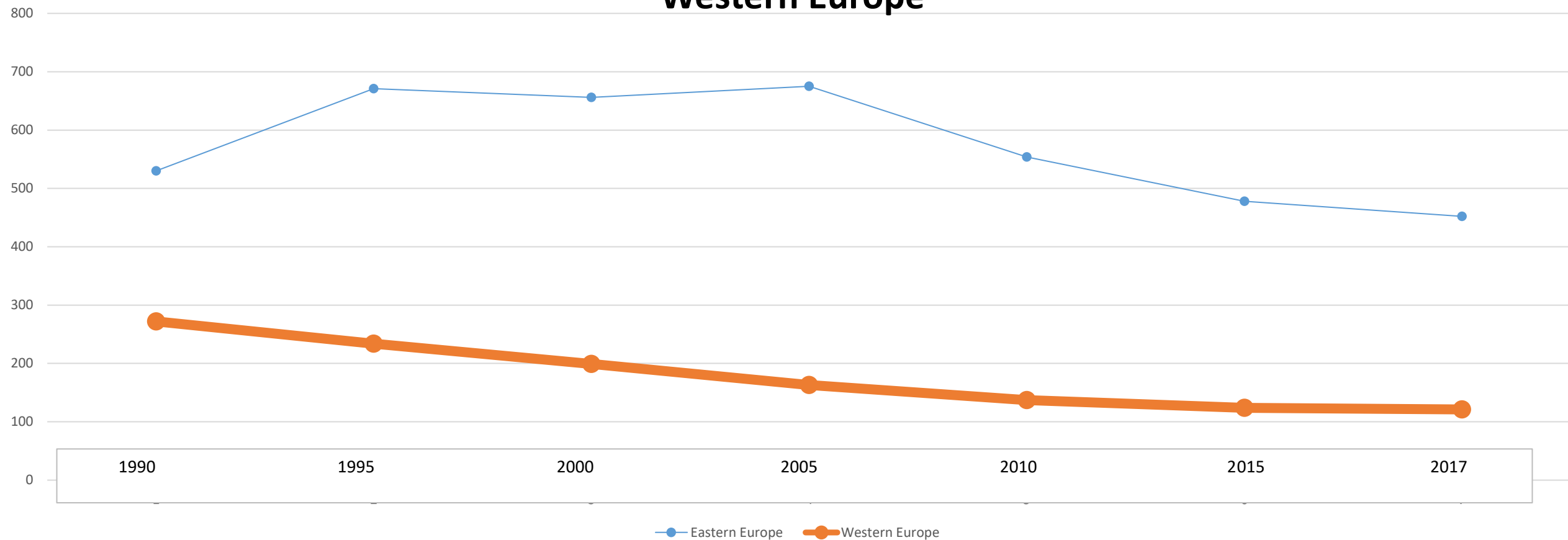
# Cardiovascular Deaths per 100,000 individuals per Region

## Eastern Europe



# Cardiovascular Deaths per 100,000 individuals per Region

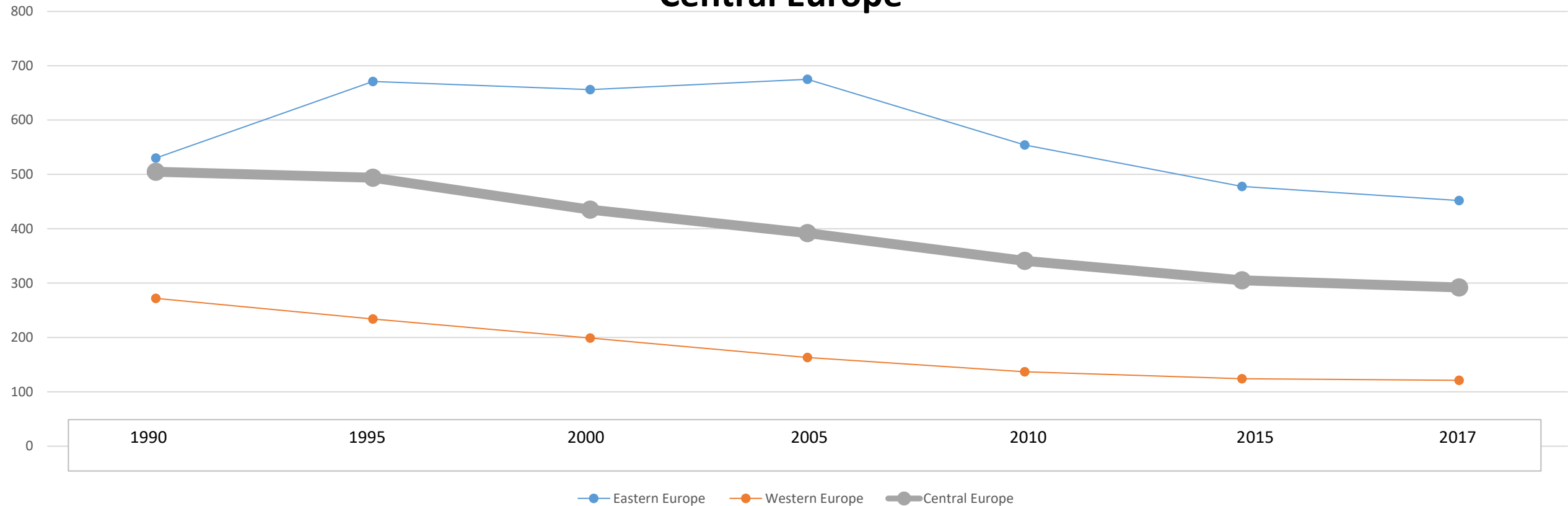
## Western Europe





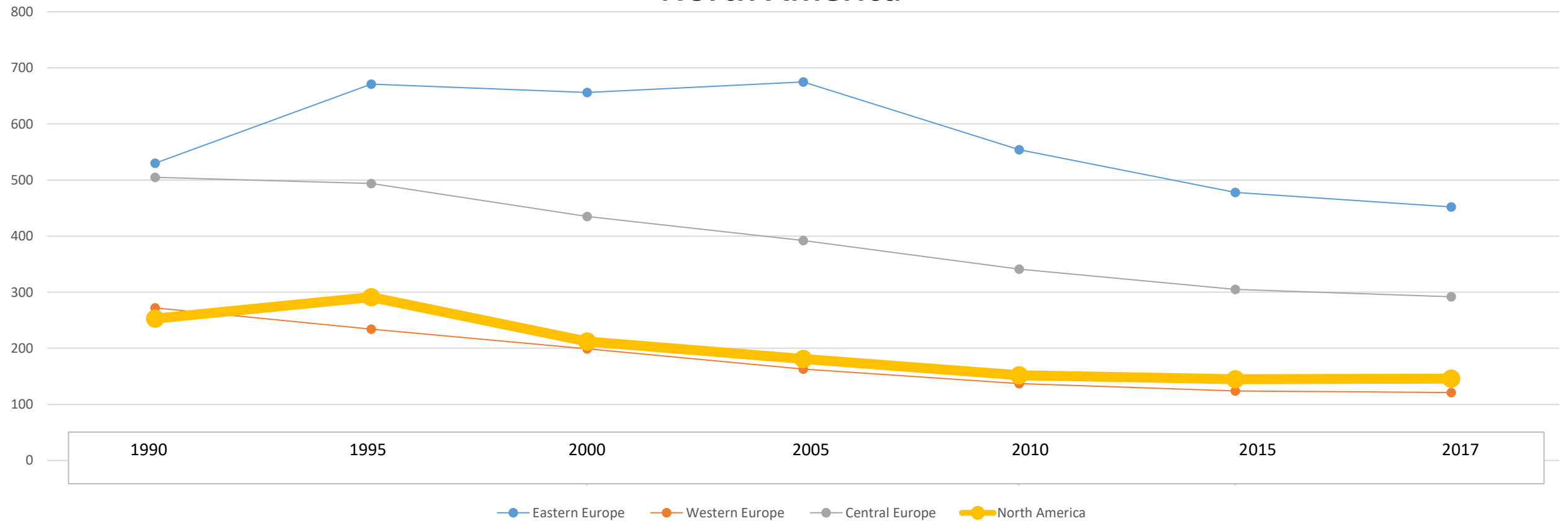
# Cardiovascular Deaths per 100,000 individuals per Region

## Central Europe



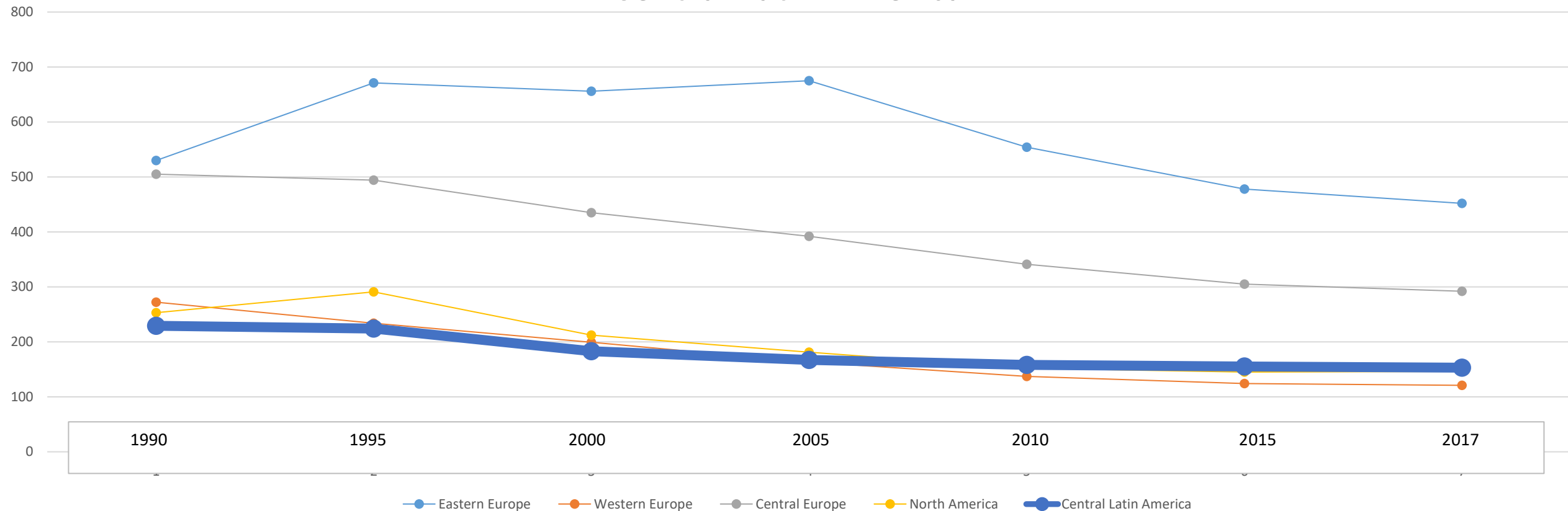
# Cardiovascular Deaths per 100,000 individuals per Region

## North America



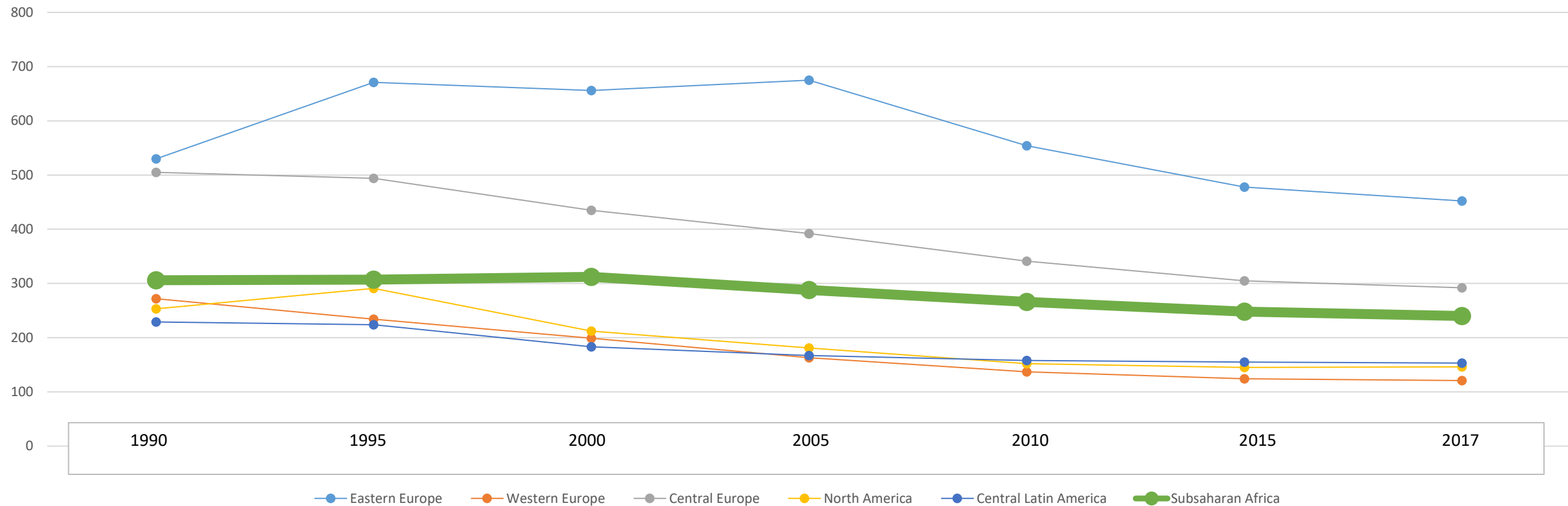
# Cardiovascular Deaths per 100,000 individuals per Region

## Central Latin America



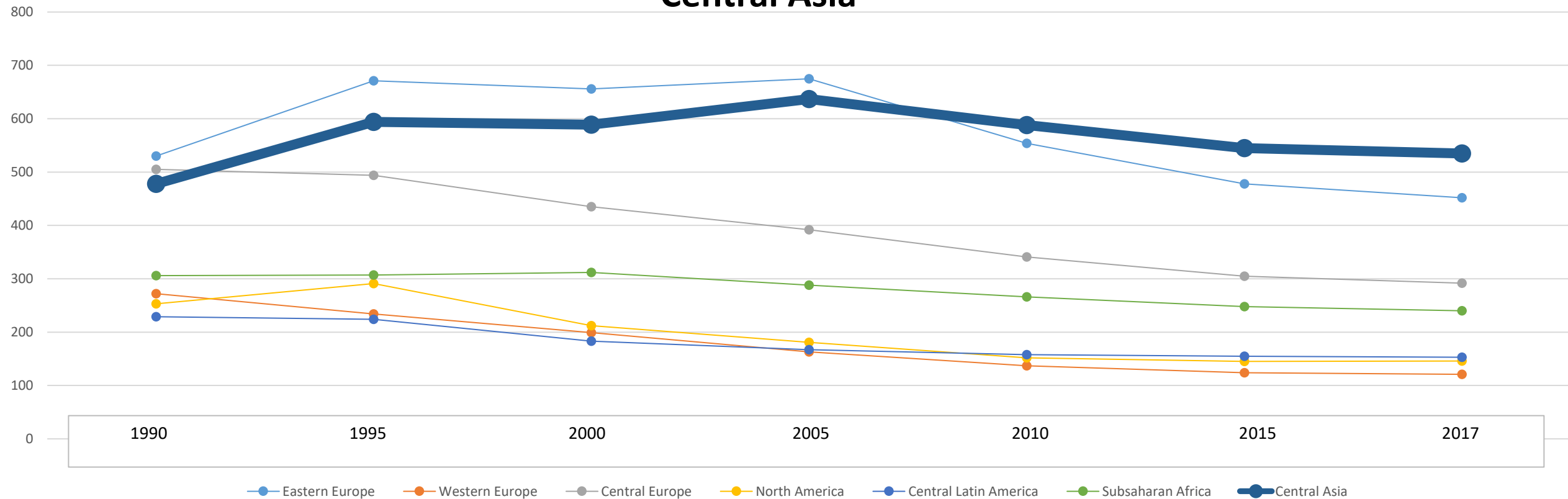
# Cardiovascular Deaths per 100,000 individuals per Region

## Subsaharan Africa



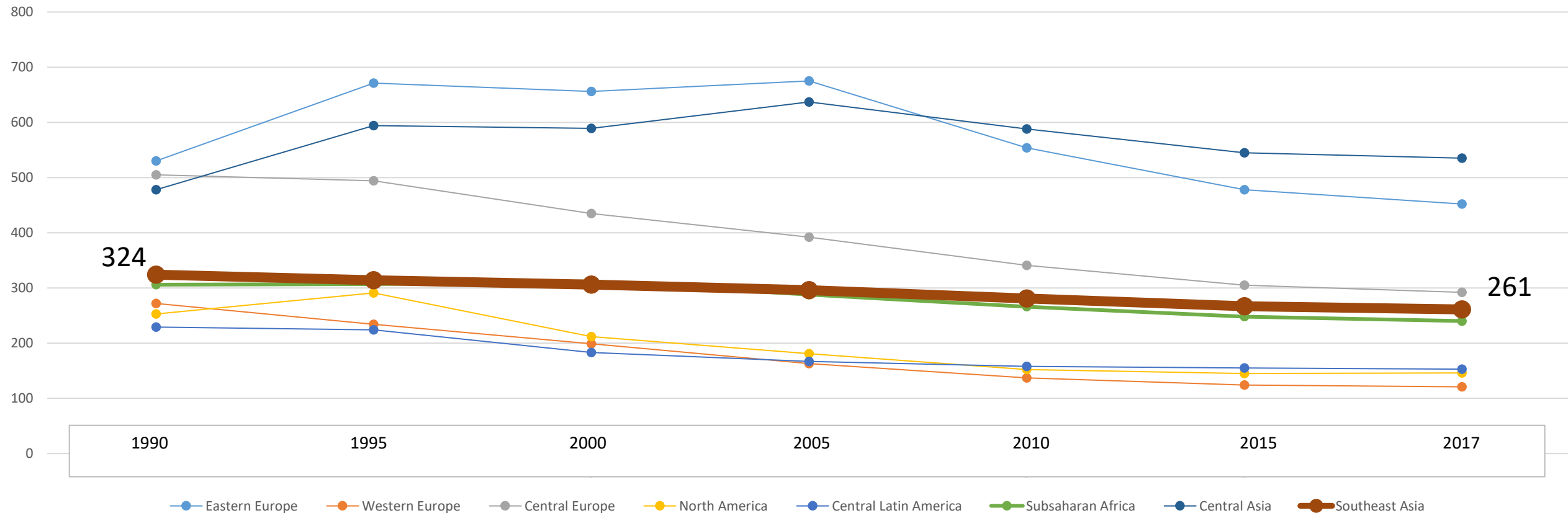
# Cardiovascular Deaths per 100,000 individuals per Region

## Central Asia



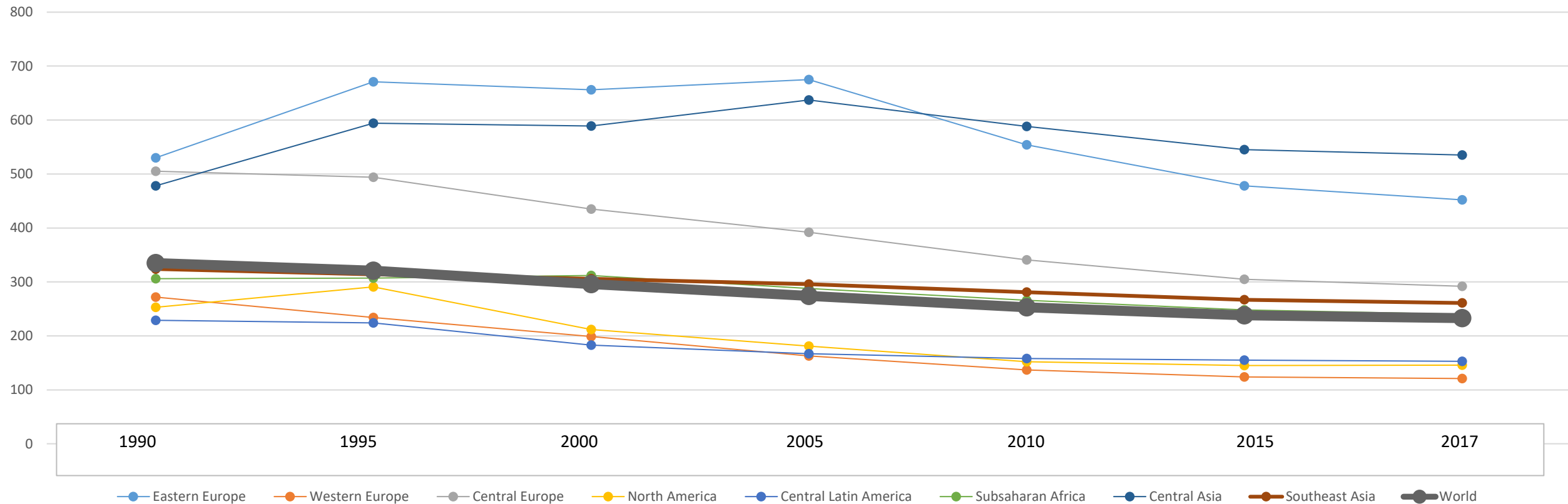
# Cardiovascular Deaths per 100,000 individuals per Region

## Southeast Asia



# Cardiovascular Deaths per 100,000 individuals per Region

## World

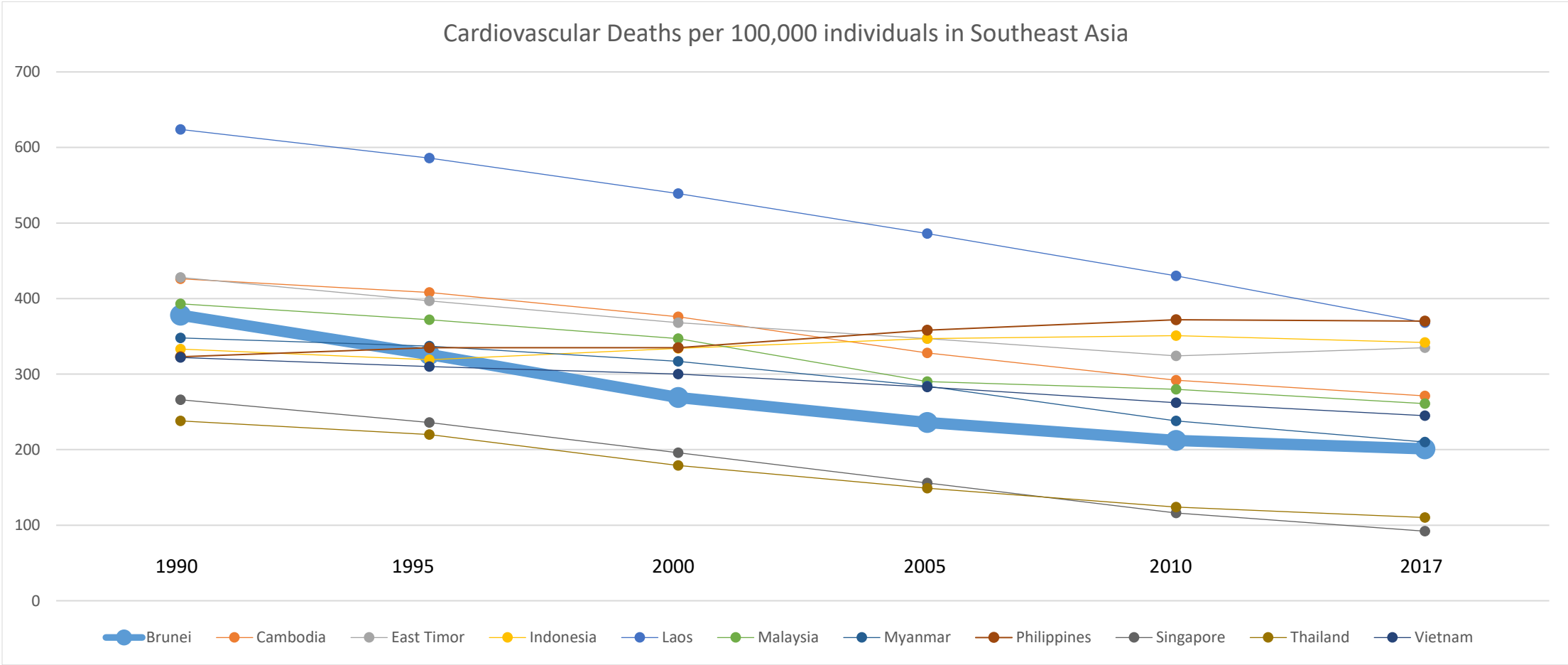


- Cardiovascular Deaths per 100,000 individuals in Southeast Asia plus 3 East Asian countries (China, Japan, South Korea)



# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

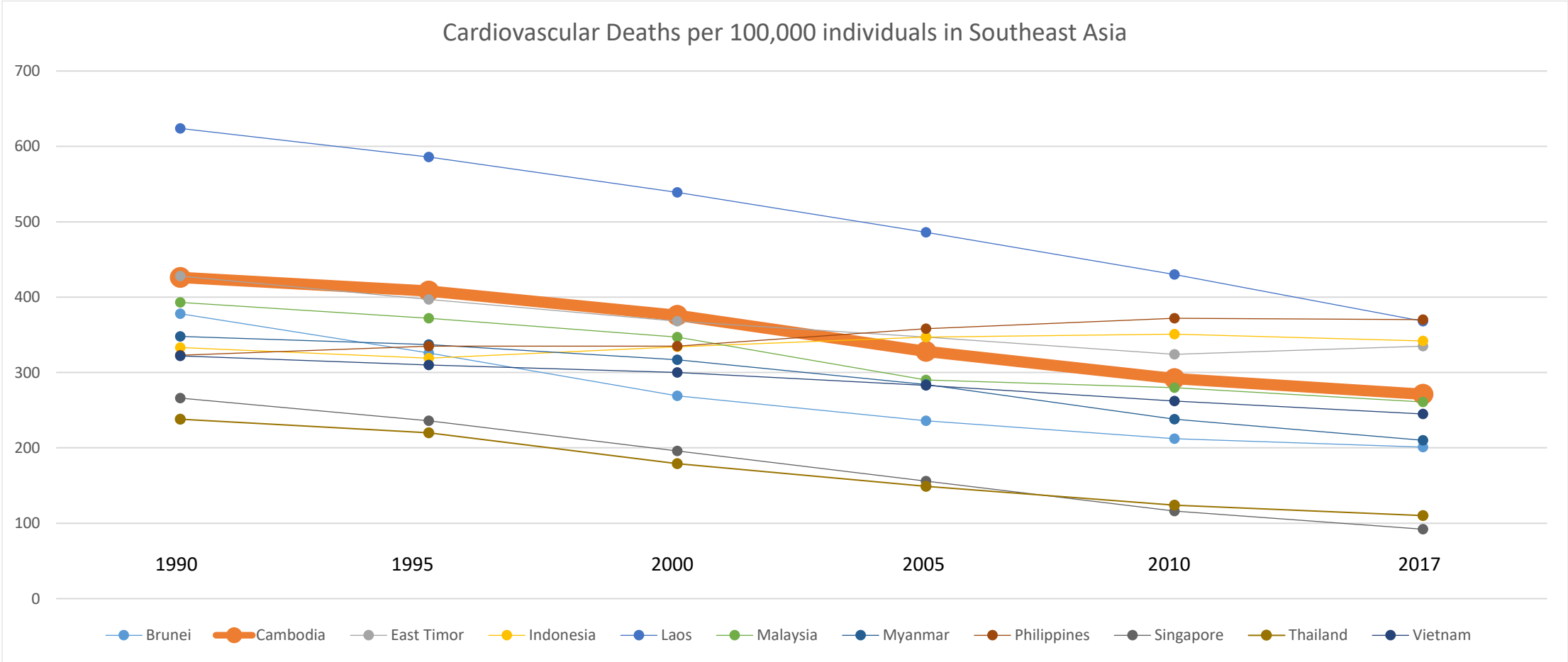
## Brunei



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

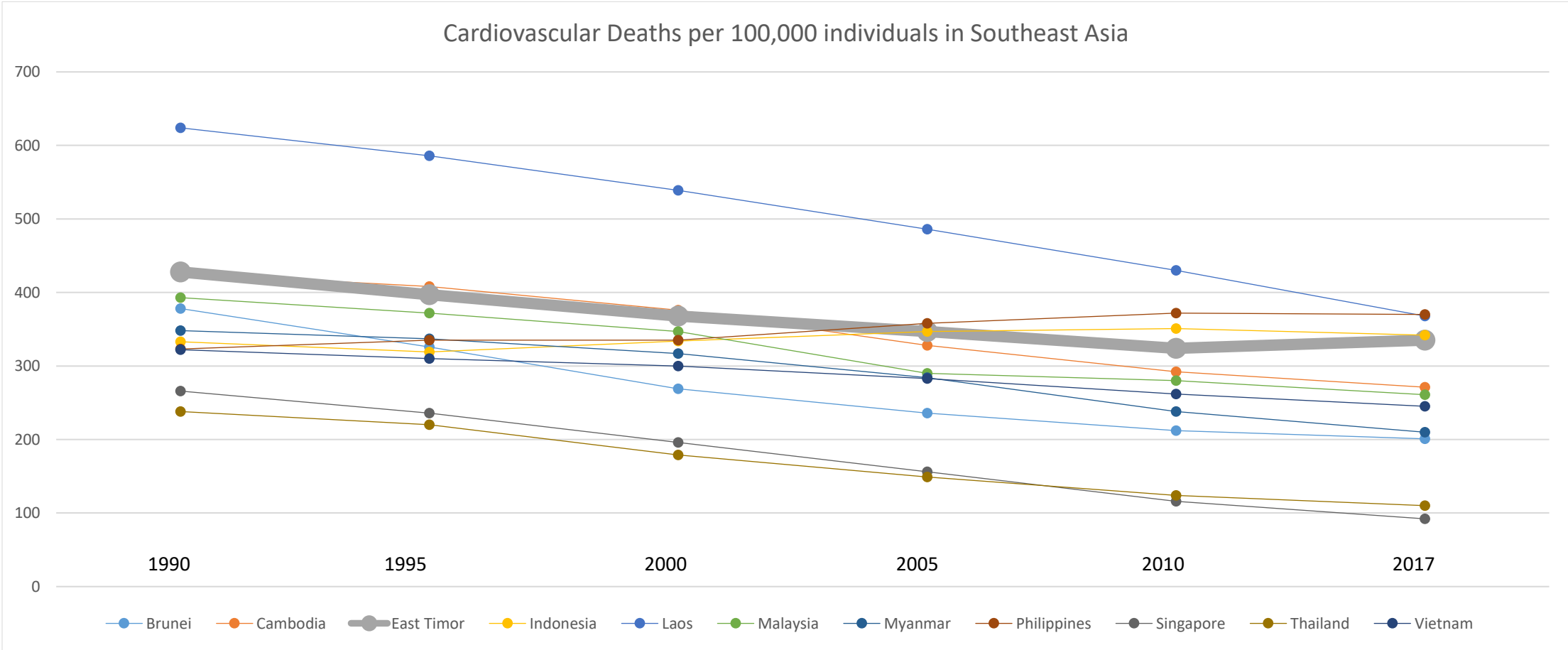
## Cambodia



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

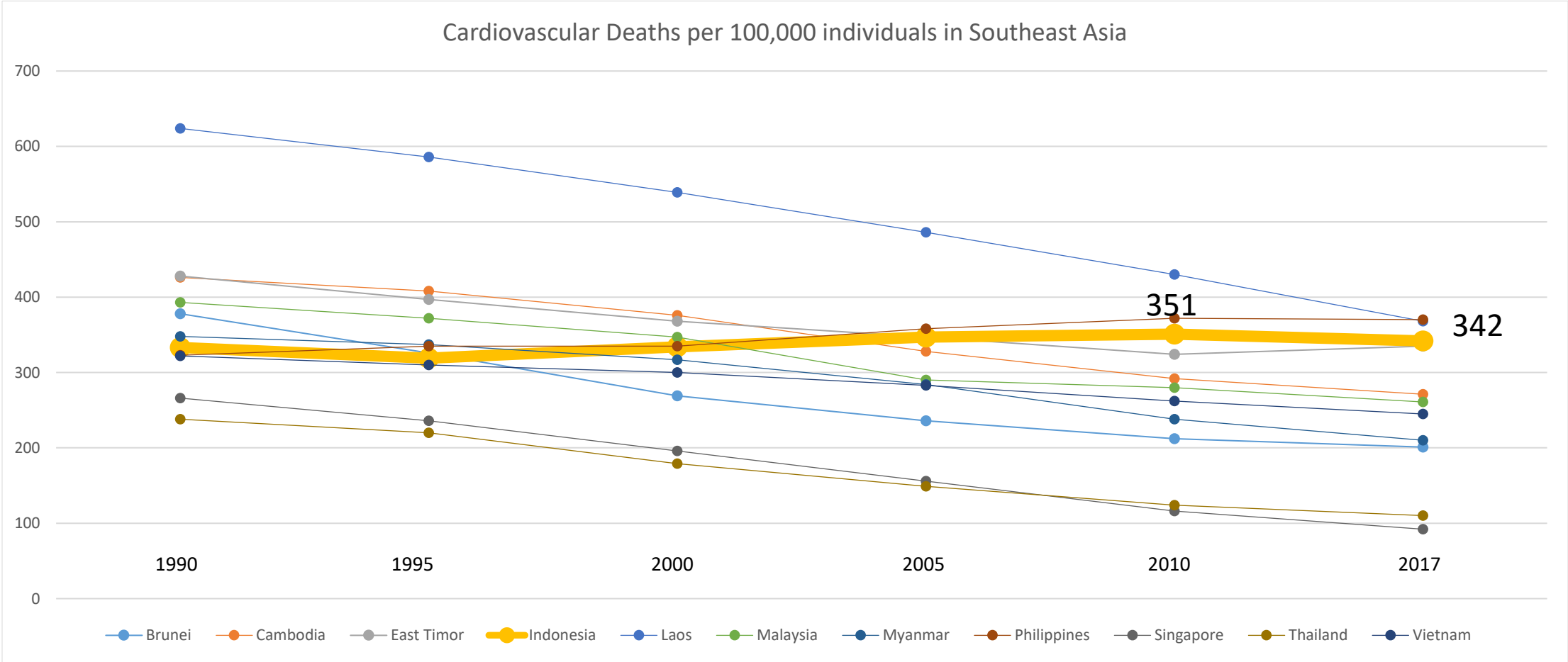
## East Timor



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

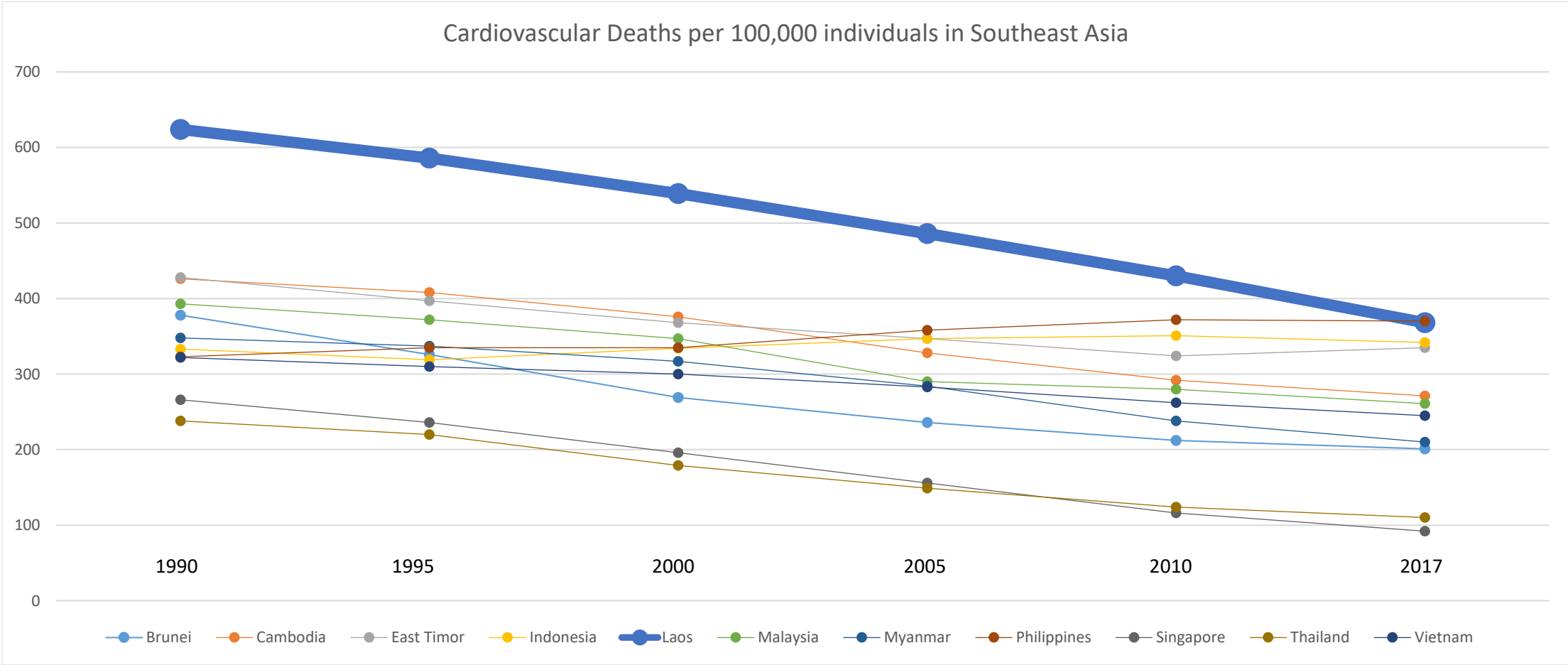
## Indonesia



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

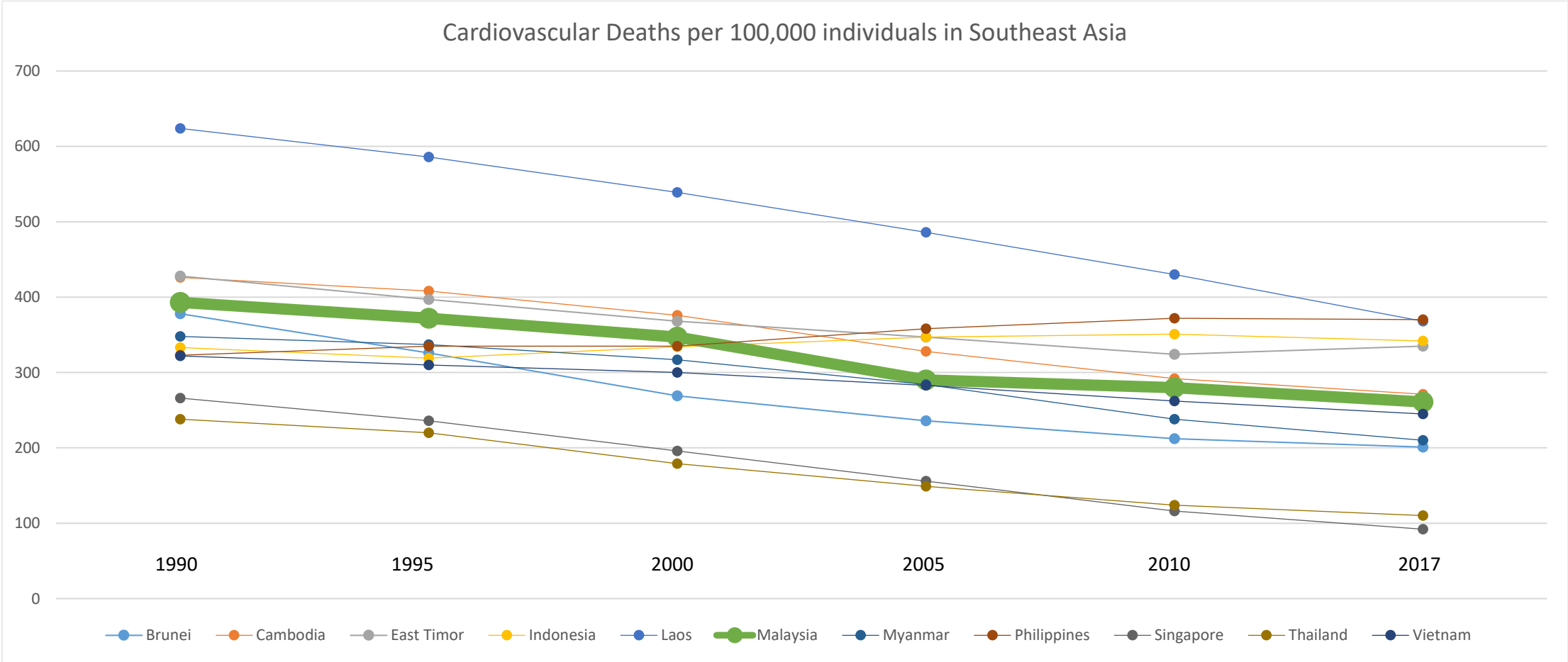
## Laos



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

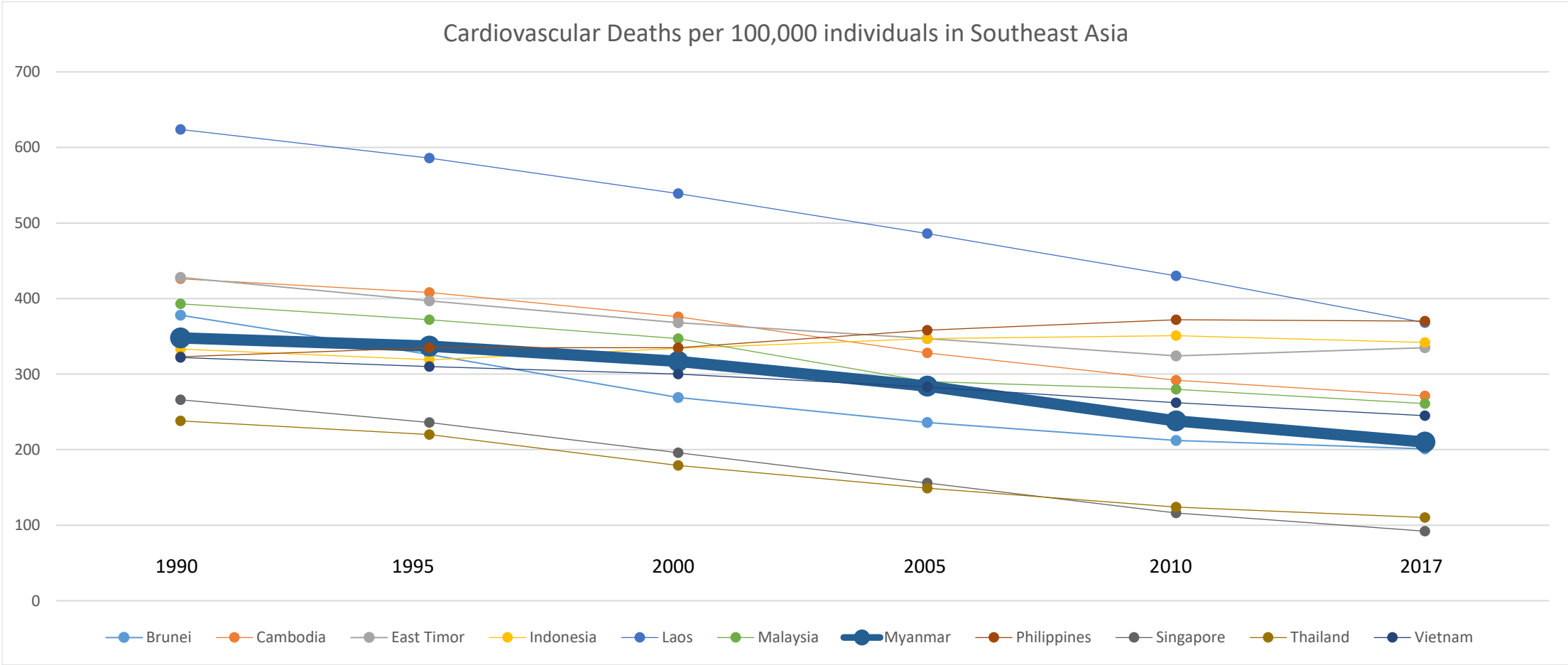
## Malaysia



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

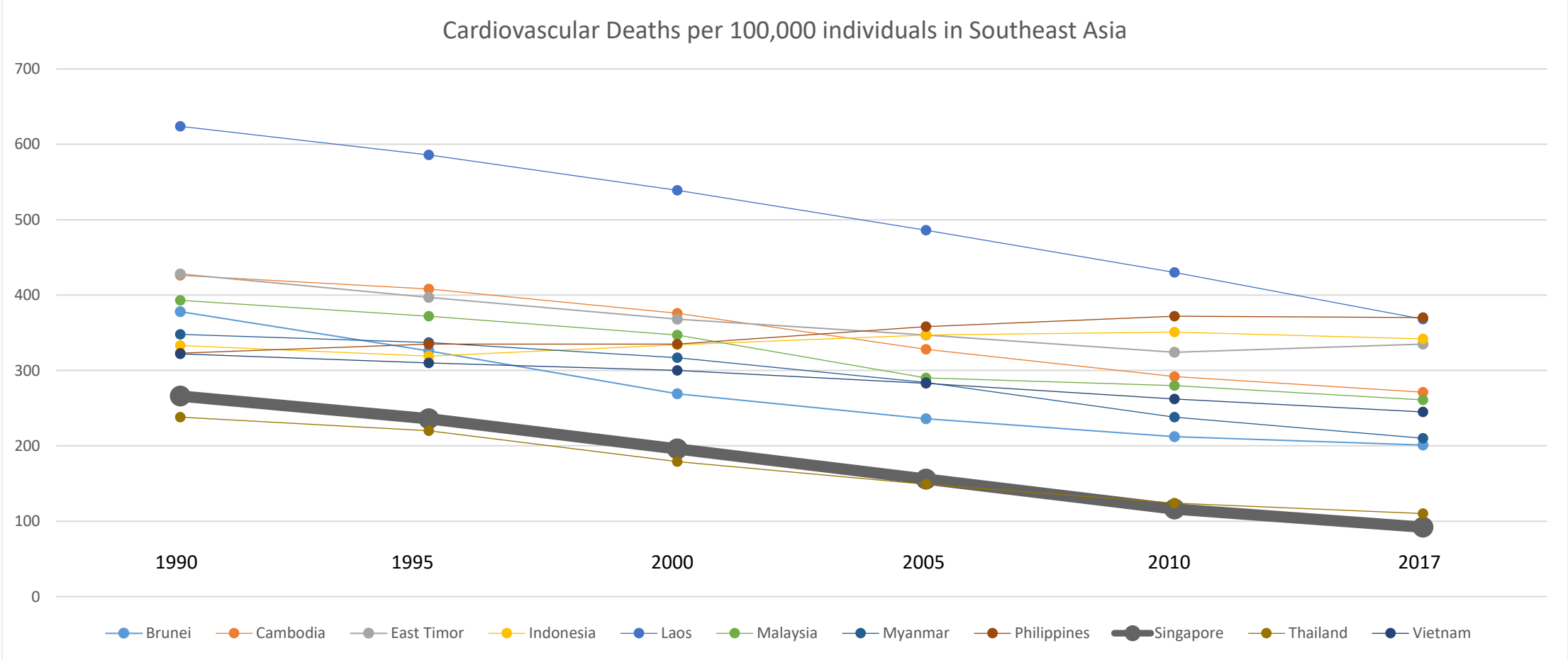
## Myanmar



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

## Singapore

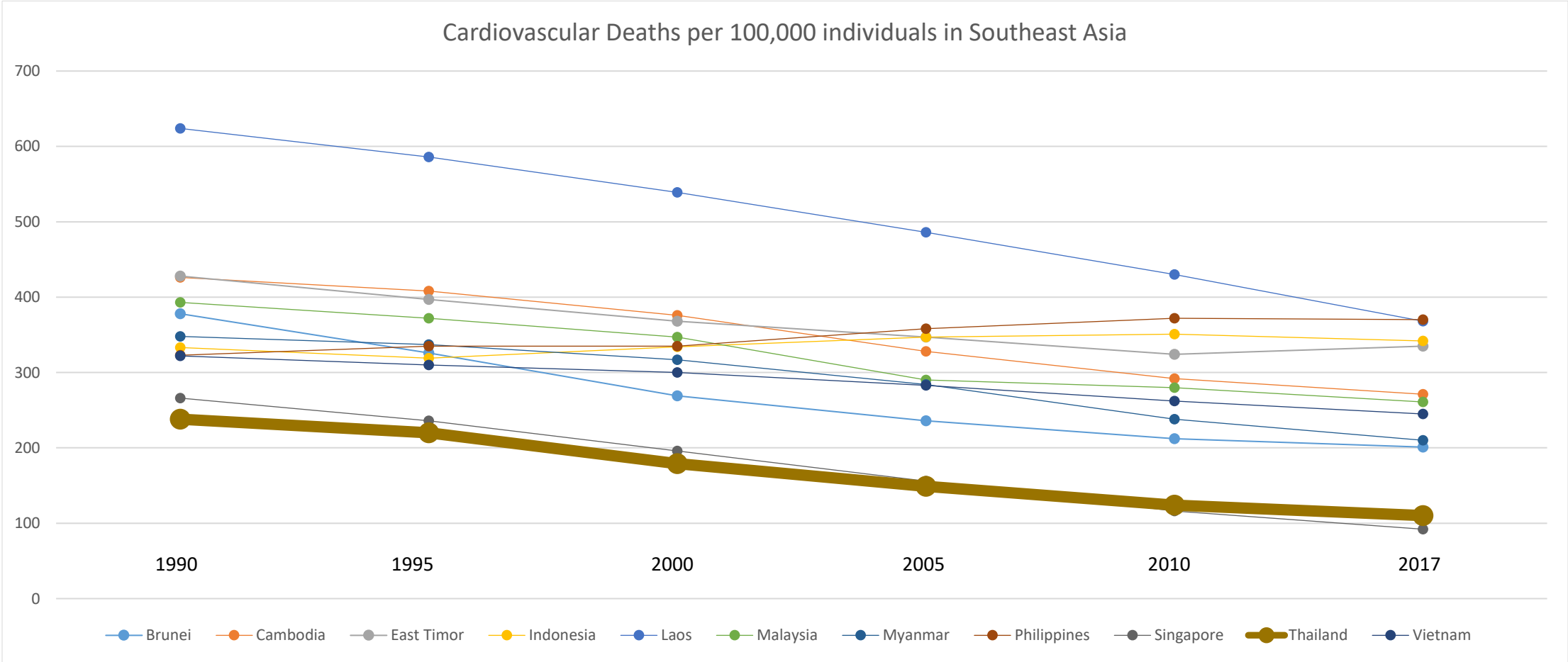


Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.



# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

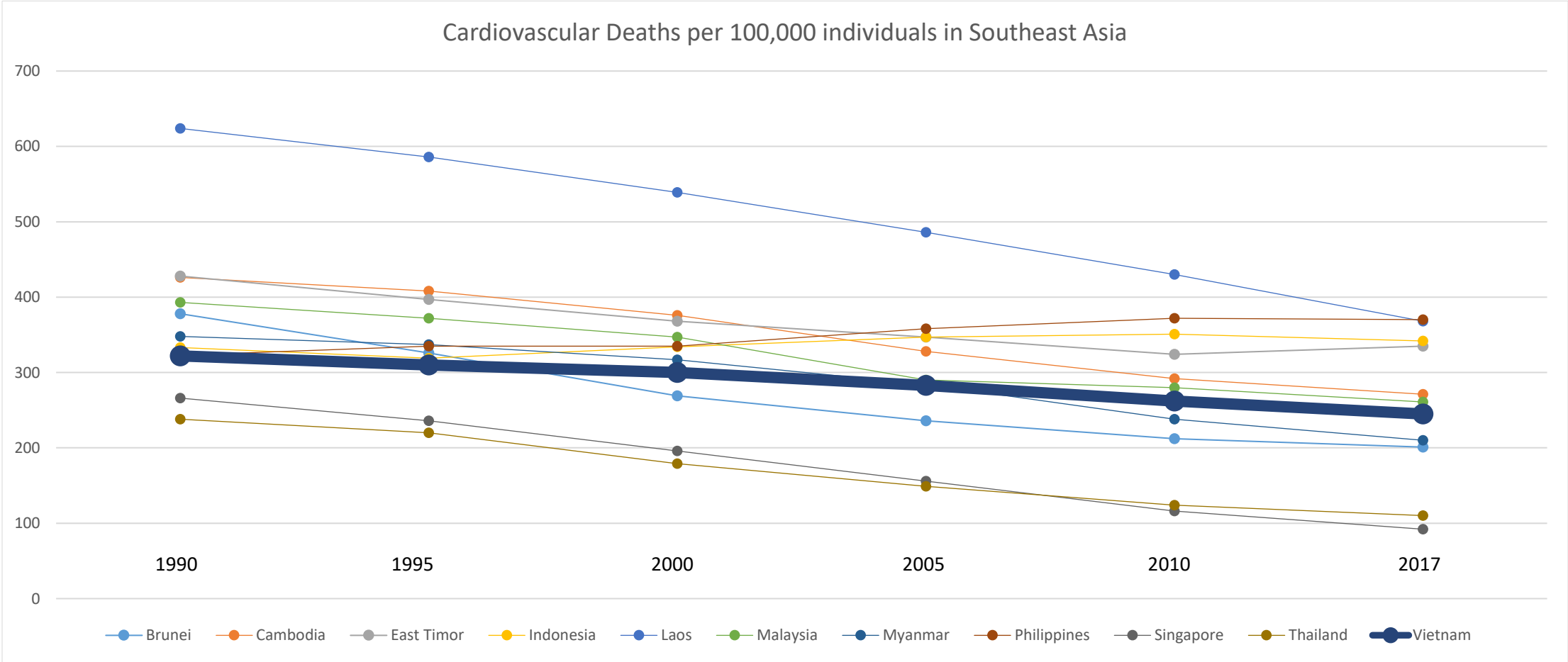
## Thailand



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

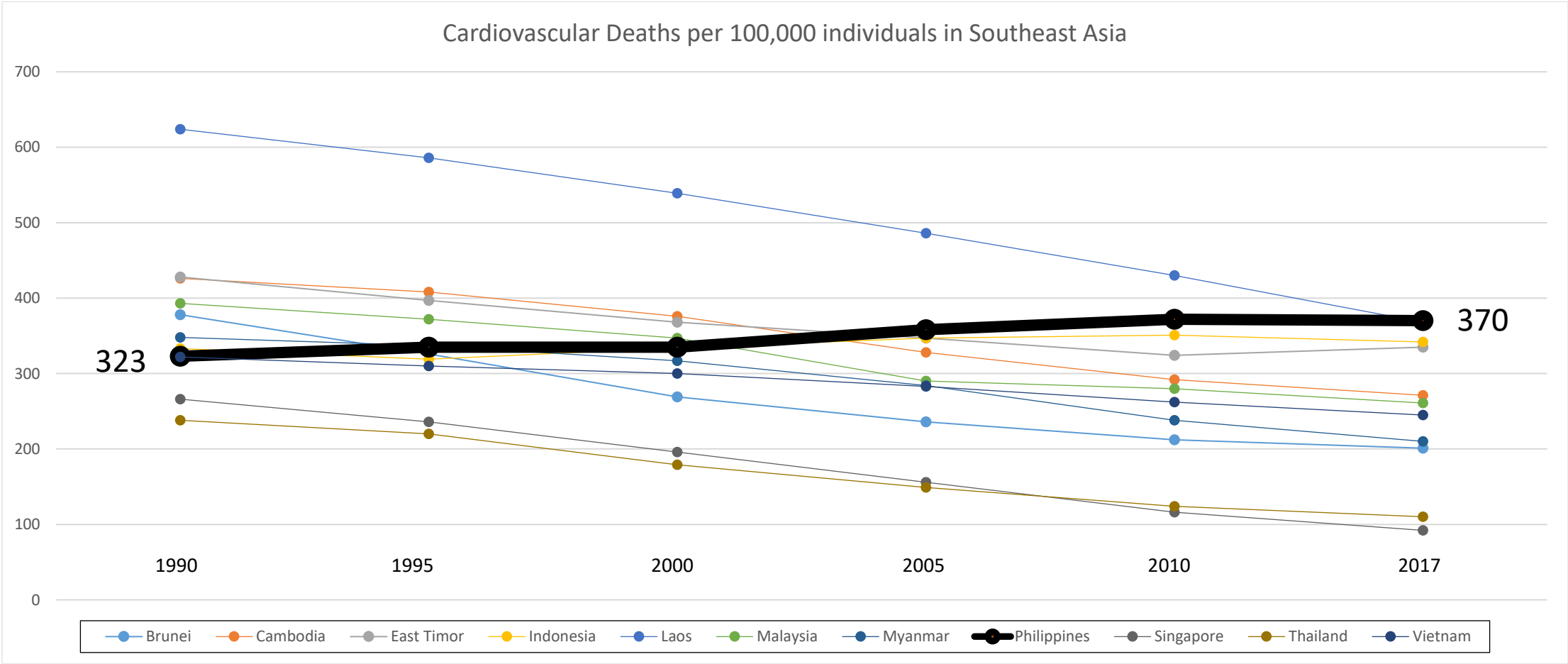
## Vietnam



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

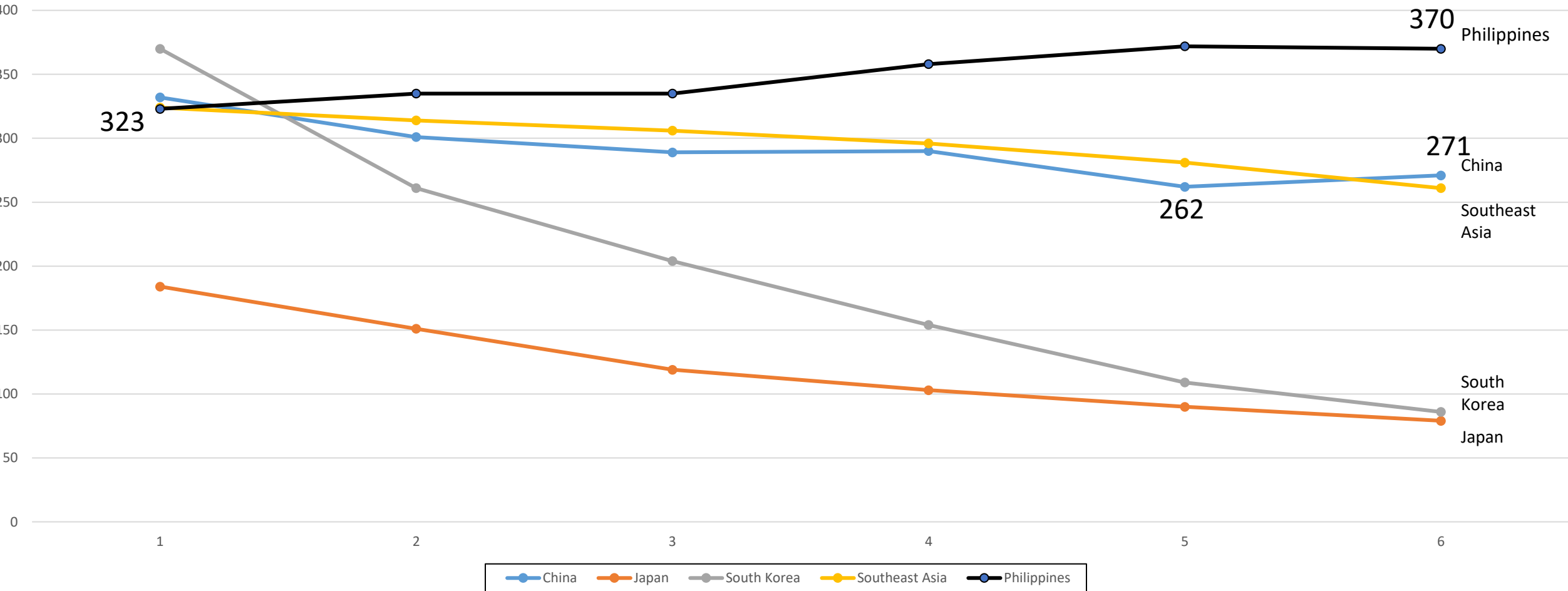
# Cardiovascular Deaths per 100,000 individuals in Southeast Asia

## Philippines



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

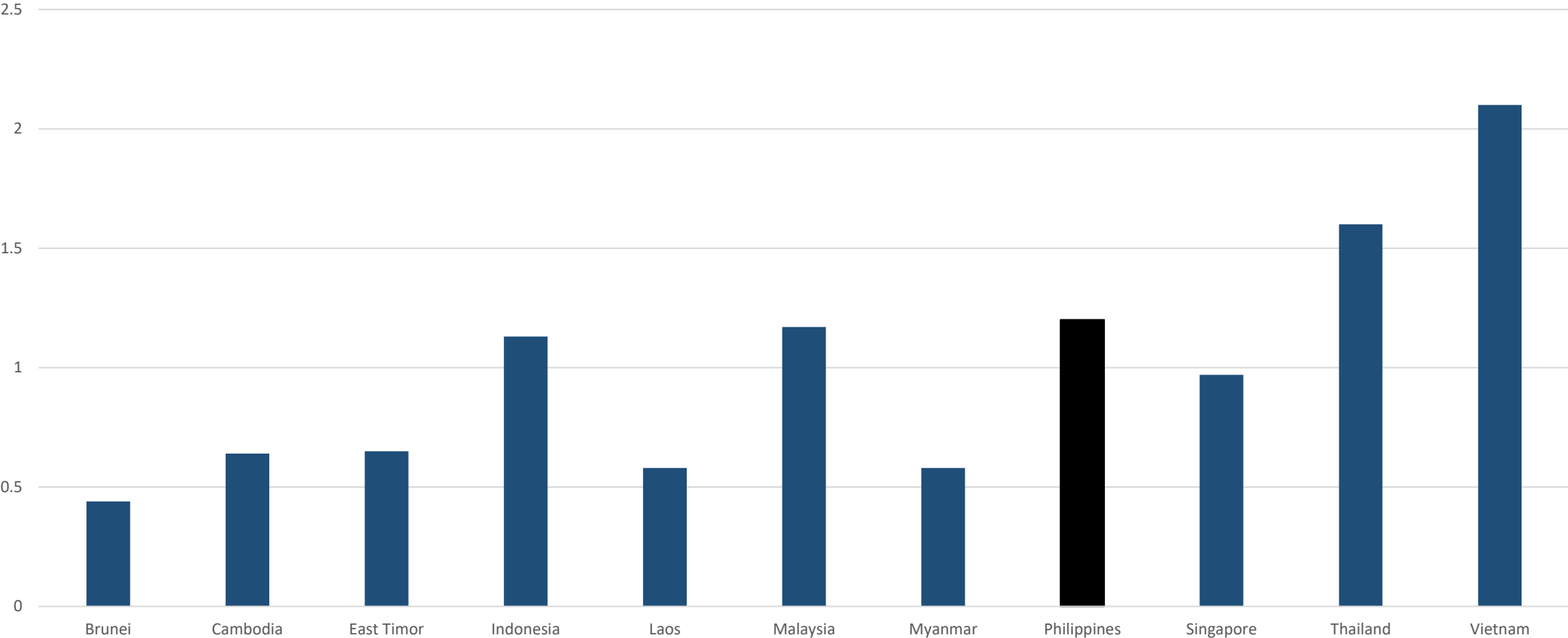
# Cardiovascular Deaths per 100,000 individuals in Southeast Asia and other Asian countries



Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2017 (GBD 2017) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2018.

# Prevalence of Cardiovascular Disease in Southeast Asia (2016)

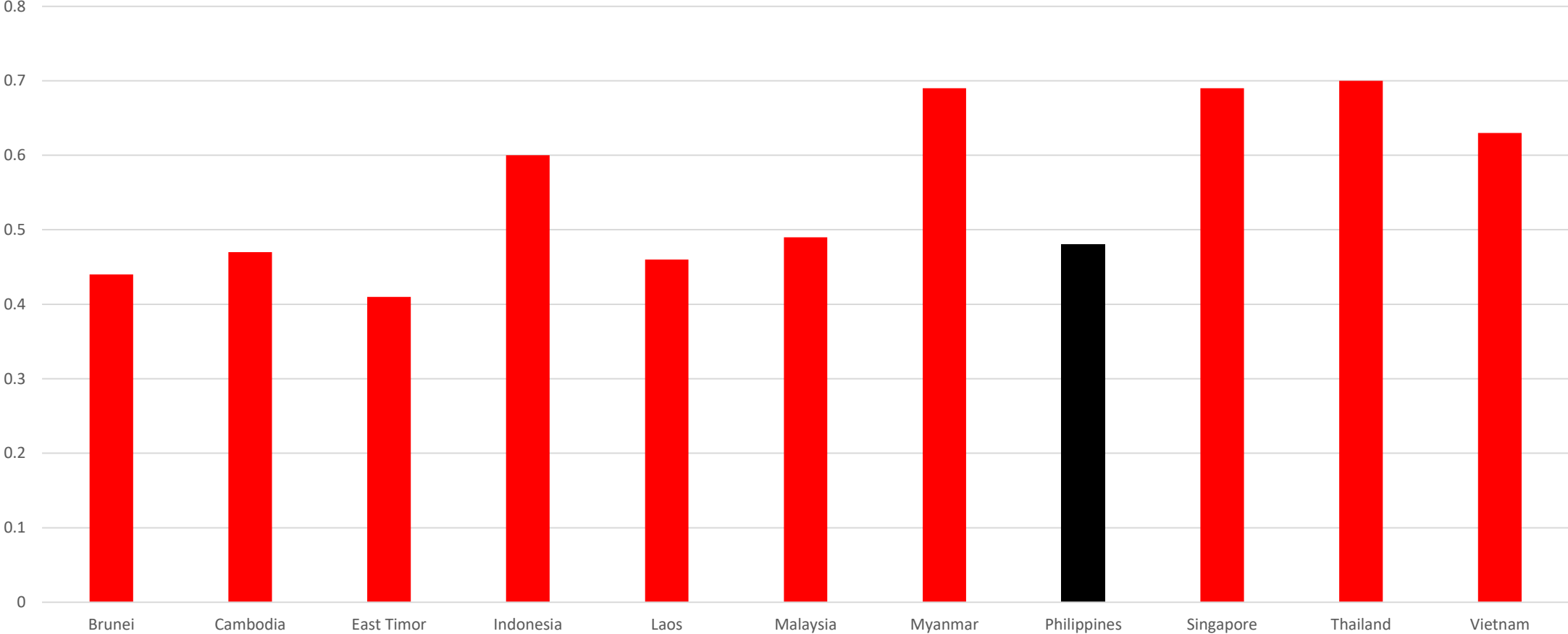
## Ischemic Heart Disease



Murray et al. Global burden of 369 diseases and injuries in 204 countries and territories. Lancet 2020; 396: 1204–22

# Prevalence of Cardiovascular Disease in Southeast Asia (2016)

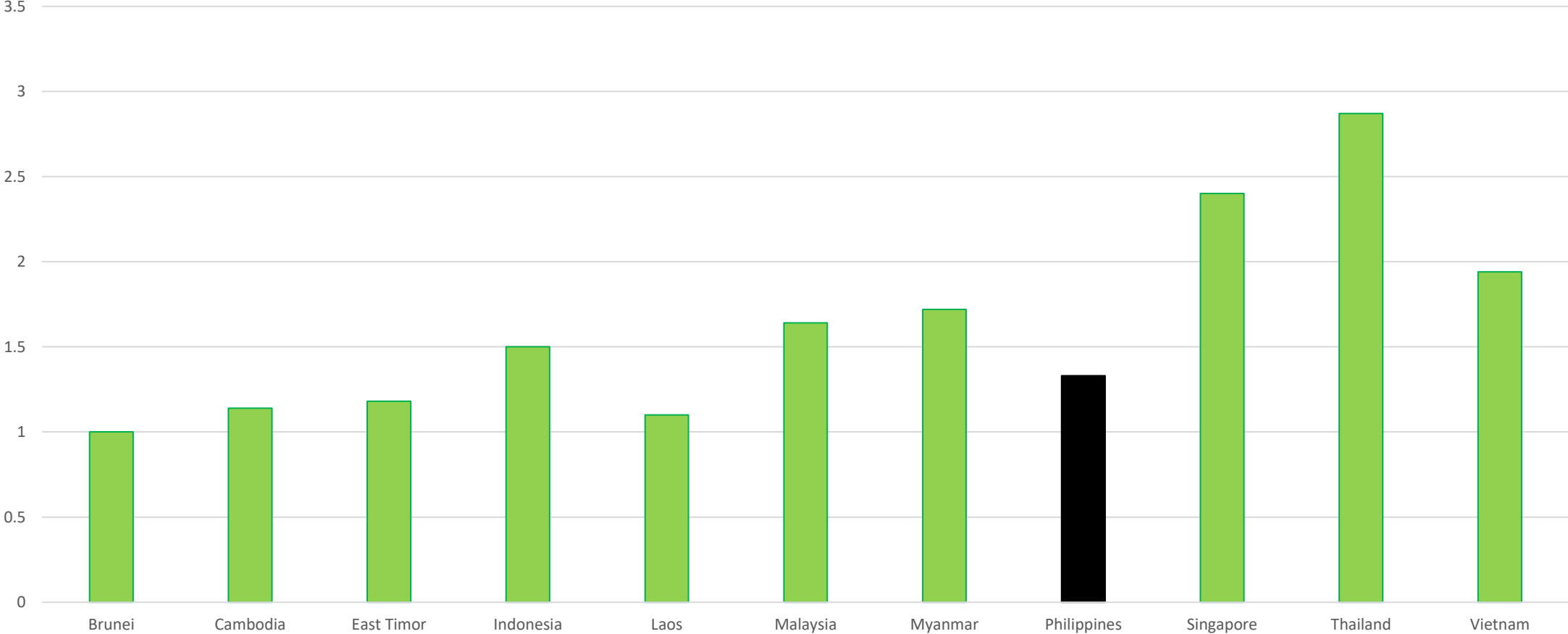
## Stroke



Murray et al. Global burden of 369 diseases and injuries in 204 countries and territories. Lancet 2020; 396: 1204–22

# Prevalence of Cardiovascular Disease in Southeast Asia (2016)

## Peripheral Artery Disease



Murray et al. Global burden of 369 diseases and injuries in 204 countries and territories. Lancet 2020; 396: 1204–22

# Risk factors for Cardiovascular Disease

- Hypertension
- Diabetes Mellitus
- Hypercholesterolemia
- Overweight / obesity
- Smoking
- Alcohol
- Physical inactivity





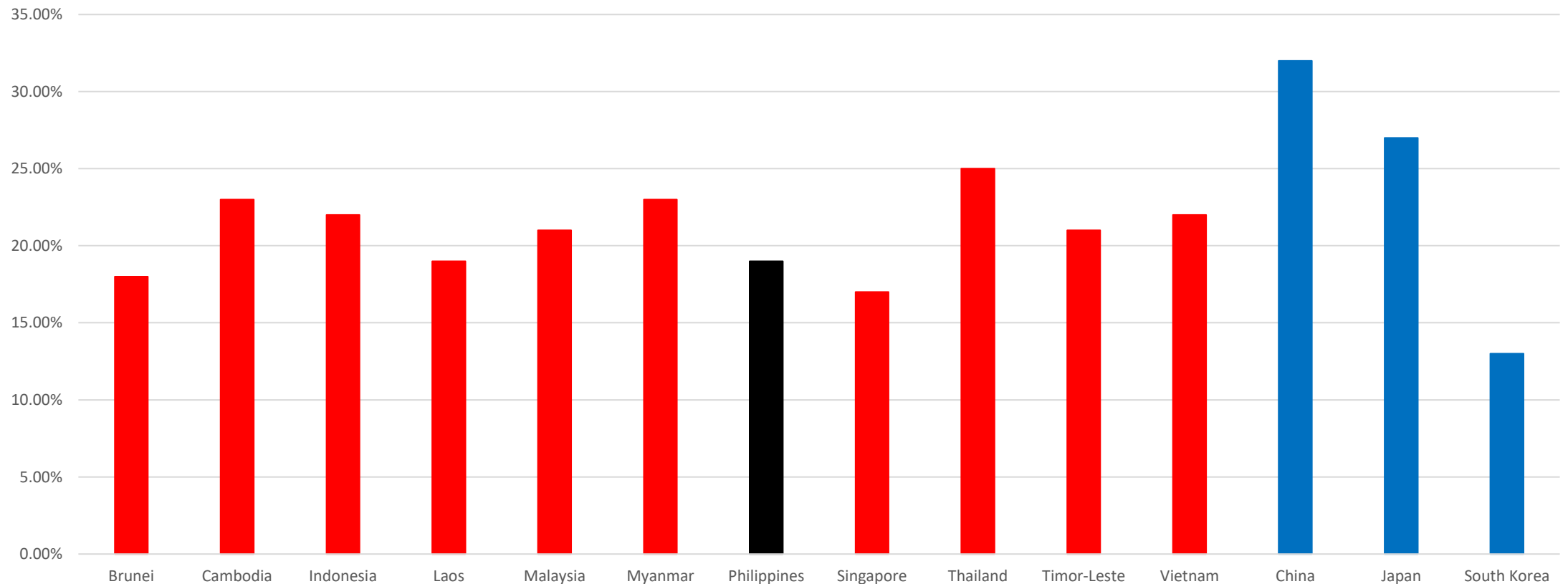
# Risk factors for MI – INTERHEART Study

Risk Factors	O.R.	P.A.R.
Inc. apoB/apoA	3.25	49.2
Smoking	2.87	35.7
Psychosocial	2.67	32.5
Diabetes	2.37	9.9
Hypertension	1.91	17.9
Abd. Obesity	1.12	20.1
Reg. Alcohol	0.91	6.7
Reg. Exercise	0.86	12.2
Fruits,vegetables	0.70	13.7

Yusuf S, et al. Lancet 2004; 364: 937-52.

# Southeast Asia: Risk Factors for Cardiovascular Disease Hypertension (2015)

**Systolic blood pressure  $\geq$  140 mmHg and/or diastolic blood pressure  $\geq$  90 mmHg**

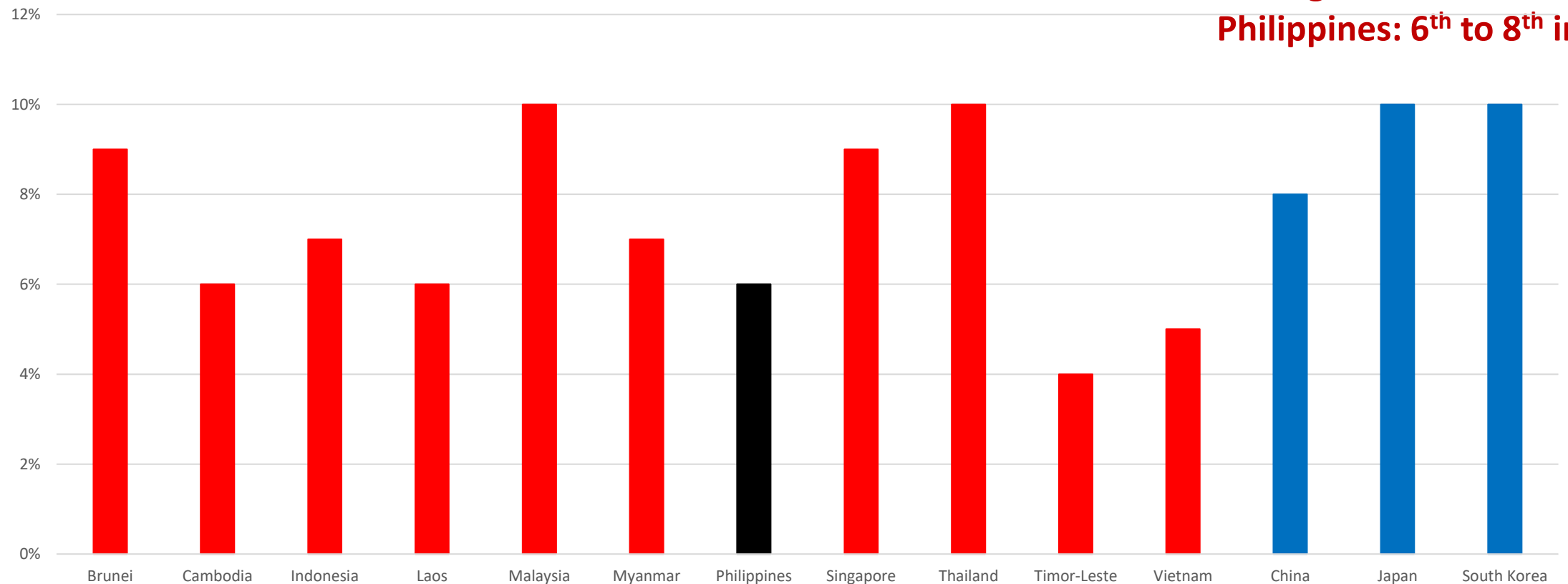


**Average in SEA: 20.9%**  
**Philippines: 7th in SEA**

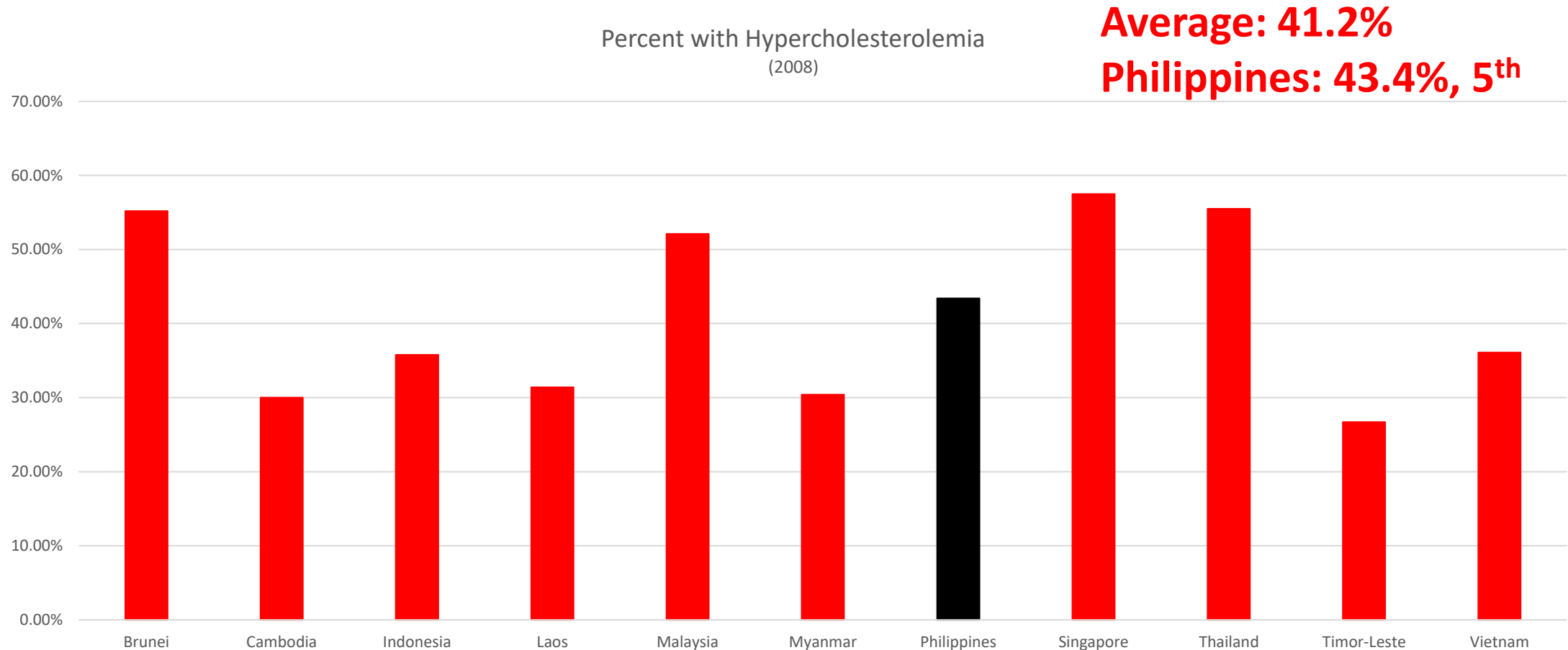
# Southeast Asia: Risk Factors for Cardiovascular Disease Diabetes Mellitus (2014)

**Fasting plasma glucose of 7.0mmol/L or higher, or a history of diagnosis with diabetes, or use of insulin or oral hypoglycemic drugs.**

**Average in SEA: 7.18%**  
**Philippines: 6<sup>th</sup> to 8<sup>th</sup> in SEA**

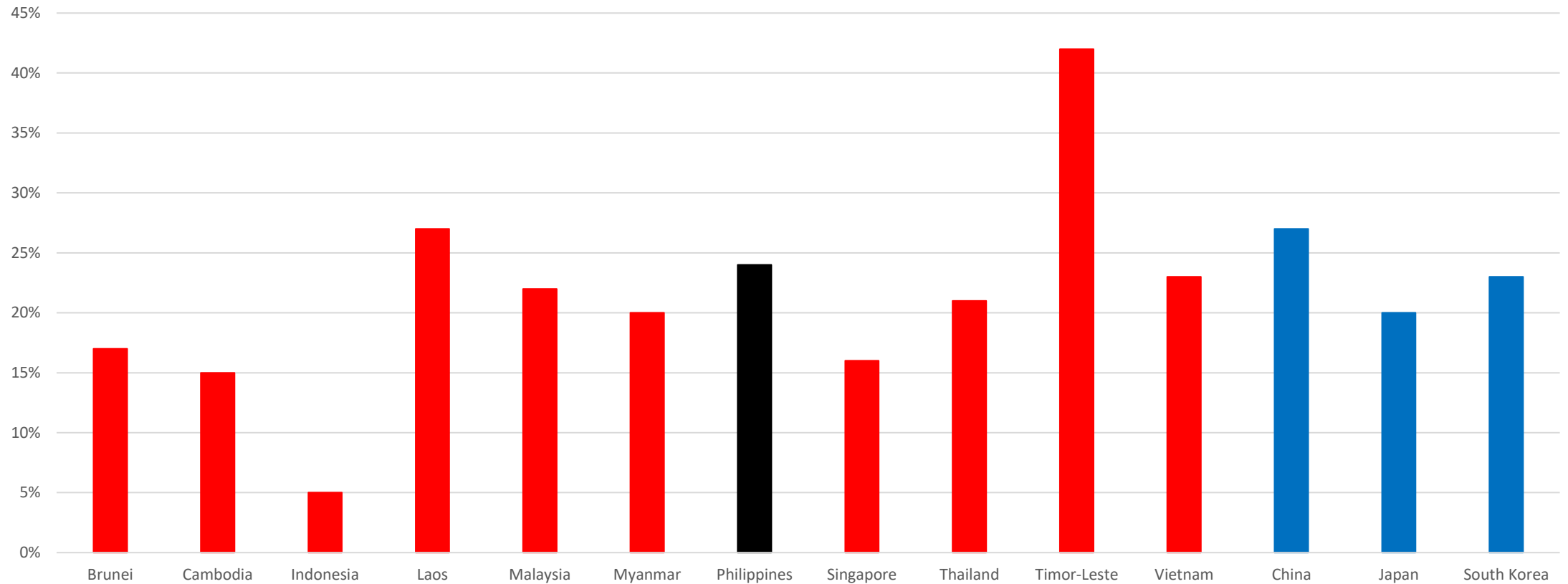


# Southeast Asia: Risk Factors for Cardiovascular Disease Hypercholesterolemia



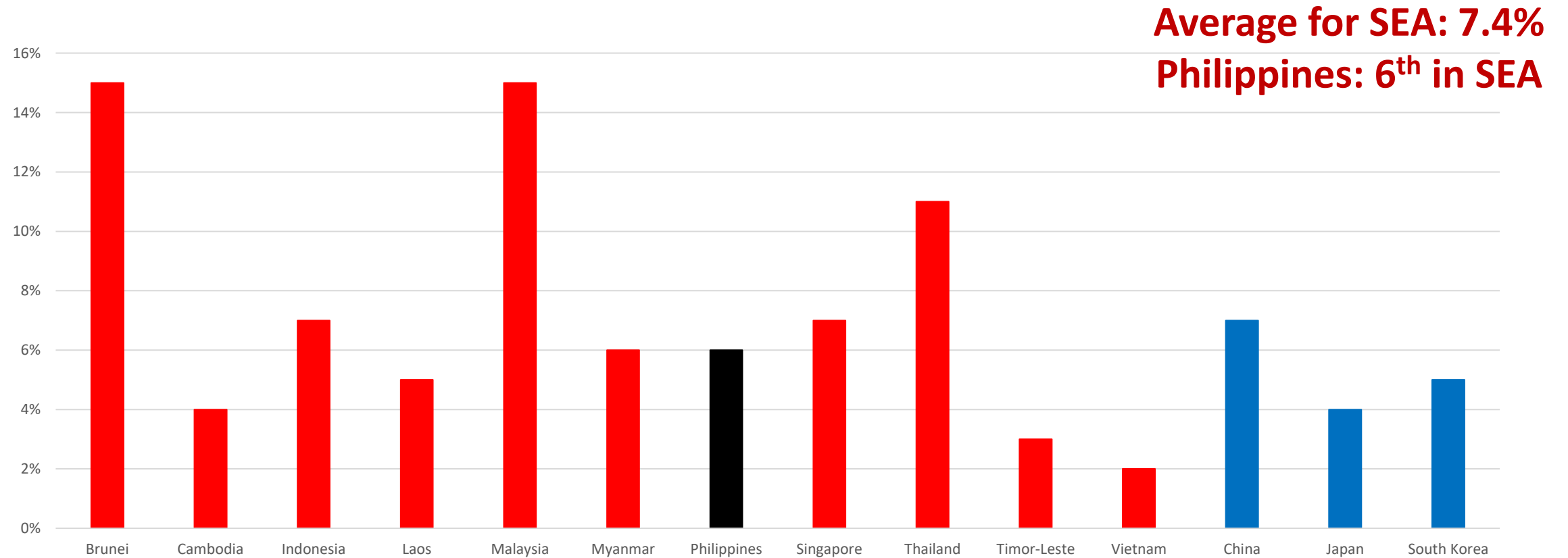
# SouthEast Asia: Risk Factors for Cardiovascular Disease Smoking (2016)

**Average for SEA: 21.1%**  
**Philippines: 3<sup>rd</sup> in SEA**



# Southeast Asia: Risk Factors for Cardiovascular Disease Obesity (2016)

Population aged 18 years and older having a body mass index (BMI)  $\geq 30$  kg/m<sup>2</sup>

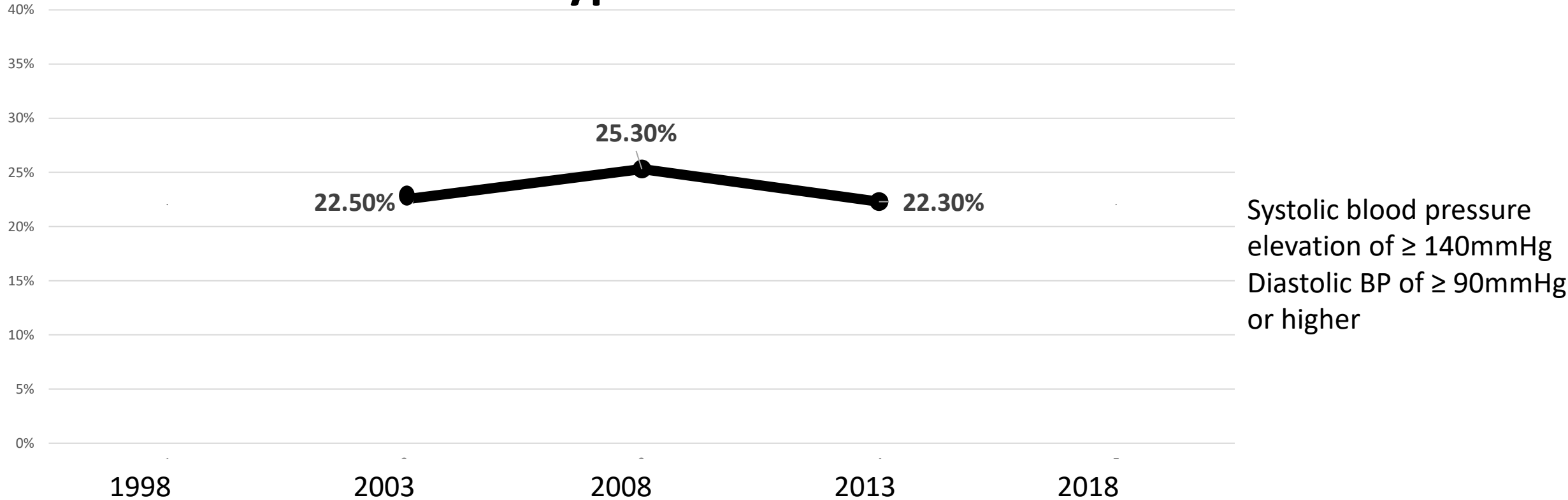


**PHILIPPINES**



# Philippines: Risk Factors for Cardiovascular Disease

## Hypertension



Expanded National Nutrition Survey: 2019 Results. Retrieved from:

[http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination\\_ADULTS%20and%20ELDERLY.pdf](http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination_ADULTS%20and%20ELDERLY.pdf)

Dans, Antonio, et.al. National Nutrition and Health Survey: Atherosclerosis – Related Diseases and Risk Factors. *Philippine Journal of Internal Medicine*. May 2005

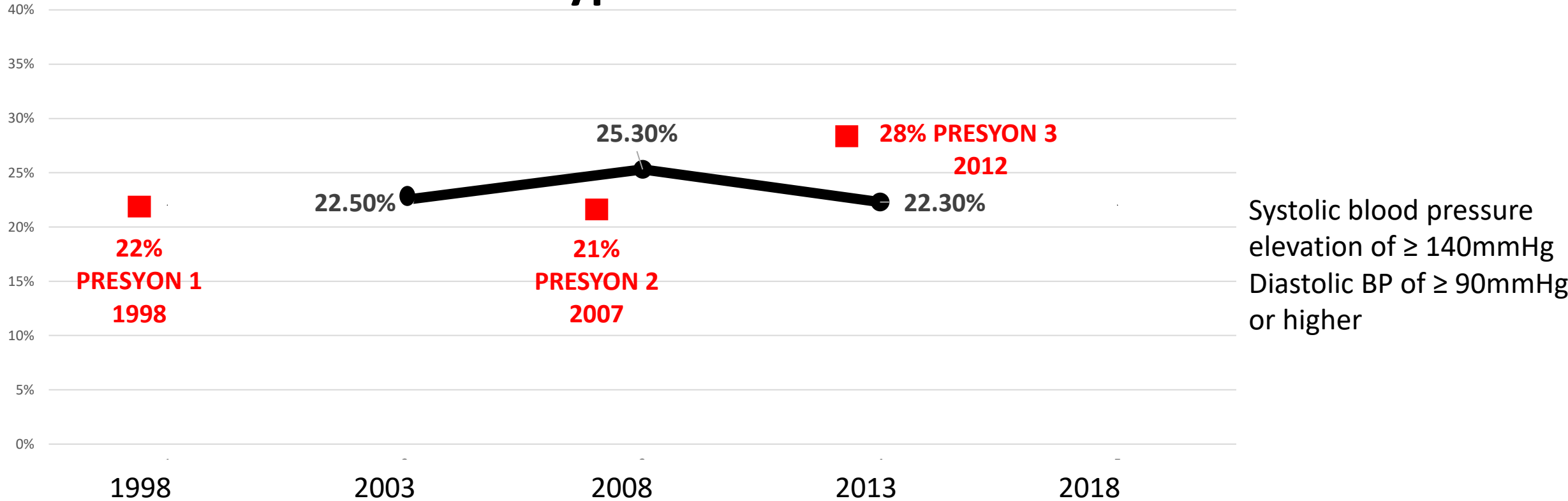
Sy, Rody, et.al. Prevalence of Atherosclerosis-Related Risk Factors and Diseases in the Philippines. *Journal of Epidemiology*. July 2012

Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST). 2015. *Philippine Nutrition Facts and Figures 2013: Clinical and Health Survey*. FNRI Bldg., DOST Compound, Bicutan, Taguig City, Metro Manila, Philippines



# Philippines: Risk Factors for Cardiovascular Disease

## Hypertension



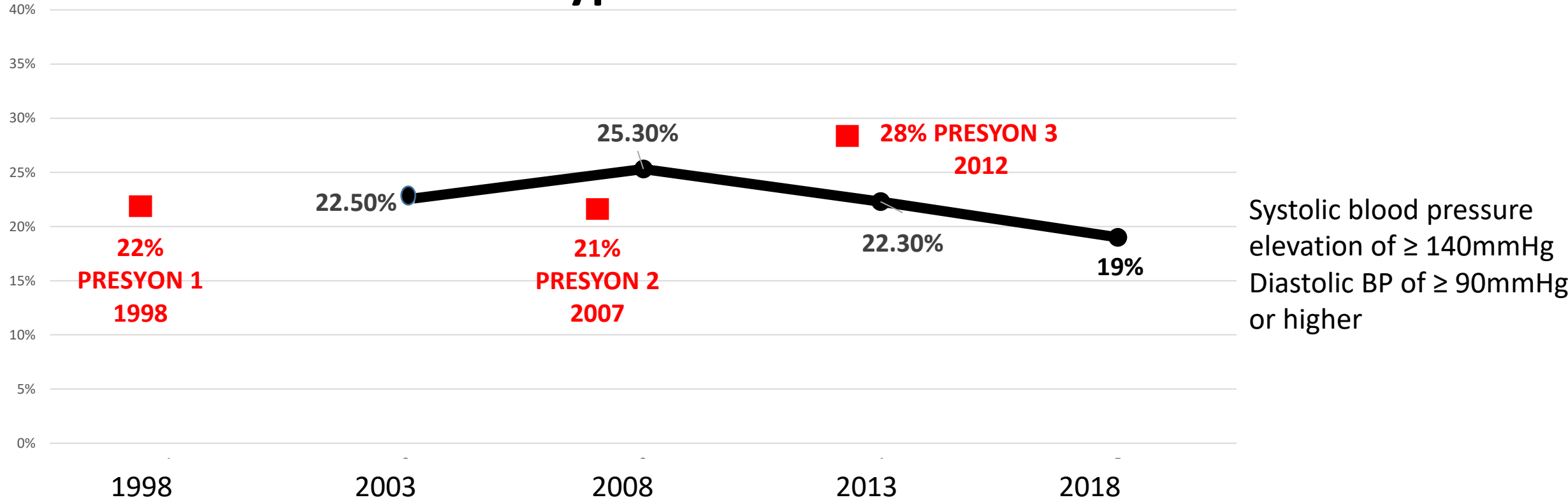
Sison JA, Atabug JL, et al. Philippine Heart Association-Council on hypertension report on survey of hypertension in the Philippines ("PRESYON" 1997–98). *Phil J Cardiol.* 1998; 26: 51- 54.

Trinidad E, Chua P, Punzalan A, et al. Philippine Heart Association-Council on Hypertension Report on Survey of Hypertension and Target Organ Damage (PRESYON 2-TOD) A report on prevalence of hypertension, awareness, treatment profile and control rate. *Phil J Cardiol.* 2007; 35: 1- 9.

Yape IMP, Sison JA, et al. Philippine heart association-council on hypertension. Philippine heart association-council on hypertension report on survey of hypertension (Presyon 3): a report on prevalence of hypertension, awareness and treatment profile. *Phil J Cardiol.* 2013; 41: 43- 48.

# Philippines: Risk Factors for Cardiovascular Disease

## Hypertension



Expanded National Nutrition Survey: 2019 Results. Retrieved from:

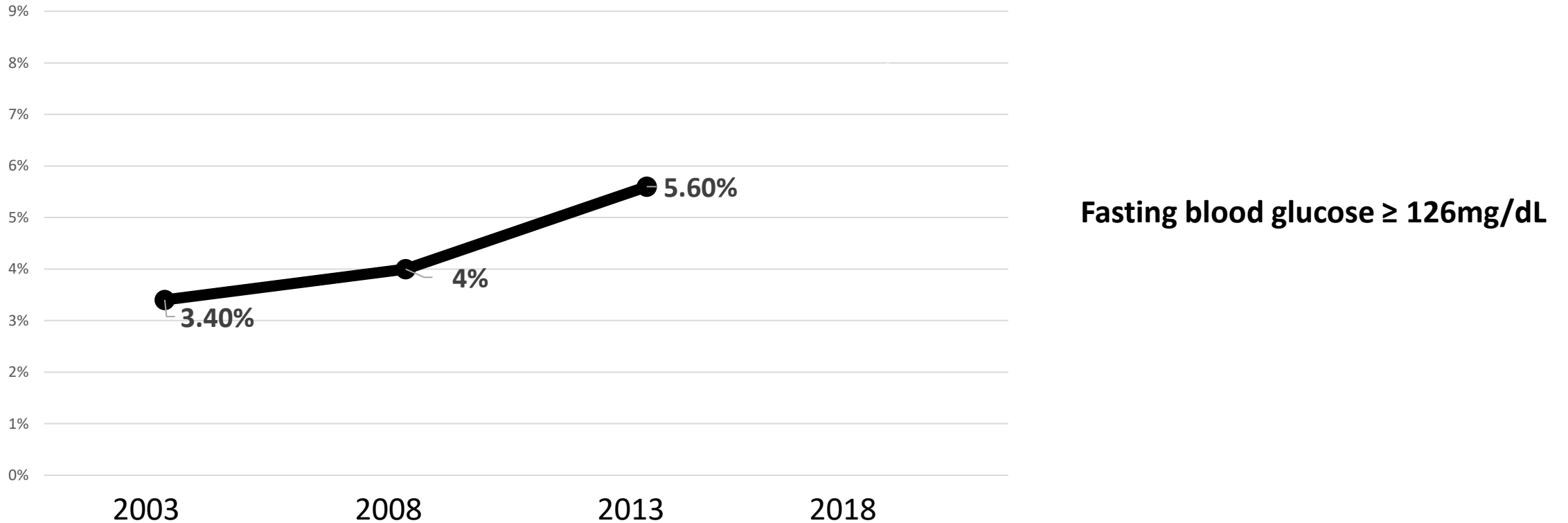
[http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination\\_ADULTS%20and%20ELDERLY.pdf](http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination_ADULTS%20and%20ELDERLY.pdf)

Dans, Antonio, et.al. National Nutrition and Health Survey: Atherosclerosis – Related Diseases and Risk Factors. Philippine Journal of Internal Medicine. May 2005

Sy, Rody, et.al. Prevalence of Atherosclerosis-Related Risk Factors and Diseases in the Philippines. Journal of Epidemiology. July 2012

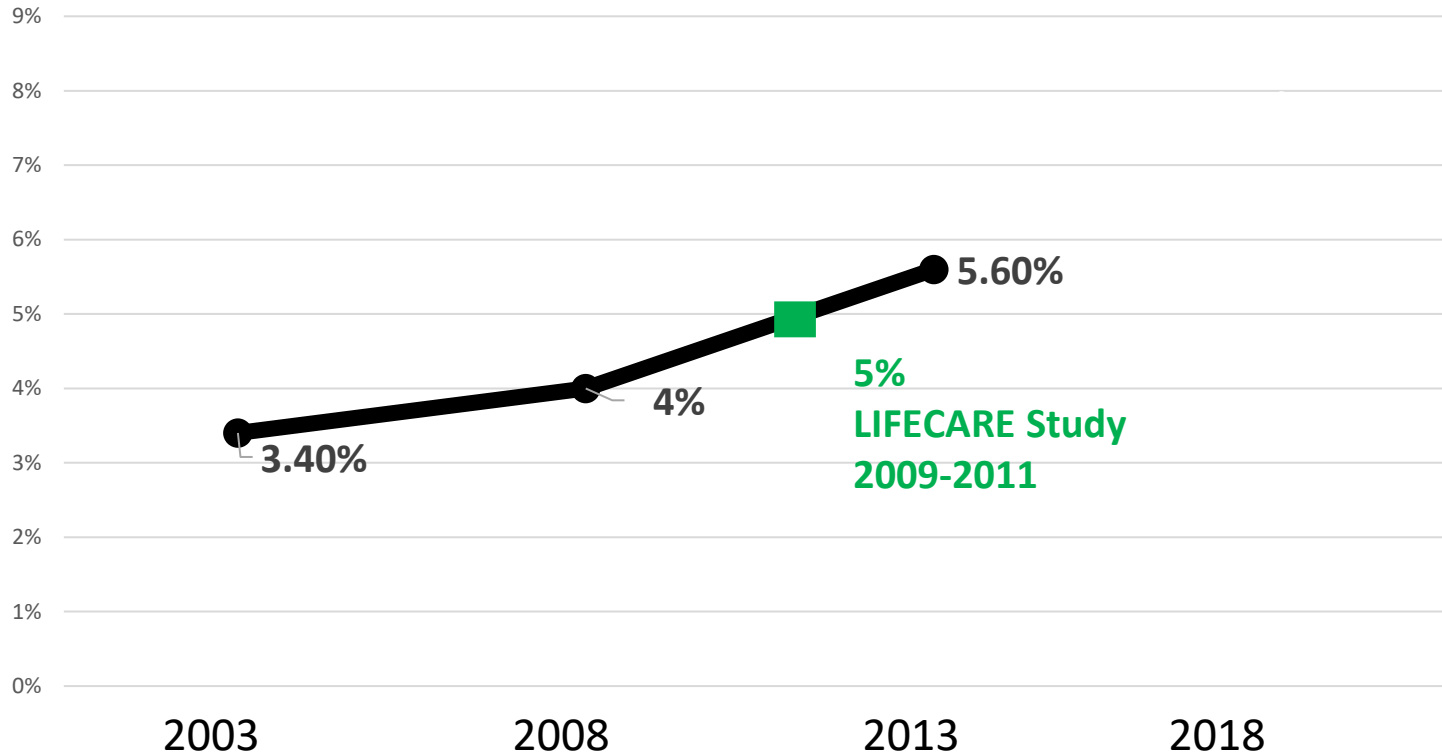
Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST). 2015. Philippine Nutrition Facts and Figures 2013: Clinical and Health Survey. FNRI Bldg., DOST Compound, Bicutan, Taguig City, Metro Manila, Philippines

# Philippines: Risk Factors for Cardiovascular Disease Diabetes



Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST). 2015. *Philippine Nutrition Facts and Figures 2013: Clinical and Health Survey*. FNRI Bldg., DOST Compound, Bicutan, Taguig City, Metro Manila  
Expanded National Nutrition Survey: 2019 Results. Retrieved from:  
[http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination\\_ADULTS%20and%20ELDERLY.pdf](http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination_ADULTS%20and%20ELDERLY.pdf)

# Philippines: Risk Factors for Cardiovascular Disease Diabetes

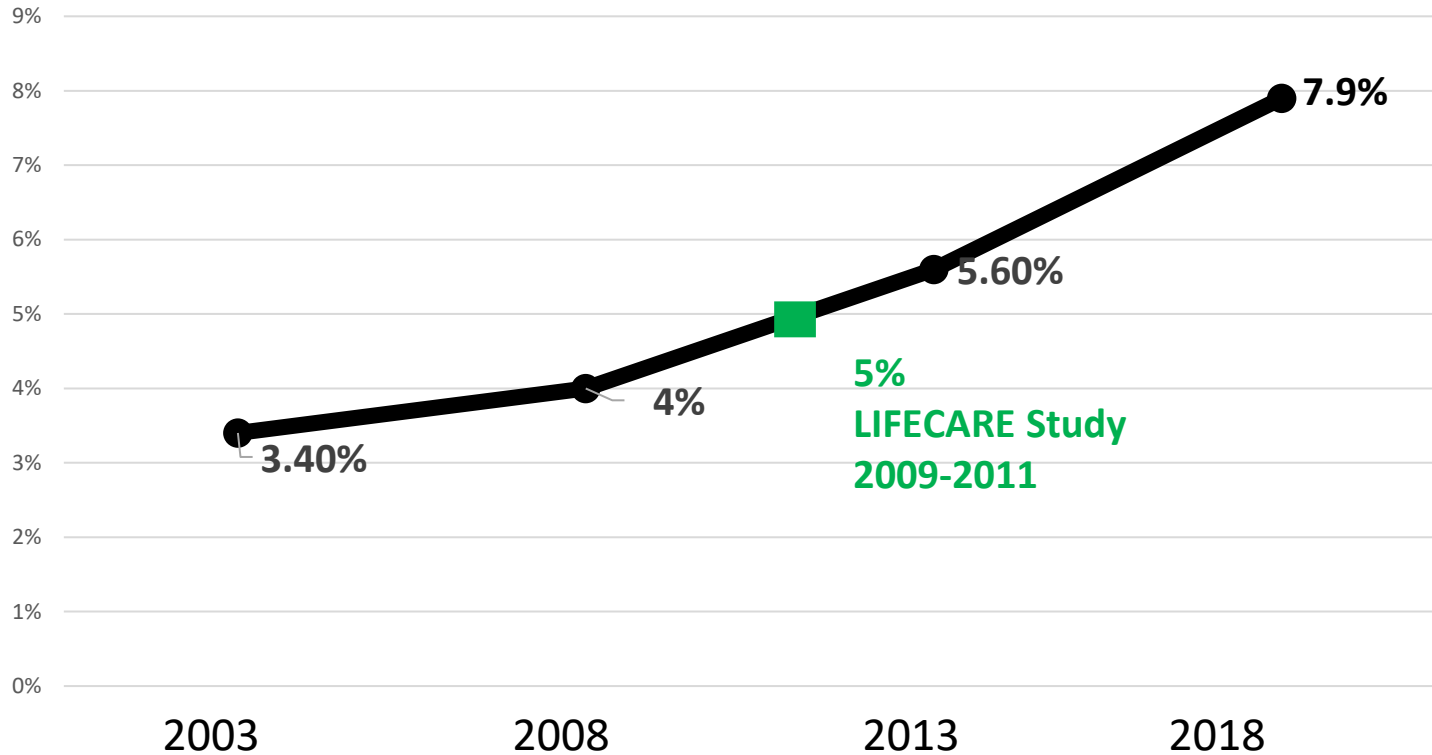


**LIFECARE STUDY operational definition**  
**Fasting blood glucose  $\geq$  126mg/dL**

Punzalan FER, Sy RG et al. Prevalence of Cardiovascular Risk Factors in relation to Socio-demographic profile of the Life Course Study in Cardiovascular Disease Epidemiology Study (LIFECARE) Philippine Cohort. 2014. Acta Medica Philippina Vol. 48 No. 2 (updated 2017)

Dr. Dans

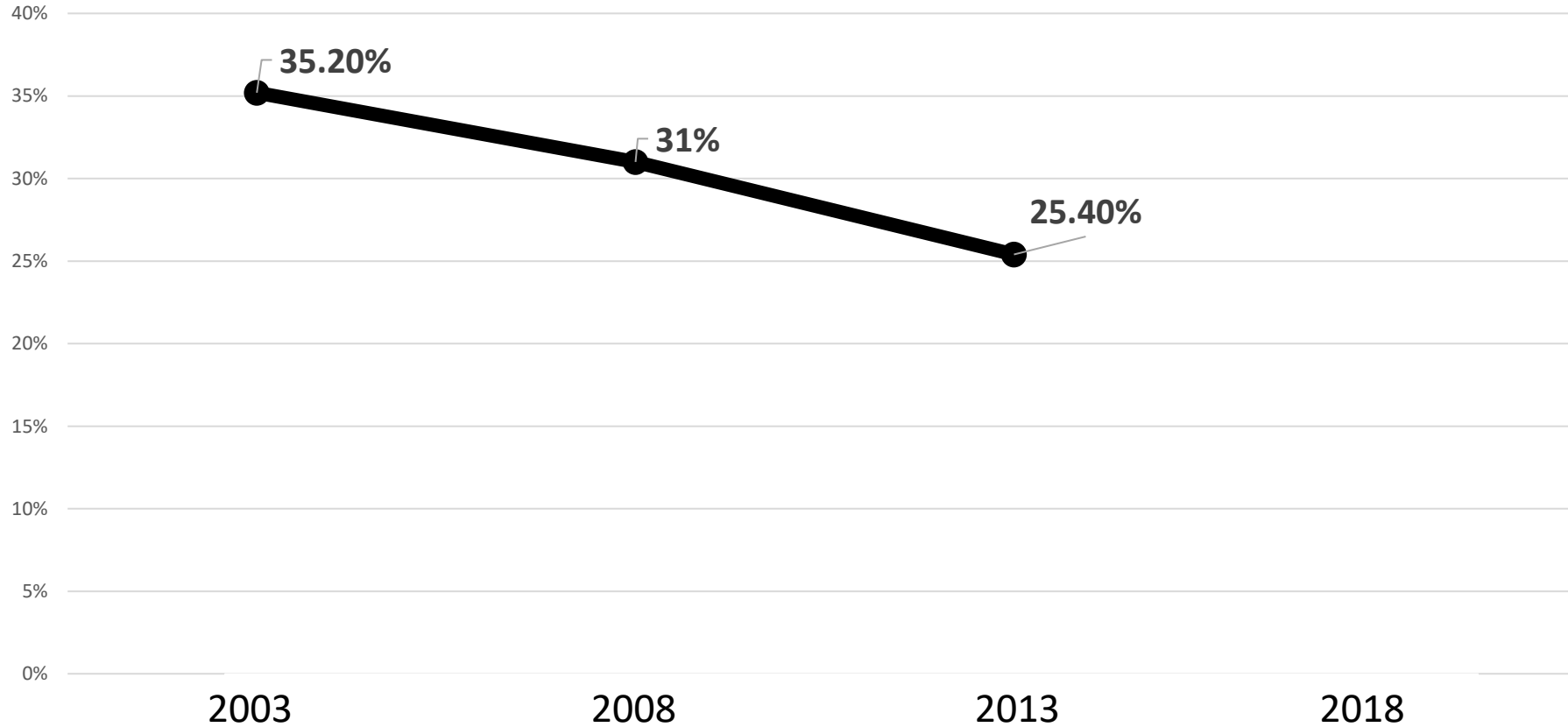
# Philippines: Risk Factors for Cardiovascular Disease Diabetes



**LIFECARE STUDY operational definition**  
Fasting blood glucose  $\geq$  126mg/dL

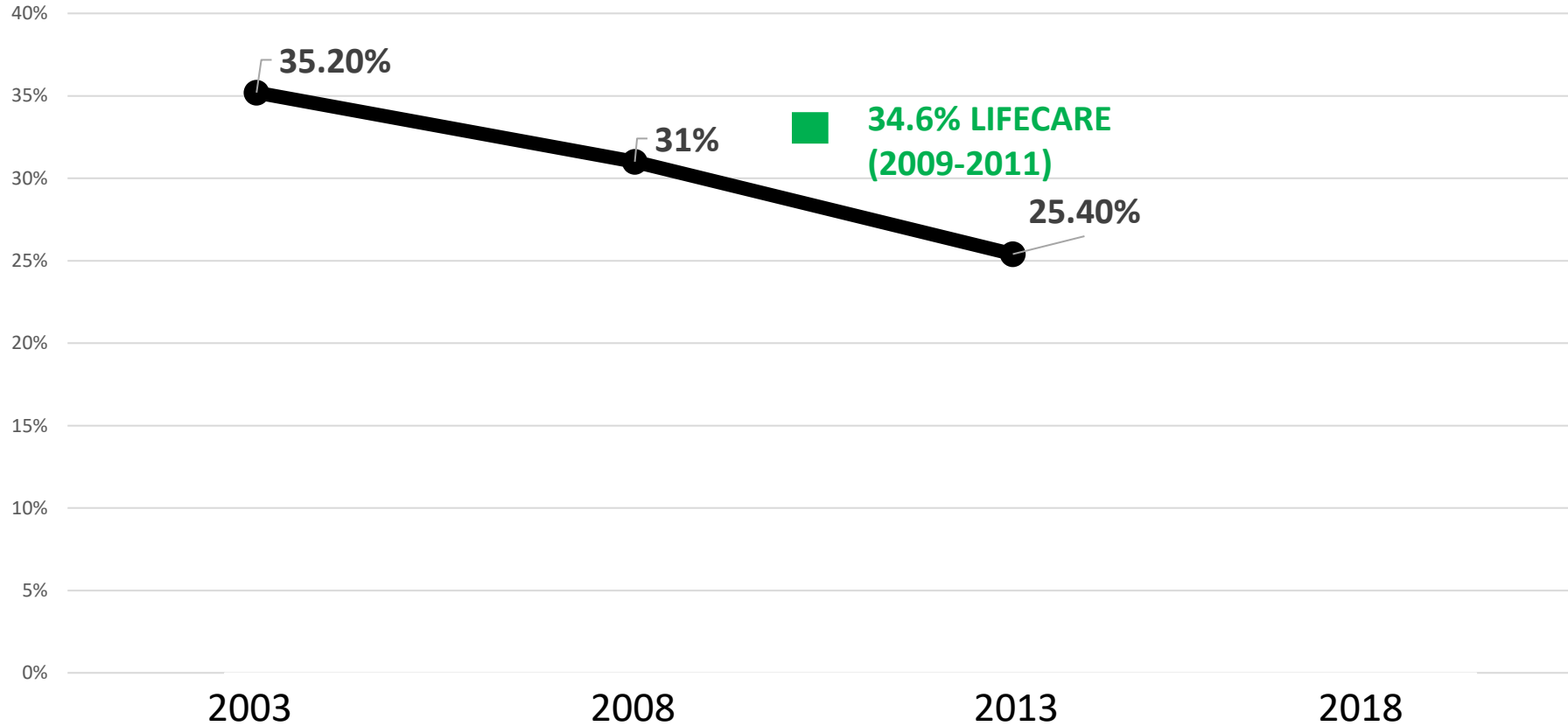
Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST). 2015. *Philippine Nutrition Facts and Figures 2013: Clinical and Health Survey*. FNRI Bldg., DOST Compound, Bicutan, Taguig City, Metro Manila  
Expanded National Nutrition Survey: 2019 Results. Retrieved from:  
[http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination\\_ADULTS%20and%20ELDERLY.pdf](http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination_ADULTS%20and%20ELDERLY.pdf)

# Philippines: Risk Factors for Cardiovascular Disease Smoking



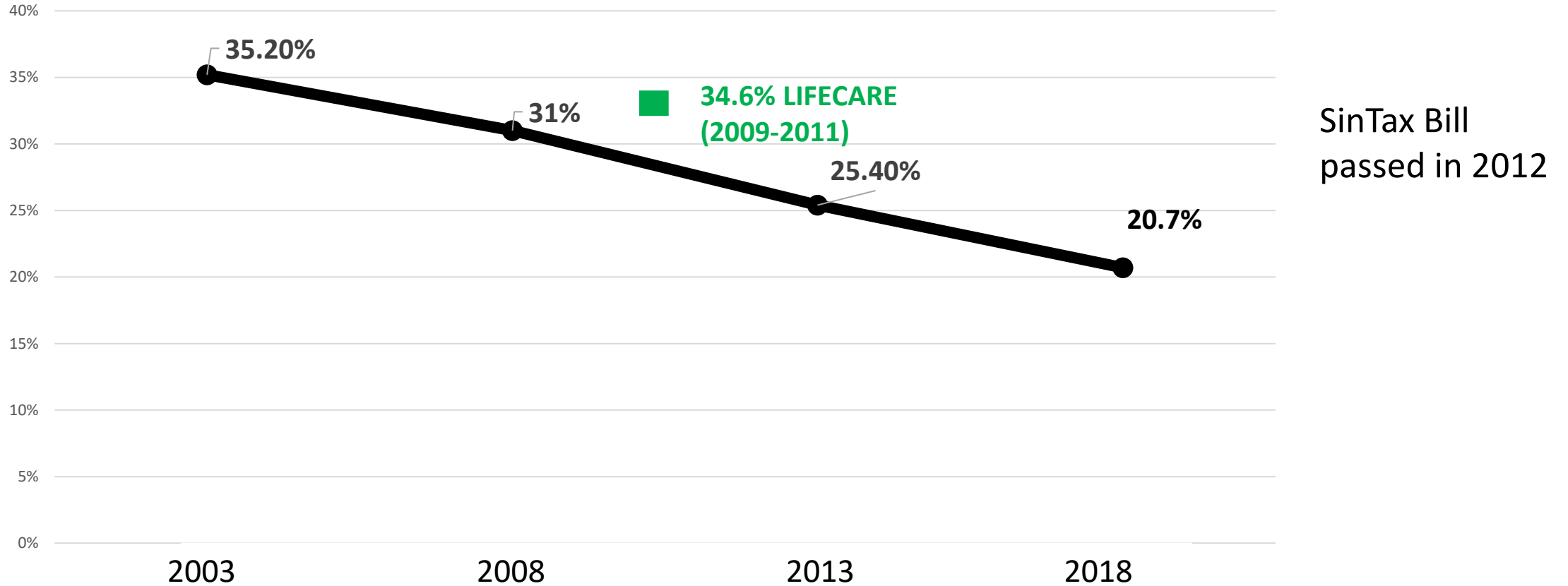
*Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST). 2015. Philippine Nutrition Facts and Figures 2013: Clinical and Health Survey. FNRI Bldg., DOST Compound, Bicutan, Taguig City, Metro Manila, Philippines. Expanded National Nutrition Survey: 2019 Results. Retrieved from: [http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination\\_ADULTS%20and%20ELDERLY.pdf](http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination_ADULTS%20and%20ELDERLY.pdf)*

# Philippines: Risk Factors for Cardiovascular Disease Smoking



*Punzalan FER, Sy RG et al. Prevalence of Cardiovascular Risk Factors in relation to Socio-demographic profile of the Life Course Study in Cardiovascular Disease Epidemiology Study (LIFECARE) Philippine Cohort. 2014. Acta Medica Philippina Vol. 48 No. 2 (updated 2017)*

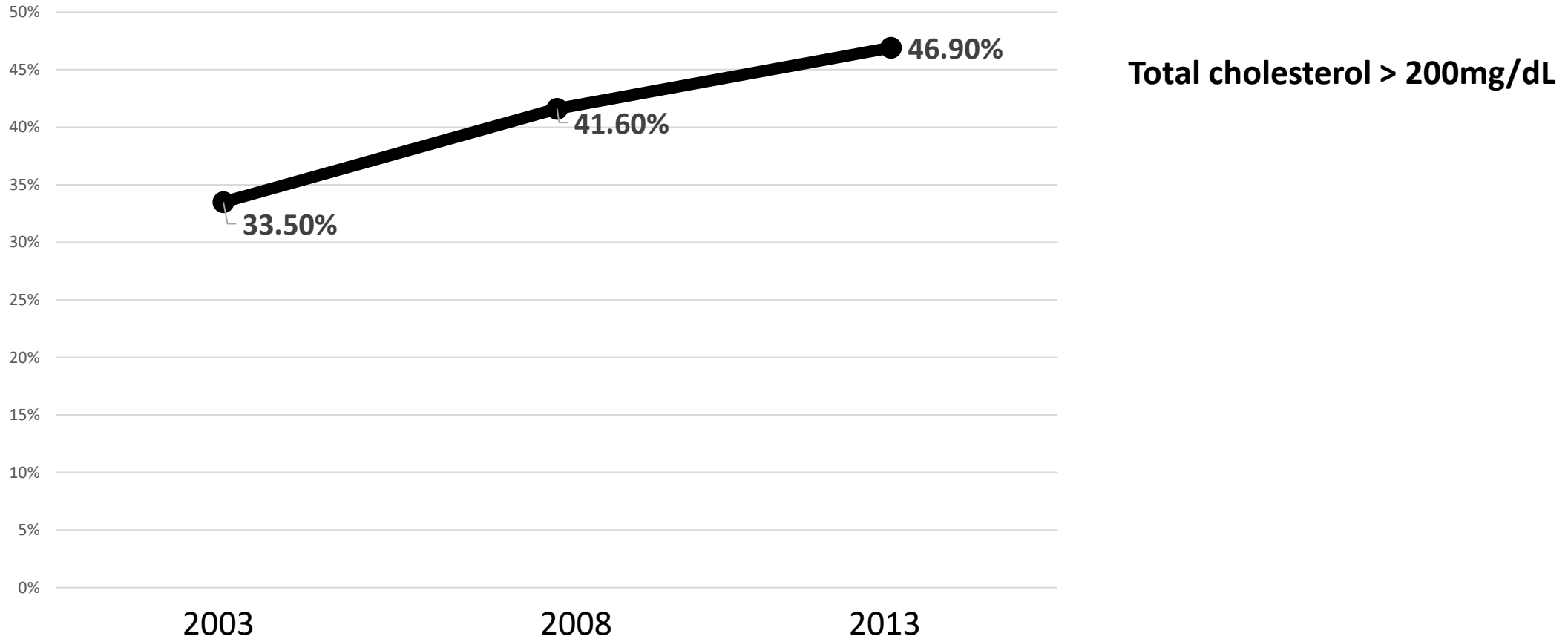
# Philippines: Risk Factors for Cardiovascular Disease Smoking



*Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST). 2015. Philippine Nutrition Facts and Figures 2013: Clinical and Health Survey. FNRI Bldg., DOST Compound, Bicutan, Taguig City, Metro Manila, Philippines. Expanded National Nutrition Survey: 2019 Results. Retrieved from: [http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination\\_ADULTS%20and%20ELDERLY.pdf](http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination_ADULTS%20and%20ELDERLY.pdf)*

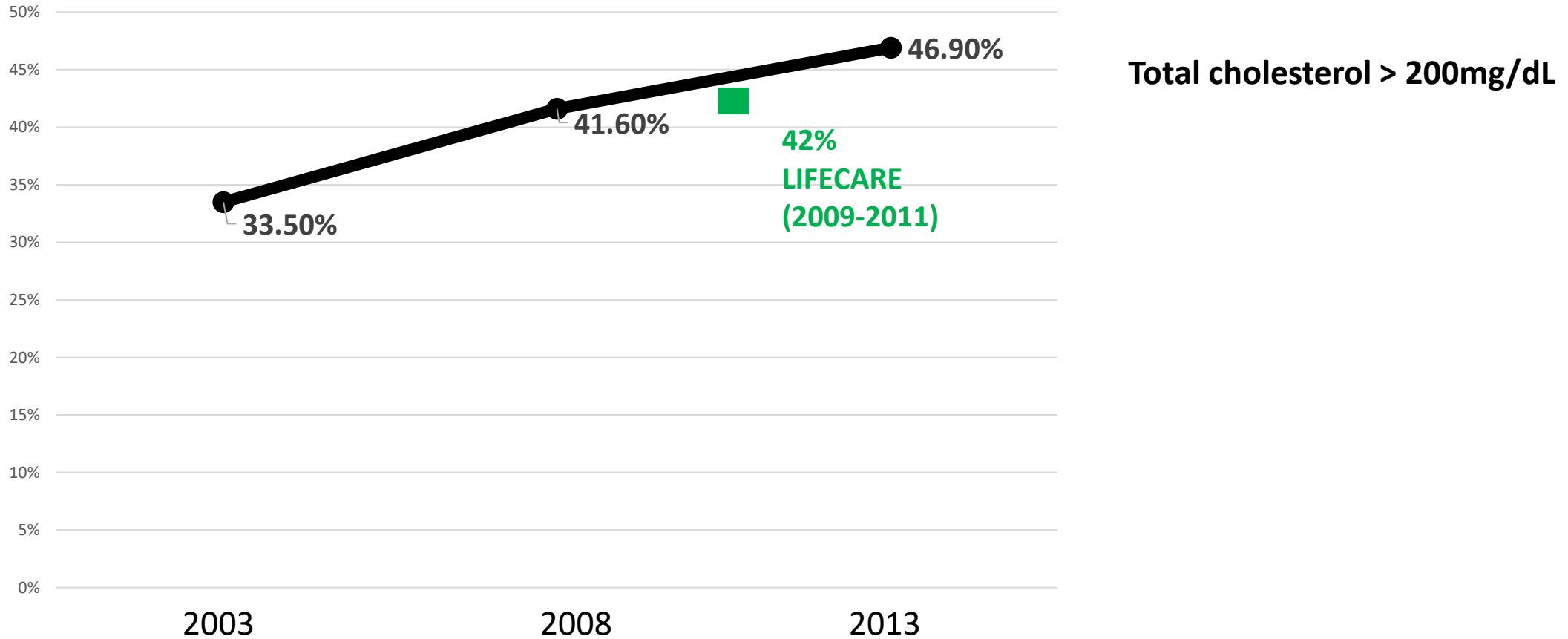


# Philippines: Risk Factors for Cardiovascular Disease Hypercholesterolemia



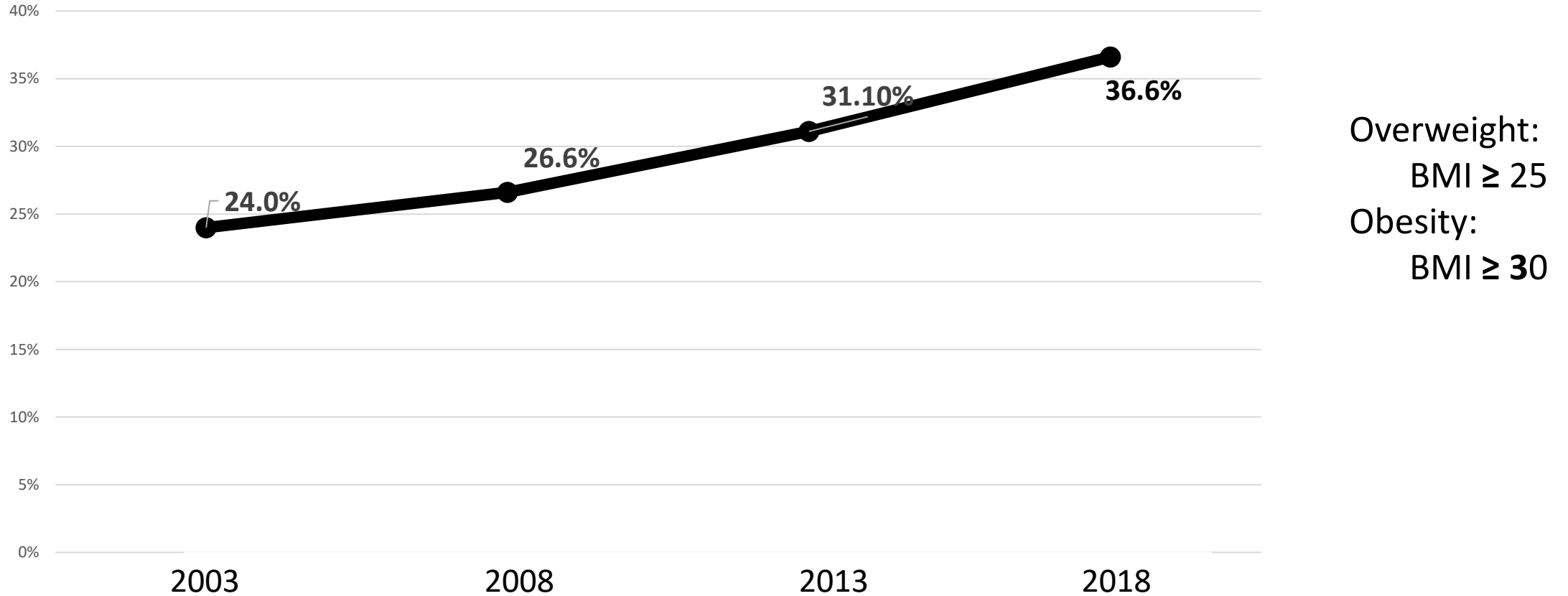
*Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST). 2015. Philippine Nutrition Facts and Figures 2013: Clinical and Health Survey. FNRI Bldg., DOST Compound, Bicutan, Taguig City, Metro Manila, Philippines. Sison JA, Atabug JL, et al. Philippine Heart Association-Council on hypertension report on survey of hypertension in the Philippines ("PRESYON" 1997-98). Phil J Cardiol. 1998; 26: 51- 54.*

# Philippines: Risk Factors for Cardiovascular Disease Hypercholesterolemia



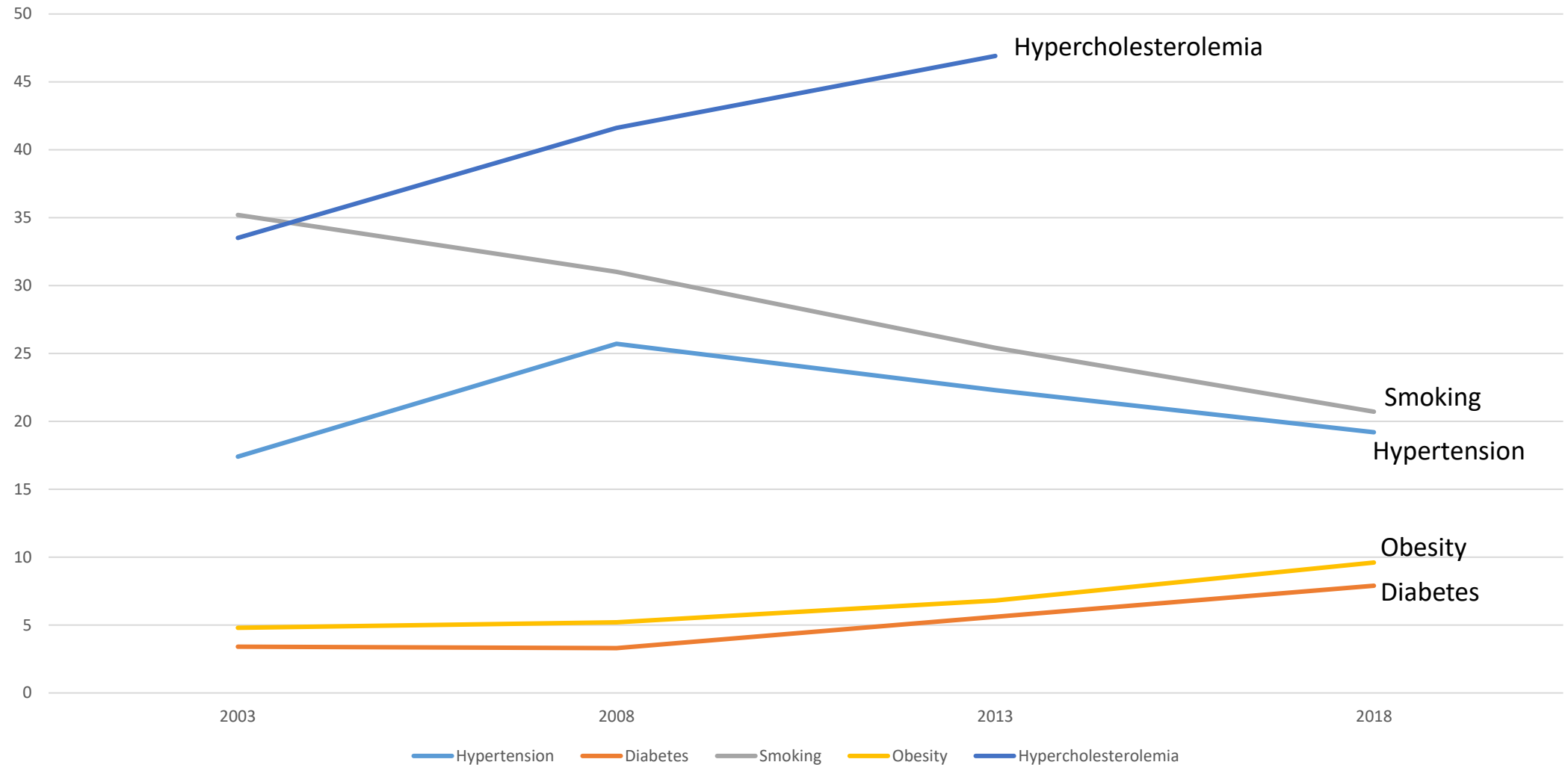
*Punzalan FER, Sy RG et al. Prevalence of Cardiovascular Risk Factors in relation to Socio-demographic profile of the Life Course Study in Cardiovascular Disease Epidemiology Study (LIFECARE) Philippine Cohort. 2014. Acta Medica Philippina Vol. 48 No. 2 (updated 2017)*

# Philippines: Risk Factors for Cardiovascular Disease Overweight and Obesity



*Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST). 2015. Philippine Nutrition Facts and Figures 2013: Clinical and Health Survey. FNRI Bldg., DOST Compound, Bicutan, Taguig City, Metro Manila, Philippines. Expanded National Nutrition Survey: 2019 Results. Retrieved from: [http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination\\_ADULTS%20and%20ELDERLY.pdf](http://enutrition.fnri.dost.gov.ph/site/uploads/2019%20ENNS%20Results%20Dissemination_ADULTS%20and%20ELDERLY.pdf)*

# Risk factor trends in the Philippines (2003-2018)



# SUMMARY

- Global CV mortality shows a downward trend in the last 3 decades
- SE Asia overall shows the same trend except for the Philippines and Indonesia
- The Philippine CV mortality is on the upward trend in the past 2 decades.
- Prevalence of hypertension and smoking are both on the downward trend.
- Prevalence of diabetes, hypercholesterolemia and overweight /obesity are increasing.

# Acknowledgement



Dr. Felix Eduardo Punzalan

Dr. Jeffrey Valencia

Dr. Namphril Malaluan

Dr. Paula Victoria Cheng

Dr. Brian Alvarez



**Epidemiology of Cardiovascular Diseases in Southeast Asia:  
a Systematic Review**

**Division of Cardiovascular Medicine, Philippine General Hospital**