

SMOKING PLAYING AS A RISK FACTOR TO OTHER DISEASES: A META-ANALYSIS

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Abstract

On July 21, 2021, a report from the World Health Organization indicated that there are presently 1.3 billion tobacco smokers globally. Data statistics show that the mortality rate of tobacco use is already at 3,021,098. Although smoking receives the lowest mortality rate among other communicable and non-communicable diseases in 2021, research suggests that smoking could hamper the quality of life of someone who already has an existing illness. This study investigated the adverse effects of smoking as a contributory factor to communicable diseases such as HIV/AIDS, Tuberculosis, and COVID-19, non-communicable diseases like Malaria and Dengue, and risk factors such as alcohol and obesity. The locale of the study is Philippines. Meta-analysis is utilized in order to examine data statistics of the Philippines in comparison to its Southeast Asian neighbors. Meta-analysis was used by the author to extrapolate data from various quantitative and qualitative documents from 2000 up to the present. Specifically, open-access journal articles and data from legitimate databases like ISI Scopus-indexed journals and/or websites were collated substantially.

Keywords: Smoking, Risk Factor, Smoking to Other Diseases

Introduction

The World Health Organization published a report on July 21, 2021, stating that there are currently 1.3 billion tobacco users worldwide (An estimate of 23 percent of the total 7.8 billion population in 2020). In the United States, tobacco use is the leading cause of preventable disease, disability, and death. Adult smokers in the United States number nearly 40 million, with approximately 47 million middle and high school students using at least one tobacco product including e-cigarettes per year. Using Live World statistics on population governance and economics, social media, the environment, food, water, energy, and health, one of the investigators tried to observe the actual number of deaths due to smoking—on average, one person dies every six seconds (00:00:06:109).

Table 1 data statistics show the mortality rates of tobacco, communicable and non-communicable diseases globally as shown:

Table 1. Data Statistics in terms of Mortality and Its Cause

Mortality this Year (2021)*	Death from
7,845,324	Communicable Disease
298,062	Seasonal Flu
4,593,594	Deaths of children under 5 years old
25,770,009	Abortion
186,793	Deaths of mother during birth
42,927,925	HIV/AIDS infected
4,963,368	Cancer
238,314	Malaria
3,021,098	Smoking

*data as of August 9, 2021

Less harmful products, such as e-cigarettes and heat does not burn, have been conclusively proven to be less harmful (up to 95% less harmful than conventional tobacco cigarettes) and highly effective at helping smokers quit permanently in countries that have studied the science and evidence. listened to all sides of the debate, and embraced the concept of harm reduction. These nations have, to varying degrees, made rational assessments of all available facts and acted in the best interests of their citizens by regulating the reduced-risk nicotine product segment to ensure compliance with appropriate manufacturing, marketing, and supply chain standards, and, most importantly, by enacting legislation to keep these products out of the hands of minors.

In the Global Adult Tobacco survey, in 2015, 23.8% overall (16.6 million adults), 41.9% of men and 5.8% of women currently use tobacco. About 110,000 Filipinos die from tobacco-related disease each year (GBD, 2017). Hence, the situation is far less encouraging in a number of other countries, particularly in Southeast Asia.

This research collaboration believes that governments can only hope to craft appropriate, risk- proportionate legislation that benefits their citizens if they uncover and understand the facts and evidence. and that this research should assist them in doing so from a science-based, relatable perspective.

This meta-analysis aims to document the number of deaths caused by Communicable Diseases like HIV/AIDS, tuberculosis, and COVID-19; Non-communicable Diseases such as malaria and dengue; and other risk factors such as alcohol, obesity, and smoking among Southeast Asian countries from 2000 until 2019. Secondly, it also aims to identify some harms of nicotine as a cause of death in comparison to ischemic heart, stroke, lower respiratory infections, chronic obstructive pulmonary disease (COPD), tuberculosis, and tracheal, bronchus, and lung cancer. Finally, it also aims to document the number of deaths caused by other risk factors in the Philippines such as household cleaning fluids, dirty water, food poisoning, accidents by land transportation, murder/homicide, suicide, and smoking from 2000 until 2019.

Methodology

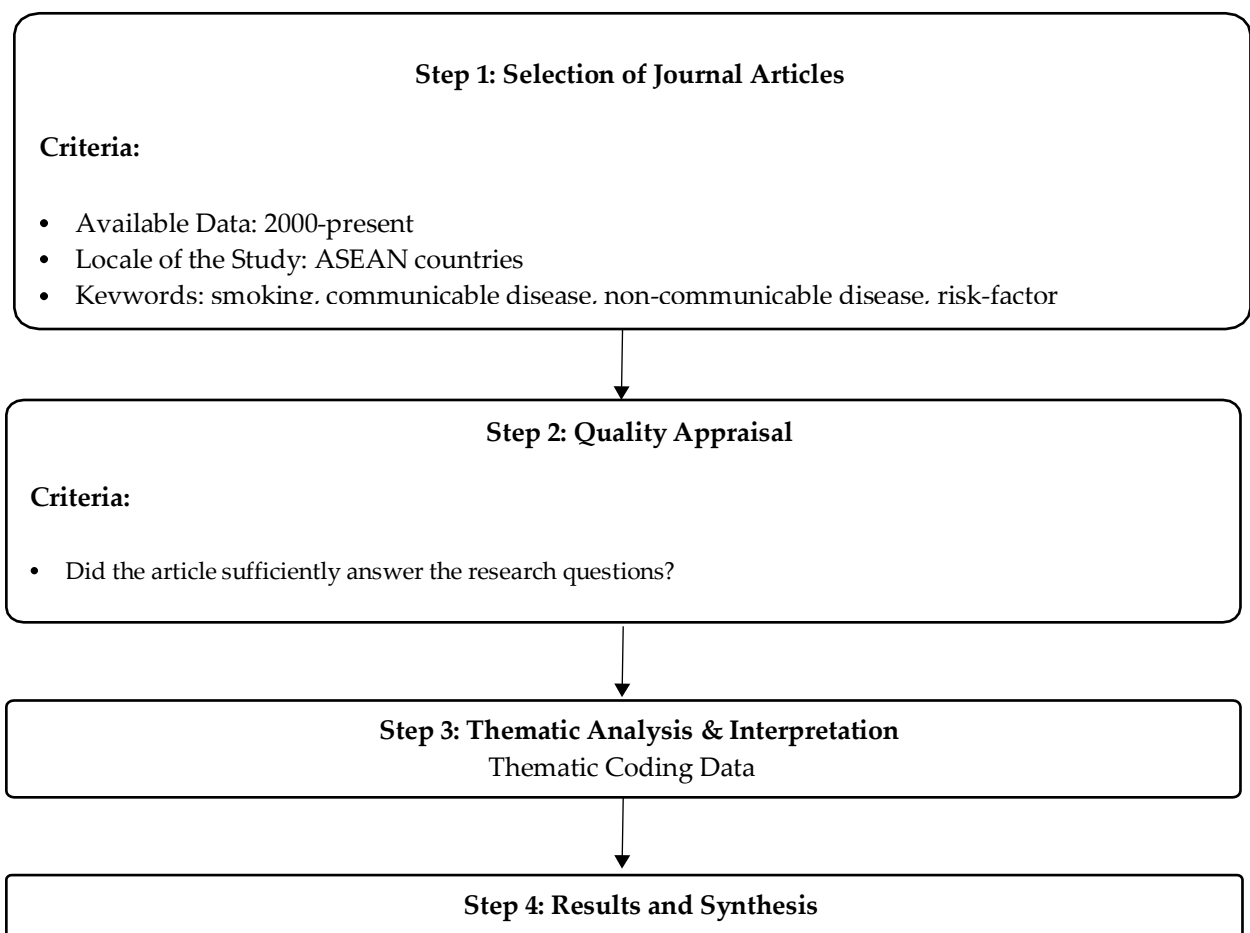
To provide a comprehensive and systematic approach in identifying related literature to suffice the demands of the study, open access journal articles and data from legitimate databases like ISI Scopus indexed journals

and/or websites were collated substantially. Keywords were used to narrow down possible sources of information. These were “smoking” or “adverse effects of smoking” and “diseases” with ASEAN countries as locale.

In order to effectively analyze and discuss the objectives of this study, meta-analysis will be used. Meta-analysis is a statistical method of combining results from different studies to weigh and compare and to identify patterns, disagreements, or relationships that appear in the context of multiple studies on the same topic (Davis et al., 2014). Meta-synthesis was used by the author in order to extrapolate data from qualitative documents related to the research problems. Since its existence, meta-synthesis has been providing a promising methodology for a holistic understanding of any problem from a field of study. Studies suggest that by interpreting a wide-range of perspectives about a topic, it can further inform policy-makers and developers, practitioners, and researchers about recent trends, developments, and even re-evaluation of common practices and policies. In the most pragmatic sense, meta-synthesis has an interpretive nature of making sense of the gathered data instead of merely collation of results. It allows interpretation and re-interpretation of validated qualitative studies in order to arrive at a more relevant and fresher understanding of the problem.

A meta-synthesis analysis will include a meta-regression and an explanation of the findings. Ewing and Cervero (2010), for example, used meta-analysis to examine the relationship between smoking variables (education, ethnicity, cups of coffee per day, diagnosis of current alcohol abuse/dependence, personality disorder) and the built environment. The employment of such method strengthened the discussion and made a more comprehensible comparisons of data related to the government’s revenue from the tobacco excise tax before and after the implementation of the Sin Tax Reform Law, the death toll linked to combustible cigarette tobacco smoking in the Philippines and other Southeast Asia countries, and the mortality rate linked to the use of tobacco and e-cigarettes.

Figure 1. Data Gathering and Preparation



Results and Discussion

Communicable Diseases in Southeast Asia from 2000-2019

Table 2 (see appendix A) presents the mortality rate for Tuberculosis among Southeast Asian nations from 2000 until 2019. Since 2000, Indonesia is the leading country with the highest mortality rate in Southeast Asia. Through the course of almost two decades, their rate decreased dramatically, from 117,562,786 in 2000, it decreased to 76,549,070 in 2019. Based on the latest data, second to Indonesia is Philippines at 29,181,111. Interestingly, Philippines gained a steady increasing rate with 27,934,235 deaths in 2000. The third country with the highest mortality rate as of 2019 is Vietnam. Since 2000, Vietnam and the Philippines were closely the same. Meanwhile, the country with the least mortality rate is Brunei Darussalam since 2000. Data shows that in Tuberculosis, all countries are equal or below 0% average increase. It is worth noting that based on the prediction data, there is a chance that the number of deaths in Tuberculosis may lower on the upcoming years. See Table 2 Tuberculosis Mortality Rate (Appendix A)

Table 3 (see appendix A) presents the mortality rate for HIV/AIDS among Southeast Asian nations from 2000 until 2019. Since 2000, Thailand is the leading country with the highest mortality rate in Southeast Asia. Through the course of almost two decades, their rate decreased dramatically, from 34,113,249 in 2000, it decreased to 17,214,732 in 2019. Based on the latest data, second to Thailand is Vietnam at 6,399,438. Interestingly, Vietnam gained a steady increasing rate with 3,766,579 deaths in 2000. The third country with the highest mortality rate as of 2019 is Indonesia. Since 2000, Vietnam and the Indonesia were closely the same. The Philippines came fourth in the ranking in 2019. It is good to note that the mortality rate for HIV/AIDS in the Philippines is increasing from 2000 to 2019. Meanwhile, the country with the least mortality rate is Brunei Darussalam since 2000. Data shows that in HIV/AIDS, Laos have the highest increase yearly with 13% average increase. Oppositely, Cambodia is the lowest with -7% average increase. It is worth noting that based on the prediction data, there is a chance that the number of deaths in HIV/AIDS may lower on the upcoming years.

Table 4. COVID-19 Mortality Rate

YEAR	2020
COUNTRY	COUNT
Vietnam	4908
Timor-Leste	0
Thailand	15557
Singapore	6795
Philippines	1048249
Myanmar	148452
Malaysia	49640
Lao People's Democratic Republic	0
Indonesia	2148683
Cambodia	0
Brunei	

Darussalam	0
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Table 4 presents the mortality rate for COVID - 19 among Southeast Asian nations in 2019. Based on the data gathered in 2019, Indonesia is the leading country with the highest mortality rate in Southeast Asia. Second to it is the Philippines with 1,048,249 deaths. The third country with the highest mortality rate as of 2019 is Vietnam. Countries with the highest death rate has a wide gap amongst each other in terms of statistics. Meanwhile, the countries with zero mortality rate are Cambodia, Timor Leste, and Brunei Darussalam.

Non-communicable Diseases in Southeast Asia from 2000-2019

Table 5 (see appendix A) presents the mortality rate for Malaria among Southeast Asian nations from 2000 until 2019. In 2019, Indonesia is the leading country with the highest mortality rate in Southeast Asia. Through the course of almost two decades, their rate increased dramatically and fluctuated, from 1,124,902 since 2000. Based on the latest data, second to Indonesia is Myanmar with 293,817. It is interesting to note that Myanmar recorded the highest rate from 2000 to 2015, before it shared almost the same rate with Indonesia in 2016. Third in rank is Vietnam, then followed by Philippines. Interestingly, Philippines gained a steady decreasing rate from 193,617 deaths in 2000 to 45,558 in 2019. Meanwhile, the countries with zero mortality rate are Brunei Darussalam and Singapore since 2000. Data shows that in Malaria, Indonesia is the highest with 7% average increase. Oppositely, Thailand is the lowest with -18% average increase.

Table 6. Dengue Fever Mortality Rate

Table 6 (see appendix B) presents the mortality rate for Dengue Fever among Southeast Asian nations from 2000 until 2019. Since 2000, Indonesia is the leading country with the highest mortality rate. Through the course of almost two decades, their rate decreased dramatically, from 12,865,701 in 2000, it decreased to 10,074,202 in 2019. Based on the latest data, second to Indonesia is Philippines with 2,173,685 deaths. Interestingly, Philippines gained a steady increasing rate from 1,031,603 deaths in 2000. The third country with the highest mortality rate as of 2019 is Myanmar.

Since 2000 to 2005, Philippines and Myanmar were closely the same. However since 2006, the Philippines continued to spike up, leaving behind Myanmar in its death rate. Meanwhile, the country with the least mortality rate is Brunei Darussalam since 2000. Data shows that in Dengue Fever, Timor-Leste is the highest with 18% average increase. Oppositely, Myanmar is the lowest with -4% average increase. It is worth noting that based on the prediction data, there is a chance that the number of deaths in Dengue may lower on the upcoming years.

Deaths due to Risk Factors in Southeast Asia from 2000-2019

The table 7 (see appendix B) presents the mortality rate for Alcohol use among Southeast Asian nations from 2000 until 2019. Vietnam has a dramatically spiking rate since 2000. It is also the leading country with the highest mortality rate in Southeast Asia. Through the course of almost two decades, their rate increased dramatically, from 11,609 in 2000, it spiked to 52,984 in 2019. Based on the latest data, second to Vietnam is Philippines with 39,802 deaths. Interestingly, Philippines gained a steady increasing rate from 25,039 deaths in 2000. The third country with the highest mortality rate as of 2019 is Thailand. Since 2000, Philippines and Thailand were closely the same. Meanwhile, the country with the least mortality rate is Brunei Darussalam since 2000. Data shows that in Alcohol, Vietnam is the highest with 8% average increase. Oppositely, Malaysia, Indonesia and Laos are the lowest with 1% average increase. It is worth noting that based on the prediction data, deaths in Alcohol use can be higher on the upcoming years.

Table 8 (see appendix B) presents the mortality rate for obesity among Southeast Asian nations from 2000 until 2019. In 2019, Indonesia is the leading country with the highest mortality rate. Through the course of almost two

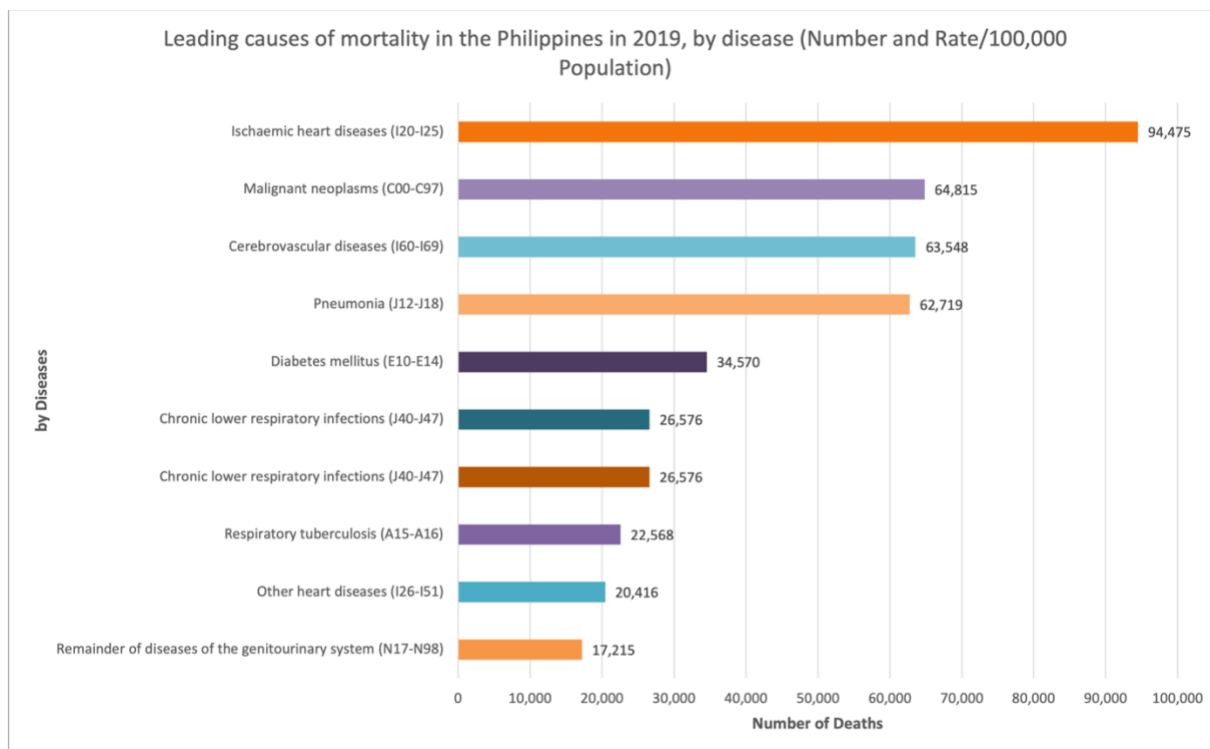
decades, their rate increased drastically, from 55,832 since 2000. Based on the latest data, second to Indonesia is Philippines with 65,200 deaths. Third in rank is Thailand. It is good to note that Philippines gained a steady increasing rate from 21,945 deaths in 2000 to 65,200 in 2019. Meanwhile, the country with the least mortality rate is Brunei Darussalam. Data shows that in Obesity, Vietnam and Timor-Leste are the highest with 8% average increase. Oppositely, Singapore is the lowest with 3% average increase. It is worth noting that based on the prediction data, deaths in Obesity can be higher on the upcoming years.

Table 9 (see appendix C) the table above presents the mortality rate for smoking among Southeast Asian nations from 2000 until 2019. In 2019, Indonesia is the leading country with the highest mortality rate. Through the course of almost two decades, their rate increased drastically, from 145,834 since 2000. Based on the latest data, second to Indonesia is Vietnam with 97,074 deaths. Third in rank is Philippines. It is good to note that Philippines gained a steady increasing rate from 61,378 deaths in 2000 to 95,587 in 2019. Meanwhile, the country with the least mortality rate is Brunei Darussalam. Data shows that in Smoking, Timor-Leste is the highest with 4% average increase. Oppositely, Myanmar is the lowest with -1% average increase. It is worth noting that based on the prediction data, deaths in Smoking can be higher on the upcoming years.

Smoking as a Risk Factor to leading diseases in the Philippines

Ischemic heart illnesses, vascular diseases, pneumonias, malignant neoplasms/cancers, all types of TB, and all other forms of the disease are the top killers in the Philippines, according to the Department of Health's 2019 Philippine Health Statistics report (see figure 16). Comparing the percentage change from 2000 to 2019, there have been significant increases with ischemic heart disease (32.9%), stroke (20.3%), lower respiratory infection (16.7%), hypertensive heart diseases (54.6%), and COPD (26.7%). See Figure 2.

Figure 2. Leading Cause of Deaths by Diseases

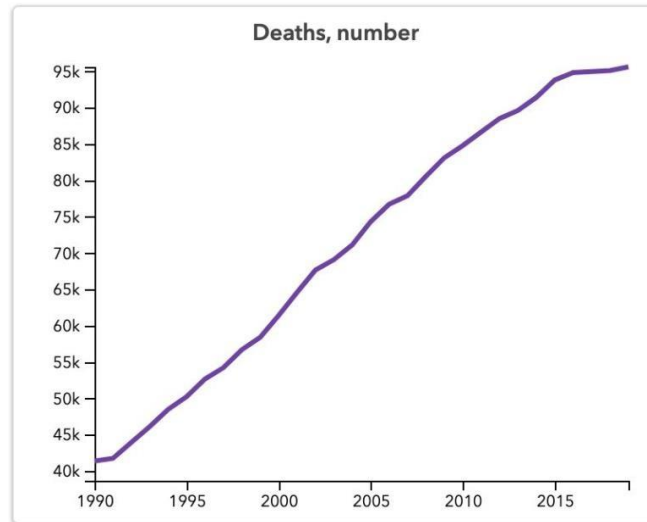


In the Philippines, 87,000 individuals die annually due to tobacco smoking. Only four of more than 40 diseases

caused by smoking — lung cancer, chronic obstructive pulmonary disease (COPD), heart disease, and stroke — account for the Php188 billion (US\$ 4 billion) in yearly healthcare costs, lost income due to illness, and premature deaths caused by tobacco use. This puts the Philippines among the top 15 countries globally that face a relatively high burden of tobacco-related mortality. These include lung cancer, COPD (chronic obstructive pulmonary disease), heart disease, and stroke.

The Global Burden of Diseases Study on Relative Risk in 2019 (GBD, 2019) indicates in Figure 3 that the number of deaths observed from 1990 to 2019 has increased constantly.

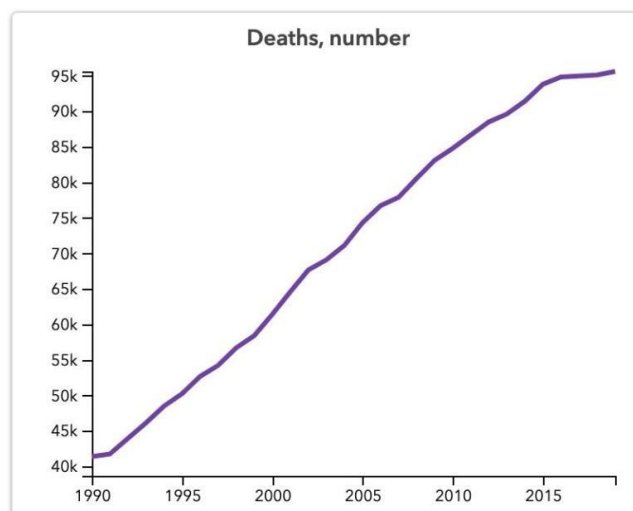
Figure 3. Leading Causes of Mortality in the Philippines



In the 2015 Philippine Global Adult Tobacco Survey (GASTS), tobacco usage among adults (age 15+),

23.8 percent of Filipinos, including 41.9 percent of males and 5.8 percent of women, use tobacco products (with 22.7 percent smoke, 40.3 percent of men and 5.1 percent of women). There were 16 percent of adolescents (ages 13 to 15) that use tobacco products (boys 22.2 percent ; girls 10.4 percent). 12 percent of the population smokes cigarettes, while 3.4% uses other tobacco products.

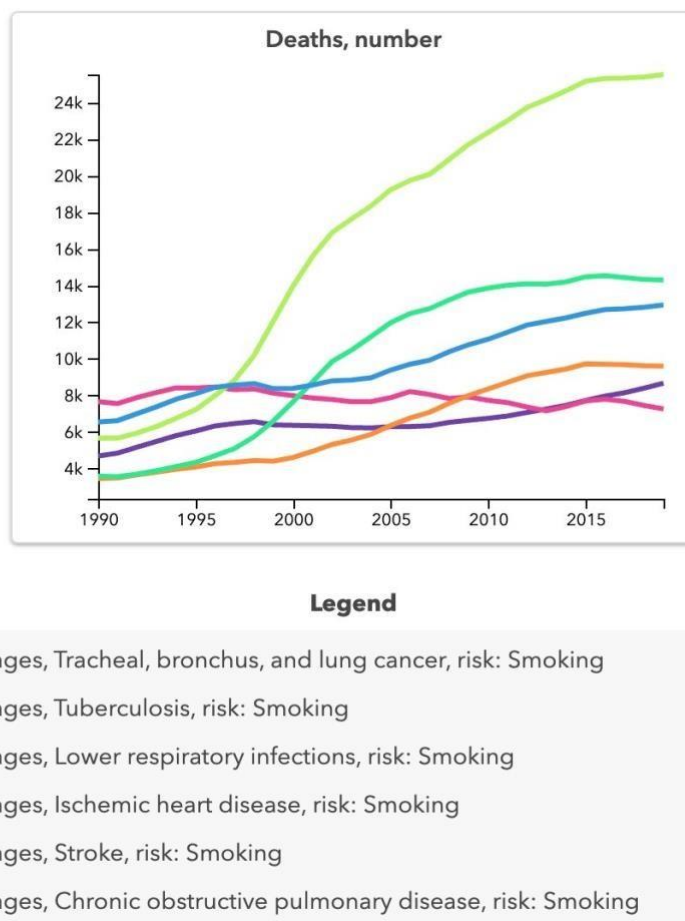
Figure 4. Deaths and Numbers associated to Smoking



Six of the top ten leading causes of mortality in the Philippines were risks associated with smoking (see Figure 4). From 2000 to 2019, comparison of data on the number deaths from tracheal, bronchus, and lung cancer; tuberculosis; ischemic heart disease; stroke; and chronic obstructive pulmonary disease.

According to the information provided by the World Health Organization (WHO), these premature deaths occurred among individuals whose income belongs to lower-to-middle class.

Figure 5. Number of Deaths (mean estimate), both sexes, All Ages, Risk: Smoking (2000-2019) in the Philippines



External risks/death-causing injuries in the Philippines

Figure 6 shows the mortality rate caused by household cleaning fluids in the Philippines from 2000 until 2019. This external factor has a fluctuating mortality rate since 2000 until 2016. It reached its lowest rate in 2012. By 2017, it drastically spiked by 156% from the previous year. From 2017 to 2019, death rate attributed to this factor is continuously increasing as shown in the graph below.

Figure 6. Household Cleaning Fluids

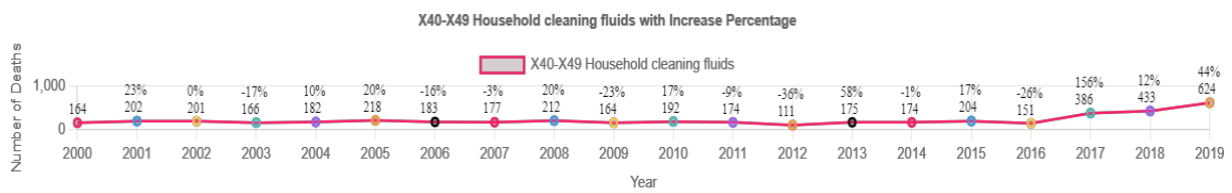


Figure 7 shows the mortality rate caused by dirty water in the Philippines from 2000 until 2019. This external factor has a steadily decreasing mortality rate since 2000. It reached its highest rate in 2000 and 2001, while its lowest rate was in 2019. The rate drastically decreased 2002 to 2004. From 2005 to 2019, death rate attributed to this factor is continuously decreasing as shown in the graph below.

Figure 7 Dirty Water/Unsafe Water Source

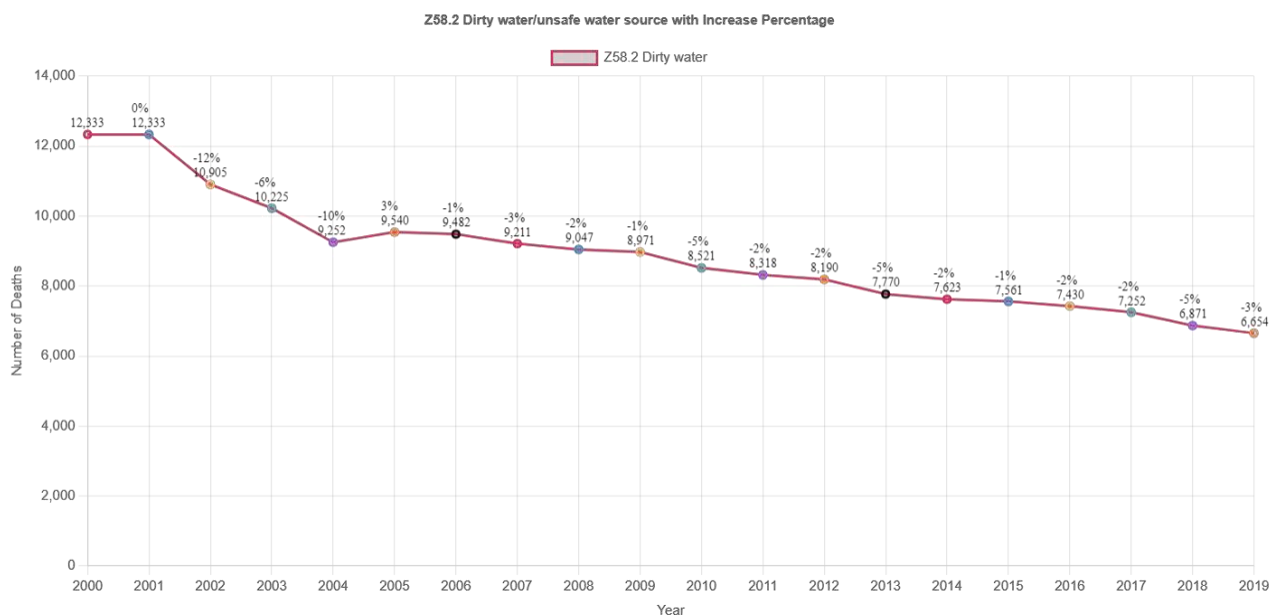


Figure 8 shows the mortality rate caused by land transportation in the Philippines from 2000 until 2019. This external factor has a steadily spiking mortality rate since 2000 until 2018. Its lowest rate was in 2000, while its highest rate was in 2018. The rate drastically decreased in 2019 by 36% from the previous year.

Figure 8. Accidents by land transportation



Figure 9 shows the mortality rate caused by assault in the Philippines from 2000 until 2019. This external factor has a steadily decreasing mortality rate since 2000 until 2015. Mortality rate in 2016 spiked up by 34%. Since then, the rate drastically decreased that in 2019, the death rate caused by assault reached its lowest with 6,008 deaths only.

Figure 9. Assault (Murder/Homicide)

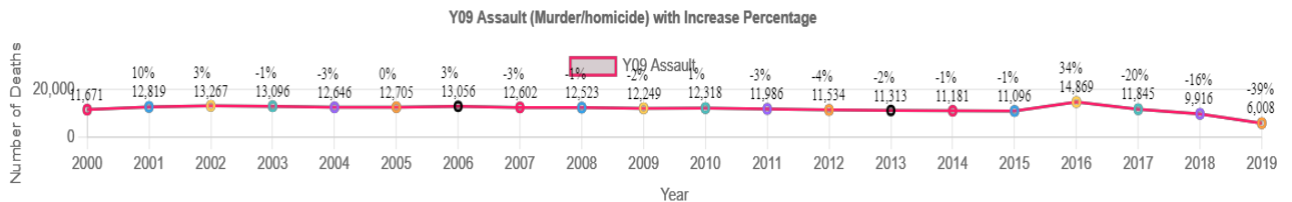


Figure 10 shows the mortality rate caused by intentional self-harm or suicide in the Philippines from 2000 until 2019. This external factor has a steadily increasing mortality rate since 2000. Its lowest rate was in 2001, while its highest rate was in 2019. The rate drastically decreased in 2016 by 22% from the previous year. However, years after, it continued to spike.

Figure 10. Intentional Self-harm (Suicide)

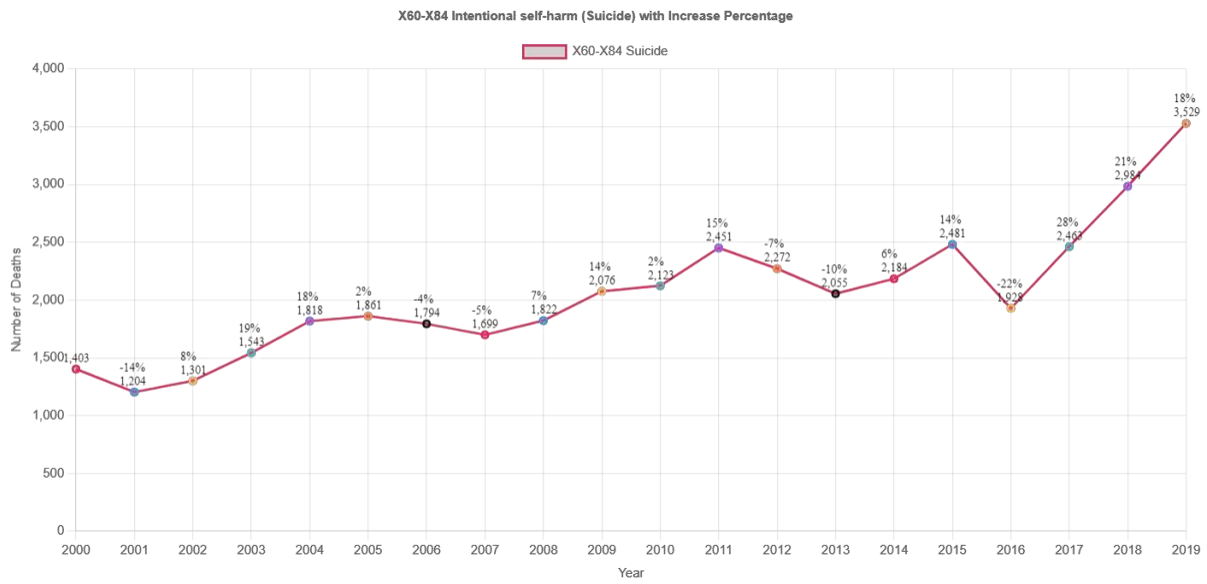


Figure 11 data the mortality rate caused by food poisoning in the Philippines from 2000 until 2013. This external factor has a fluctuating mortality rate since 2000. It reached its lowest rate in 2011. By 2012, it drastically spiked by 200% from the previous year. The latest record of death due to food poisoning was in 2013 with 9 casualties only.

Figure 11. Food Poisoning

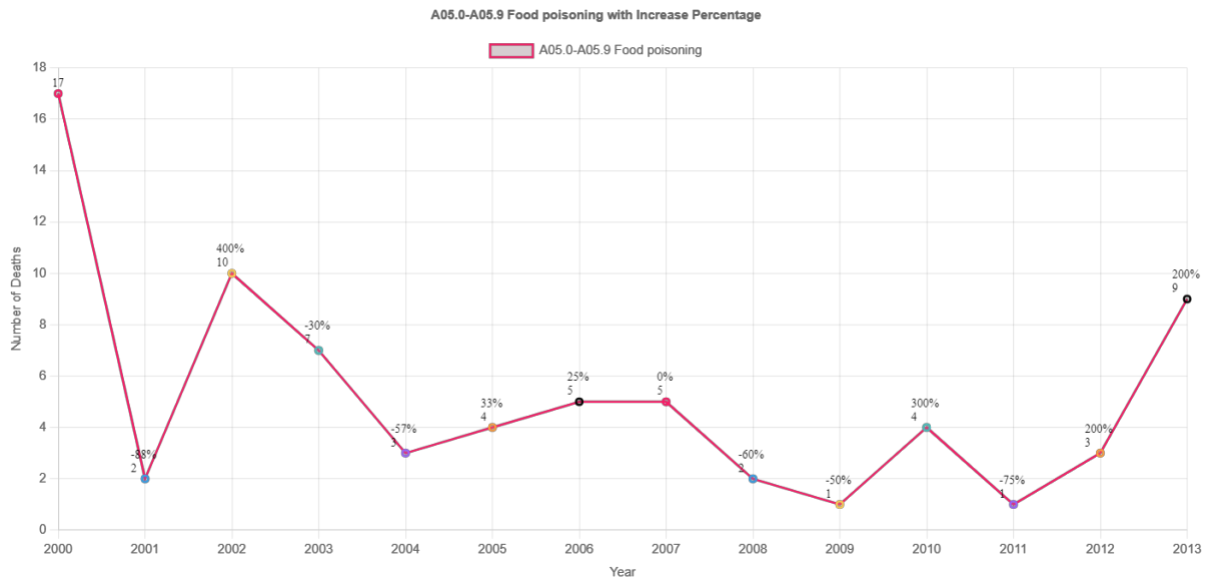


Figure 12 shows the mortality rate caused by smoking in the Philippines from 2000 until 2019. Smoking has a steadily increasing mortality rate since 2000. Its lowest rate recorded was in 2000 with 61,378 deaths. Based on the data, there is an average increase of 2% yearly. The average death insmoking between year 2000 to 2019 is 82062.6.

Figure 12. Smoking

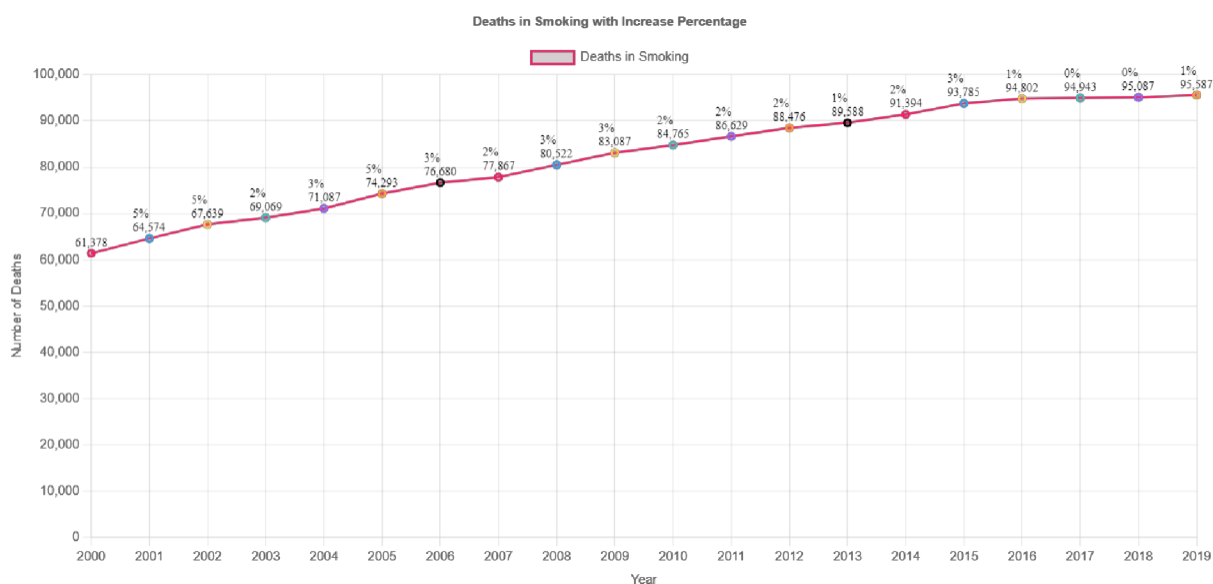


Table 10 (see appendix C) is a summary of various external factors analyzed in this study, namely household cleaning fluids, dirty water/unsafe water source, food poisoning, accidents by land transportation, assault, and intentional self-harm. Homicide, accidents by transportation, and unsafe water source remained to be the top three causes of death in the Philippines from 2000 to 2019. In 2016, 14,689 died die to homicide. This is the highest mortality rate recorded for the last two decades. Although, by 2019, there was a major turnaround wherein the leading cause of death were accidents and unsafe water. It can also be noted that the death rates among these three are decreasing since 2018. It is also quite alarming to observe that intentional self-harm was almost half the same with deaths caused by homicide in 2019. Based on the predictions models presented above, there is a possibility that deaths by dirty water/unsafe water source and assault (murder/homicide) may lower in the upcoming years.

While accidents by land transportation and intentional self-harm (suicide) may increase in the upcoming years.

Figure 13. External Factors Vs. Smoking

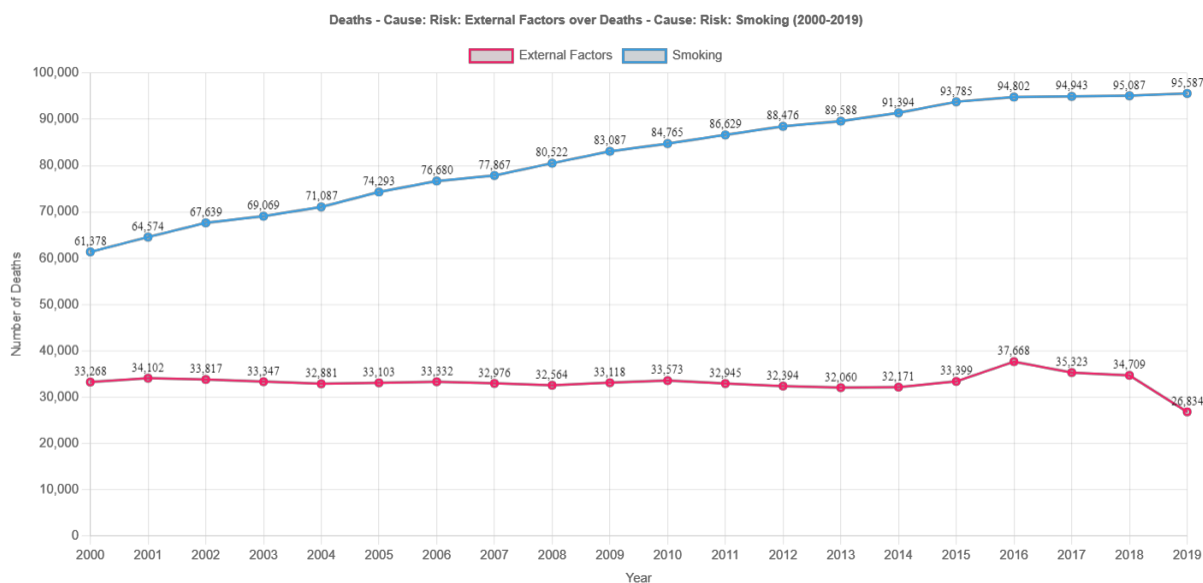


Figure 13 shows the comparison between deaths of external factors and deaths on smoking from 2000 to 2019. Deaths in external factor is 663,584, while deaths in smoking is 1,641,252. This means that there is 84.8362% difference between these two. This further indicates that smoking is far worse than deaths by external factors. It is also evident that deaths caused by smoking is drastically increasing for the past two decades from 61,378 casualties in 2000 to 95,587 in 2022. Oppositely, deaths caused by external factors only ranged from 40,000 to 25,000 casualties for over 20 years, and was steadily fluctuating within the range mentioned.

Conclusion

After gathering multiple data for meta-analysis, the study found out that that were many people died from communicable diseases like HIV/AIDS, Tuberculosis, and COVID-19; non-communicable diseases like Malaria and Dengue; and other risk factors like alcohol, obesity, and smoking in Southeast Asia from 2000 until 2019. Furthermore, it was also found that smoking can aggravate the health condition of those people who are suffering from serious health conditions. Smoking could also affect the quality of life of patients who are terminally ill. Finally, the study also collected important information about the leading causes of death among Filipinos. Homicide, accidents by transportation, and unsafe water source remained to be the top three causes of death in the Philippines from 2000 to 2019. The study also found that there were more fatalities from smoking than external causes. This proves even more clearly how much more deadly smoking is than external causes of mortality.

Recommendations

After conducting the investigation, the researchers recommend that further studies be conducted to discuss some factors that lead to the results. It is also recommended that future researchers dwell into data from European countries so there will be a comparison of the behaviors of the data between Asian and European countries. This will give the study a wider perspective in terms of the diseases mentioned here.

Smoking is a global phenomenon, and this study acknowledges that smoking has detrimental effects not only to those with terminal illnesses, but even healthy individuals. The Philippines had a fair share of its effects. Thus, this study also taps the policymakers in the Philippine government in order to curb these effects by legislating or creating policies that would safeguard the quality of life that Filipinos aspire to live.

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Appendix A

Table 2. Tuberculosis Mortality Rate

YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
COUNTRY	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1
Vietnam	25,01 1.2	24,98 2.4	24,90 1.8	24,67 5.8	24,43 4.1	24,15 8.9	24,03 3.5	23,86 2.6	23,54 8.9	23,37 1.4	23,10 4.4	22,74 6.2	22,29 5.9	21,81 6.2	21,40 1.0	20,80 3.0	20,23 2.8	19,65 3.3	19,12 8.6	18,68 0.6
Timor-Leste	374.2	368.8	356.7	365.2	334.9	318.8	287.6	271.2	251.3	256.1	262.6	269.4	272.0	272.6	278.0	284.4	289.5	292.9	296.1	298.6
Thailand	11,45 1.2	10,38 4.6	9,794 6	9,139 6	8,991 1	8,705 5	8,614 6	8,493 1	8,319 7	8,111 7	8,137 1	8,009 2	7,828 5	7,641 2	7,552 4	7,506 4	7,615 3	7,657 6	7,731 1	7,774 7
Singapore	101.2	94.5	88.1	83.7	80.6	75.4	75.6	74.7	71.1	67.6	65.1	62.3	60.5	57.2	55.9	53.4	52.3	51.1	55.1	57.6
Philippines	27,93 4.2	27,63 6.6	27,45 2.6	27,06 3.7	27,10 2.0	28,20 7.7	29,64 1.8	29,34 5.6	28,87 6.3	29,48 8.0	28,99 0.6	28,74 9.7	28,13 4.8	27,64 1.1	28,66 5.1	30,13 1.6	30,72 2.4	30,52 6.9	29,77 5.6	29,18 1.1
Myanmar	36,54 9.2	35,97 4.0	35,08 8.5	34,02 3.0	33,03 7.6	31,26 4.4	29,40 3.8	27,31 6.0	25,48 2.1	23,98 1.0	22,37 9.1	21,14 3.3	19,73 5.2	18,73 9.2	17,73 7.4	16,81 1.3	16,09 8.8	15,47 6.8	14,89 3.3	14,31 3.3
Malaysia	2,366. 7	2,337. 5	2,252. 2	2,239. 7	2,156. 9	2,099. 7	2,044. 4	2,011. 5	2,074. 0	2,095. 5	2,007. 2	1,957. 6	1,901. 7	1,808. 5	1,858. 5	1,871. 0	1,917. 7	1,926. 9	1,927. 7	1,991. 7
Lao People's Democratic Republic	4,464.7	4,306.3	4,153.7	3,984.1	3,834.3	3,668.1	3,468.2	3,308.0	3,122.7	2,940.5	2,777.2	2,635.5	2,534.7	2,451.6	2,376.3	2,296.0	2,210.8	2,143.7	2,093.4	
Indonesia	117,025. 9	116,568. 8	115,703. 0	114,201. 0	112,034. 0	110,252. 5	109,058. 2	106,903. 9	104,609. 5	101,631. 3	97,484. 9	92,812. 8	89,584. 2	86,953. 3	83,909. 0	82,532. 6	80,770. 5	78,493. 9	76,549. 1	
Cambodia	10,217.	29,860.1	9,422.9	9,024.0	8,649.7	8,314.8	8,113.7	7,952.6	7,834.9	7,741.2	7,551.3	7,350.5	7,134.3	6,933.5	6,733.8	6,530.9	6,318.3	6,174.4	6,045.6	
Brunei Darussalam	17.5	17.4	17.1	16.8	16.4	16.1	15.9	15.7	15.8	16.0	16.1	16.2	16.8	17.3	17.7	18.1	18.7	19.0	19.3	

*val - mean estimate

Table 3. HIV/AIDS Mortality Rate

YEAR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
COUNTRY	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	
Vietnam	3,766. 6	4,431. 8	5,147. 2	5,899. 7	6,656. 7	7,381. 7	7,891. 1	7,901. 4	7,451. 4	6,727. 6	6,847. 9	7,582. 9	7,686. 5	7,502. 3	7,332. 8	7,270. 6	7,049. 0	6,761. 2	6,499. 2	6,399. 4
Timor-Leste	263.6	264.0	261.9	258.9	254.1	248.2	243.7	242.2	243.6	246.9	251.7	255.7	260.5	265.4	266.1	263.7	262.5	255.8	246.6	237.6
Thailand	34,11 3.2	35,47 1.2	35,79 7.8	34,90 1.2	33,08 9.1	29,30 3.0	23,47 6.0	19,39 5.1	17,63 8.5	16,59 0.4	16,26 0.6	16,04 4.0	16,87 4.6	19,26 8.6	20,83 9.3	21,10 3.5	20,54 2.8	19,54 4.0	18,40 4.6	17,21 4.7
Singapore	60.0	75.4	67.9	52.0	39.5	38.1	36.6	51.1	43.7	47.0	38.1	22.4	42.8	48.7	52.2	36.4	31.9	36.5	36.4	36.0
Philippines	2,546. 4	2,852. 2	3,200. 0	3,601. 4	4,063. 0	4,609. 9	5,678. 4	5,667. 5	5,612. 7	5,515. 8	5,191. 9	5,499. 4	5,373. 2	5,298. 1	5,241. 0	5,704. 6	5,434. 4	5,362. 9	5,292. 5	5,222. 5
Myanmar	8,147. 3	9,622. 9	11,13 5.1	12,61 2.2	13,98 4.9	15,20 1.2	16,09 1.8	16,57 1.7	16,64 5.4	16,47 4.4	16,10 9.2	15,41 8.0	14,35 4.2	13,06 6.9	11,59 3.3	9,950. 1	8,294. 4	6,771. 7	5,605. 2	4,772. 8

Malaysia	1,855. 4	2,033. 6	2,124. 6	2,096. 1	2,032. 7	1,996. 1	1,984. 3	1,991. 8	2,000. 8	2,017. 6	2,144. 8	2,357. 5	2,525. 7	2,610. 8	2,622. 4	2,515. 6	2,339. 9	1,938. 8	1,596. 0	1,520. 8
Lao People's Democratic Republic	44.8	67.9	99.0	135.9	177.3	216.6	251.7	288.9	325.2	354.0	389.2	427.5	453.5	462.9	461.5	451.2	437.5	419.8	396.5	373.9
Indonesia	1,154. 5	1,322. 0	1,513. 6	1,747. 6	2,029. 3	2,355. 2	2,686. 3	2,791. 1	2,881. 6	3,094. 9	3,498. 7	4,032. 0	4,511. 9	4,851. 6	5,163. 9	5,316. 5	5,339. 8	5,290. 3	5,415. 2	5,602. 9
Cambodia	6,400. 6	7,121. 3	7,592. 7	7,800. 7	7,709. 7	7,286. 7	6,523. 0	5,541. 4	4,628. 3	3,919. 7	3,361. 3	2,874. 5	2,521. 1	2,290. 2	2,120. 7	1,961. 0	1,824. 8	1,689. 7	1,539. 4	1,415. 5
Brunei Darussalam	1.9	2.2	2.5	2.8	3.1	3.5	3.9	4.2	4.6	5.0	5.0	4.8	5.0	5.2	5.4	5.8	5.3	4.9	5.0	5.3

*val - mean
estimate

Table 4. Malaria Mortality Rate

YEAR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
COUNTRY	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	val	val
Vietnam	1,259 .7	973.2	906.1	638.1	522.7	674.3	453.1	338.4	431.8	398.0	298.7	298.2	217.3	175.7	84.4	44.5	67.7	61.2	59.4
Timor-Leste	55.5	136.6	110.2	365.9	327.9	376.4	355.2	447.4	320.4	309.9	118.0	13.9	2.3	0.8	0.2	0.3	0.0	0.0	0.1
Thailand	232.7	182.5	186.8	135.0	155.2	146.5	169.9	134.8	123.8	131.3	98.8	69.7	81.1	67.8	7.4	6.5	2.1	2.1	1.1
Singapore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Philippines	155.3	241.8	347.0	349.4	422.1	525.4	591.1	422.2	395.0	340.5	140.2	92.1	89.4	22.9	46.1	17.5	41.0	34.2	45.6
Myanmar	5,017 .7	5,958 .2	7,237 .3	6,695 .0	7,529 .0	8,428 .0	10,69 2.3	13,47 0.4	11,91 3.9	11,43 2.7	8,811 .6	9,453 .2	5,795 .5	2,889 .4	1,918 .5	975.1	215.6	270. 8	293. 8
Malaysia	57.9	61.4	35.5	34.6	33.0	26.4	23.7	29.3	18.0	12.8	5.4	4.9	8.4	6.6	5.5	2.9	5.0	4.7	5.3
Lao People's Democratic Republic	208.7	203.5	207.3	193.4	163.3	198.1	197.3	182.6	141.4	177.5	125.9	275.5	169.7	158.2	75.2	20.9	22.2	23.7	22.8
Indonesia	1,046 .8	1,235 .7	1,096 .3	2,323 .9	1,692 .4	3,208 .5	2,375 .9	2,261 .2	3,012 .1	6,124 .8	6,096 .3	3,870 .8	1,480 .0	2,019 .0	979.1	1,076 .6	1,287 .3	724. 8	636. 7
Cambodia	608.7	633.2	916.4	746.9	487.3	822.3	442.0	490.4	602.7	334.7	319.5	148.2	84.1	117.7	138.1	93.9	152.2	66.1	57.2
Brunei Darussalam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*val - mean estimate

Appendix B

Table 6. Dengue Fever Mortality Rate

YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
COUNTRY	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l	va l
Viet Nam	104.5	103.9	103.8	107.8	112.0	113.3	113.3	140.1	113.8	115.0	117.8	119.6	121.0	120.9	122.4	124.1	151.1	155.6	123.2	121.9
Timor-Leste	4.1	4.0	3.9	4.0	3.8	25.9	3.6	3.7	3.5	3.5	3.6	3.8	4.1	4.2	6.2	4.3	4.5	4.4	4.4	4.6

Thailand	338.7	321.8	311.6	295.3	293.7	284.1	283.2	285.3	281.5	271.1	265.0	281.7	251.8	242.1	233.2	226.7	209.9	208.4	210.2	212.0
Singapore	0.4	0.6	0.9	1.1	1.5	1.9	2.2	2.6	2.4	2.4	2.7	2.8	3.4	5.1	4.4	4.8	8.0	4.8	4.9	5.0
Philippines	1,031.6	1,103.9	1,159.1	1,222.5	1,215.8	1,420.6	1,526.9	1,607.5	1,702.3	1,748.2	2,459.4	1,726.8	1,755.9	1,744.8	1,726.8	1,744.3	1,750.6	2,394.8	1,697.3	2,173.7
Myanmar	786.9	754.5	732.7	717.1	716.4	695.3	658.6	640.4	584.5	559.6	523.3	499.5	466.1	452.7	441.4	417.3	416.1	395.7	373.9	366.3
Malaysia	198.4	207.0	220.4	230.5	230.7	228.2	218.5	267.4	207.6	205.5	195.7	187.8	191.6	198.5	222.5	236.3	245.3	425.4	262.1	274.2
Lao People's Democratic Republic	22.2	22.4	22.6	22.3	21.6	20.9	20.1	19.1	20.1	19.6	18.8	18.0	17.6	94.1	16.7	16.5	16.1	15.4	15.2	14.9
Indonesia	12,865.7	12,757.0	12,607.0	12,417.8	12,852.6	11,954.3	11,740.6	11,910.7	11,439.9	11,261.8	10,923.7	10,603.4	10,602.7	10,523.6	10,522.1	10,630.4	10,281.1	10,683.0	10,142.4	10,074.2
Cambodia	65.5	65.6	67.6	67.1	66.3	64.9	61.9	242.2	58.3	55.9	55.3	53.8	54.6	54.0	55.2	55.4	55.1	54.3	54.1	53.4
Brunei Darussalam	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.9	0.9

*val - mean estimate

Table 7. Alcohol Use Mortality Rate

YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
COUNTRY	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1	va 1
Vietnam	11,609.0	13,191.0	15,128.0	17,323.0	19,638.0	21,892.0	24,225.0	27,133.0	30,190.0	33,201.0	35,814.0	38,276.0	40,762.0	43,220.0	45,559.0	47,428.0	49,262.0	50,803.0	51,954.0	52,984.0
Timor Leste	111.0	114.0	118.0	126.0	125.0	130.0	131.0	136.0	137.0	149.0	160.0	176.0	189.0	199.0	211.0	222.0	234.0	246.0	257.0	266.0
Thailand	29,549.0	28,543.0	29,201.0	29,632.0	29,981.0	29,347.0	29,831.0	30,436.0	31,002.0	31,400.0	32,475.0	33,161.0	33,685.0	34,006.0	34,773.0	35,776.0	37,245.0	37,864.0	38,546.0	39,223.0
Singapore	214.0	209.0	203.0	192.0	184.0	182.0	186.0	195.0	206.0	213.0	219.0	228.0	236.0	245.0	250.0	255.0	265.0	270.0	289.0	307.0
Philippines	25,039.0	25,527.0	26,138.0	26,544.0	27,364.0	28,318.0	29,530.0	29,772.0	30,648.0	31,675.0	32,185.0	33,101.0	33,935.0	35,435.0	36,292.0	37,930.0	38,754.0	39,216.0	39,431.0	39,802.0
Myanmar	7,443.0	8,004.0	8,771.0	9,617.0	10,654.0	11,463.0	12,302.0	13,123.0	16,798.0	14,810.0	15,532.0	16,386.0	17,018.0	17,827.0	18,507.0	19,081.0	19,613.0	20,068.0	20,294.0	20,452.0
Malaysia	2,657.0	2,550.0	2,433.0	2,411.0	2,338.0	2,275.0	2,264.0	2,271.0	2,363.0	2,446.0	2,472.0	2,520.0	2,567.0	2,588.0	2,735.0	2,829.0	2,963.0	3,091.0	3,213.0	3,388.0
Lao People's Democratic Republic	1,835.0	1,834.0	1,800.0	1,787.0	1,777.0	1,781.0	1,799.0	1,828.0	1,871.0	1,916.0	1,945.0	1,976.0	2,011.0	2,079.0	2,130.0	2,196.0	2,256.0	2,309.0	2,354.0	2,381.0
Indonesia	14,972.0	15,033.0	15,030.0	15,040.0	16,222.0	15,212.0	15,493.0	15,749.0	16,035.0	16,334.0	16,485.0	16,649.0	16,592.0	16,619.0	16,661.0	16,452.0	16,713.0	17,035.0	17,364.0	17,644.0
Cambodia	3,902.0	4,070.0	4,213.0	4,356.0	4,536.0	4,736.0	4,972.0	5,329.0	5,708.0	6,115.0	6,530.0	6,925.0	7,327.0	7,754.0	8,163.0	8,541.0	8,906.0	9,230.0	9,461.0	9,655.0
Brunei Darussalam	10.0	10.0	10.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	12.0	12.0	12.0	13.0	13.0	14.0	14.0	15.0	15.0

*val - mean estimate

Table 8. Obesity Mortality Rate

YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
COUNTRY	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val
val																				
Vietnam	1,259.7	973.2	906.1	638.1	522.7	674.3	453.1	338.4	431.8	398.0	298.7	298.2	217.3	175.7	84.4	44.5	67.7	61.2	59.4	
Timor-Leste	55.5	136.6	110.2	365.9	327.9	376.4	355.2	447.4	320.4	309.9	118.0	13.9	2.3	0.8	0.2	0.3	0.0	0.0	0.1	
Thailand	232.7	182.5	186.8	135.0	155.2	146.5	169.9	134.8	123.8	131.3	98.8	69.7	81.1	67.8	7.4	6.5	2.1	2.1	1.1	
Singapore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Philippines	155.3	241.8	347.0	349.4	422.1	525.4	591.1	422.2	395.0	340.5	140.2	92.1	89.4	22.9	46.1	17.5	41.0	34.2	45.6	
Myanmar	5,017.7	5,958.2	7,237.3	6,695.0	7,529.0	8,428.0	10,692.3	13,470.4	11,913.9	11,432.7	8,811.6	9,453.2	5,795.5	2,889.4	1,918.5	975.1	215.6	270.8	293.8	
Malaysia	57.9	61.4	35.5	34.6	33.0	26.4	23.7	29.3	18.0	12.8	5.4	4.9	8.4	6.6	5.5	2.9	5.0	4.7	5.3	
Lao People's Democratic Republic	208.7	203.5	207.3	193.4	163.3	198.1	197.3	182.6	141.4	177.5	125.9	275.5	169.7	158.2	75.2	20.9	22.2	23.7	22.8	
Indonesia	1,046.8	1,235.7	1,096.3	2,323.9	1,692.4	3,208.5	2,375.9	2,261.2	3,012.1	6,124.8	6,096.3	3,870.8	1,480.0	2,019.0	979.1	1,076.6	1,287.3	724.8	636.7	
Cambodia	608.7	633.2	916.4	746.9	487.3	822.3	442.0	490.4	602.7	334.7	319.5	148.2	84.1	117.7	138.1	93.9	152.2	66.1	57.2	
Brunei Darussalam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

*val - mean estimate

Appendix C

Table 9. Smoking Mortality Rate

YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
COUNTRY	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val	val
Vietnam	64,369.0	66,637.0	68,898.0	71,175.0	73,446.0	75,517.0	77,426.0	79,611.0	81,451.0	83,106.0	84,215.0	85,692.0	86,887.0	88,163.0	89,406.0	90,356.0	91,784.0	93,378.0	95,168.0	97,074.0
Thailand	53,630.0	49,679.0	49,759.0	49,716.0	50,652.0	51,222.0	51,245.0	51,409.0	51,697.0	51,838.0	53,079.0	53,374.0	53,274.0	53,165.0	54,012.0	55,270.0	57,666.0	59,295.0	61,149.0	62,859.0
Singapore	2,482.0	2,439.0	2,422.0	2,374.0	2,345.0	2,314.0	2,300.0	2,354.0	2,389.0	2,385.0	2,406.0	2,428.0	2,467.0	2,499.0	2,525.0	2,557.0	2,593.0	2,617.0	2,732.0	2,814.0
Philippines	61,378.0	64,574.0	67,639.0	69,069.0	71,087.0	74,293.0	76,680.0	77,867.0	80,522.0	83,087.0	84,765.0	86,629.0	88,476.0	89,588.0	91,394.0	93,785.0	94,802.0	94,943.0	95,087.0	95,587.0
Myanmar	72,271.0	71,784.0	71,157.0	70,288.0	70,000.0	68,773.0	67,893.0	66,507.0	65,134.0	64,396.0	63,289.0	62,878.0	62,000.0	61,510.0	60,934.0	60,595.0	60,387.0	60,119.0	59,960.0	60,039.0
Malaysia	15,740.0	15,988.0	16,135.0	16,745.0	16,794.0	16,860.0	17,232.0	17,686.0	18,781.0	19,595.0	19,664.0	20,012.0	20,276.0	19,995.0	20,977.0	21,584.0	22,512.0	23,096.0	23,607.0	24,588.0
Indonesia	145,834.0	150,300.0	155,846.0	161,447.0	167,351.0	173,358.0	179,540.0	186,319.0	192,154.0	197,806.0	202,488.0	207,510.0	212,520.0	217,236.0	221,684.0	227,045.0	232,096.0	236,766.0	241,623.0	246,359.0
Cambodia	10,893.0	11,085.0	11,271.0	11,495.0	11,763.0	12,005.0	12,241.0	12,584.0	12,954.0	13,355.0	13,782.0	14,156.0	14,422.0	14,669.0	14,904.0	15,156.0	15,427.0	15,725.0	16,103.0	16,459.0
Timor Leste	425.0	441.0	459.0	485.0	496.0	514.0	524.0	542.0	557.0	592.0	636.0	682.0	719.0	752.0	782.0	821.0	848.0	878.0	905.0	928.0
Lao People's Democratic Republic	5,005.0	5,029.0	4,971.0	4,968.0	4,960.0	4,977.0	5,003.0	5,006.0	5,014.0	5,013.0	5,010.0	5,004.0	5,031.0	5,086.0	5,155.0	5,251.0	5,356.0	5,490.0	5,658.0	5,848.0
Brunei Darussalam	191.0	188.0	192.0	199.0	201.0	204.0	204.0	200.0	199.0	204.0	209.0	210.0	212.0	220.0	227.0	233.0	240.0	250.0	259.0	267.0

*val - mean
estimate

Table 10. Summary of Different External Factors

CAUSE OF DEATH	YEAR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
a. Household cleaning fluid		202	201	166	182	218	183	177	212	164	192	174	111	175	174	204	151	386	433	624
b. Dirty Water		12,333	10,905	10,225	9,252	9,540	9,482	9,211	9,047	8,971	8,521	8,318	8,190	7,770	7,623	7,561	7,430	7,252	6,871	6,654
c. Food poisoning		2	10	7	3	4	5	5	2	1	4	1	3	9						
d. Accidents by land transportation		5,541	6,131	6,307	6,976	6,770	6,806	7,275	6,950	7,648	8,405	8,004	8,272	8,725	8,995	10,042	11,274	11,360	12,487	8,000
e. Murder/ homicide		12,819	13,267	13,096	12,646	12,705	13,056	12,602	12,523	12,249	12,318	11,986	11,534	11,313	11,181	11,096	14,869	11,845	9,916	6,008
f. Suicide		1,204	1,301	1,543	1,818	1,861	1,794	1,699	1,822	2,076	2,123	2,451	2,272	2,055	2,184	2,481	1,928	2,463	2,984	3,529