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Health and Long-term Care Information in Ageing Asia

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Health and Long-term Care Information in Ageing Asia

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List of Abbreviations and Acronyms

ASEAN	Association of South East Asian Nations
BAPPENAS	Ministry of National Development Planning, Indonesia
BPS	Badan Pusat Statistik (Central Bureau of Statistics), Indonesia
CCDC	Chinese Center for Disease Control and Prevention
COVID-19	Coronavirus Disease 2019
CRVS	Civil Registration and Vital Statistics
DEPS	Department of Economic Planning and Statistics, Ministry of Finance and Economy, Brunei
DOSM	The Department of Statistics, Malaysia
DUKCAPIL	Directorate General of Population and Civil Registration, Indonesia
GHE	Global Health Estimates
GOPFP	General Office for Population and Family Planning, Vietnam
GSO	General Statistics Office, Vietnam
ICA	Immigration & Checkpoints Authority, Singapore
ICD-10	International Statistical Classification of Diseases and Related Health Problems 10th Revision
IPSS	National Institute of Population and Social Security Research
ISIC	International Standard Industrial Classification of All Economic Activities
NHC	National Health Commission of the People's Republic of China
NRD	National Registration Department, Malaysia
NSO	National Statistics Office, Thailand
OECD	Organisation for Economic Co-operation and Development
PSA	Philippine Statistics Authority
SDGs	Sustainable Development Goals
SRS	Sample Registration System
UN	United Nations
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
WHO	World Health Organization

Part A

Cause of Death Statistics in ASEAN+3 Countries

1. Regional Overview

Tracking cause of death statistics is crucial to monitoring the health of the people. It is also important for the calculation of Sustainable Development Goal (SDG) indicators such as 3.4.1 (Mortality rates attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease), 3.4.2 (Suicide mortality rate), 3.6.1 (Death rate due to road traffic injuries), 3.9.1(Mortality rate attributed to household and ambient air pollution), 3.9.2 (Mortality rate attributed to unsafe water, unsafe sanitation, and lack of hygiene) and 3.9.3 (Mortality rate attributed to unintentional poisoning). However, the quality of cause of death statistics in Asia is often insufficient.

In 2014, member countries of the United Nations in Asia and the Pacific adopted the 'Ministerial Declaration to "Get Every One in the Picture" in Asia and the Pacific', for universal and responsive civil registration and vital statistics systems (CRVS), setting 2015 to 2024 as the CRVS Decade for Asia and the Pacific (UNESCAP 2021). The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) is facilitating the progress, and resources are available online. The United Nations (UN) defines the CRVS as the 'continuous, permanent, compulsory and universal recording of the occurrence and characteristics of vital events of the population in accordance with the law.' Births, deaths, marriages and divorce, and causes of death are amongst the vital events to be recorded and disseminated.

Since the 19th century, the international community has gathered to create a standardised cause of death classification. The World Health Organization (WHO) inherited the efforts since its creation in 1948. In 2019, the World Health Assembly adopted the 11th Revision of the International Classification of Diseases (ICD). Each member country is expected to use this classification once it takes effect on 1 January 2022.

However, in most middle- and low-income countries, death registration is not complete. Even amongst registered deaths, causes of death are not properly stated and compiled. Based on the country report on cause of death statistics, WHO examines the usability of vital statistics and assigns the data quality into one of four categories (WHO, 2020):

i. Category 1. Multiple years of data with high completeness and quality

ii. Category 2. Moderate quality issues

iii. Category 3. Severe quality issues

iv. Category 4. Death registration data are unavailable or unusable due to quality issues

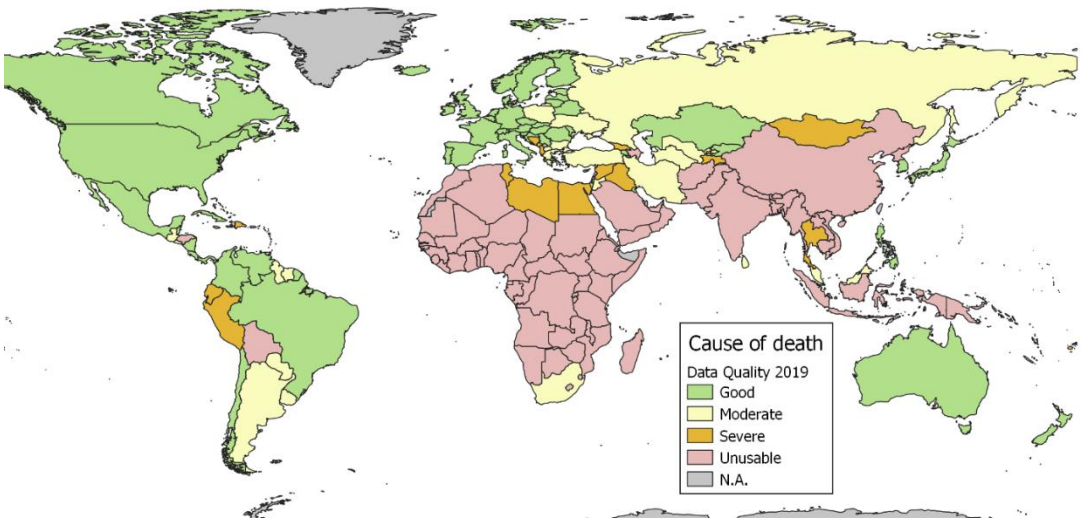
As of 2019, amongst 183 countries[1] included in the data, only 61 are in category 1, including four ASEAN+3 countries: Japan, Republic of Korea, the Philippines, and Singapore. Brunei and Malaysia are in category 2, Mongolia and Thailand in category 3, and the remaining countries in category 4 (Table A-1, Figure A-1). The category assigned to a country can change over time. For example, the Philippines entered category 1 for the first time in 2019.

Table A-1. Cause of Death Statistics Quality Category, ASEAN+3 countries

Category	Description		Countries
1	Multiple years of data with high completeness and quality		Philippines, Singapore, Japan, Republic of Korea
2	– Multiple years of death registration data available.	Moderate quality issues	Brunei, Malaysia
3	– Data has low completeness and/or issues with cause-of-death assignment	Severe quality issues	Thailand
4	Death registration data is unavailable or unusable due to quality issues		Cambodia, China, Indonesia, Lao PDR, Myanmar, Viet Nam

Lao PDR = Lao People's Democratic Republic
Source: WHO (2020).

Figure A-1. Data Quality of Causes of Death Statistic



Note: Map created by Shapefile of Natural Earth (https://www.naturalearthdata.com/) using QGIS Geographic Information System.
Sources: WHO (2020).

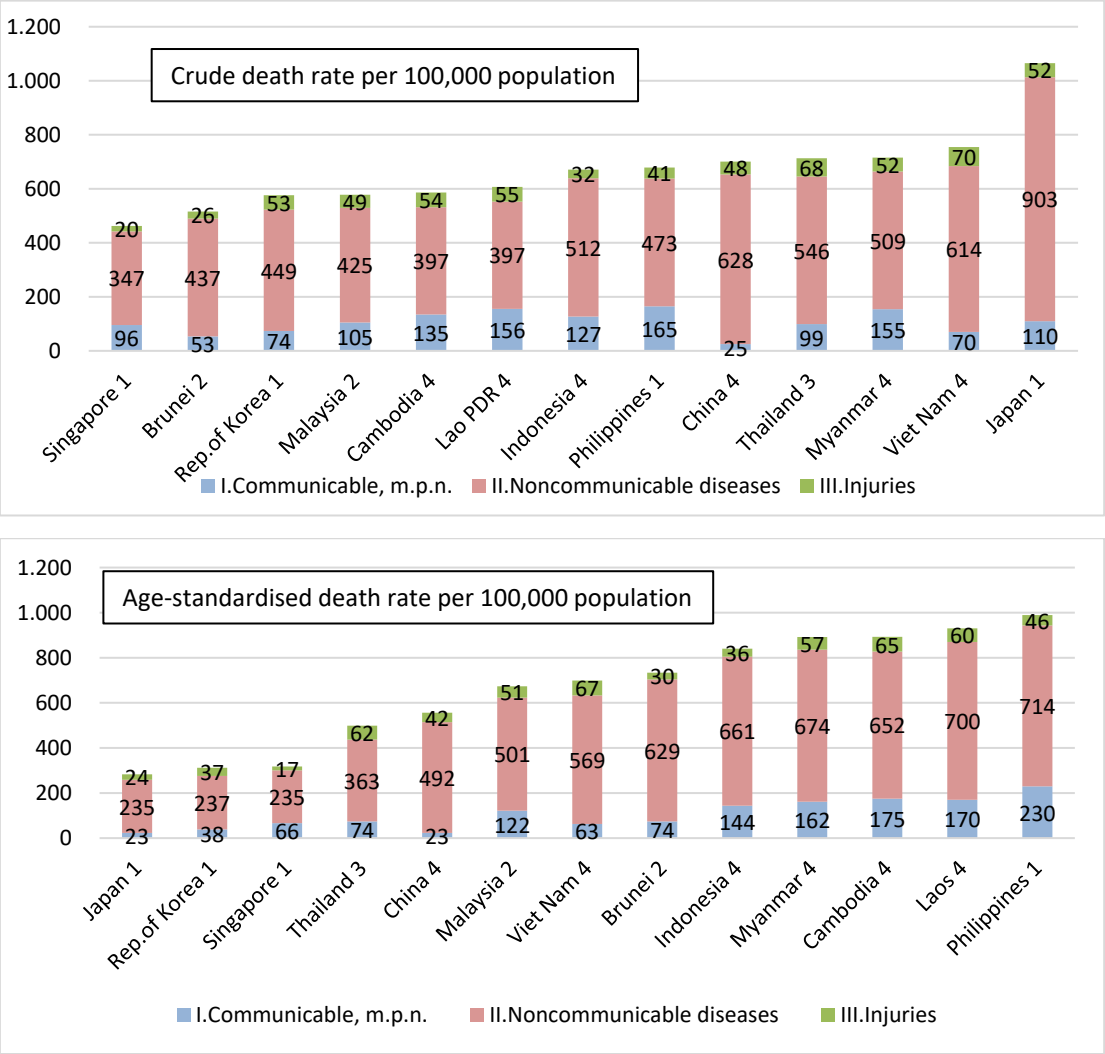
[1] Out of 194 member states of WHO, eleven (Andorra, Cook Islands, Dominica, Marshall Islands, Monaco, Nauru, Niue, Palau, Saint Kitts and Nevis, San Marino, Tuvalu) with a population of less than 90,000 in 2019 were not included.

The Global Health Estimates (GHE) 2019 is compiled and adjusted by WHO using the registration based vital statistics produced by each country government if it is available and usable. In the absence of usable data, WHO uses other data from WHO and UN interagency programs on child mortality, maternal mortality, HIV/AIDs, tuberculosis, malaria, and also the Global Burden of Disease (GBD 2019) study estimates.

Figure A-2 shows mortality by broad categories of causes in ASEAN+3 countries. Japan has the highest crude death rate (number of death per 100,000 population) with 1,066, and Singapore has the lowest with 462persons. Crude death rate is affected by the population age structure. Inevitably, a population with a high number of older persons has a higher crude death rate. Hence, when we see the age-standardised death rate,[2] Japan has the lowest and the Philippines has the highest. As Japan is a super-aged country, where 29% of the population are aged 65 years and over (as of July 2021, Statistics Bureau of Japan, 2021), the increasing number of very old persons increases the number of deaths. However, if the effect of ageing is removed, the level of mortality is the lowest in Japan. For all ASEAN+3 countries, the prevailing cause of deaths in both crude and age-standardised death rates is non-communicable diseases.

[2] Age-standardised death rate is calculated using age-specific death rate applied to the standard population by age-group. Here, the standard population is set by WHO as the 'world standard population' (Omar et al., 2001).

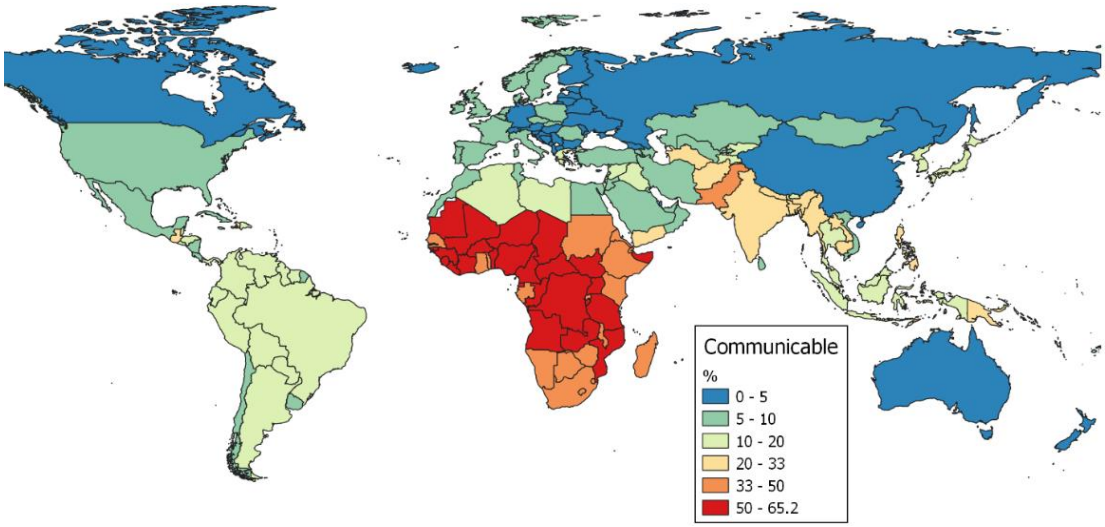
Figure A-2. Crude and Age-standardised Death Rate by Cause, ASEAN+3 countries



Notes:
1. Number after the country name is the data quality category shown in Table A-1.
2. Communicable, m.p.n. means communicable, maternal, perinatal, and nutritional conditions.
Source: WHO (2020).

According to the widely accepted epidemiological transition theory, causes of death should shift from communicable to non-communicable diseases along with the development of society. In 2019, data shows that ASEAN+3 are already post-transition countries in contrast with many low-income countries in other regions, especially Africa, where the majority of deaths are caused by communicable, maternal, perinatal, and nutritional conditions (Figure A-3).

Figure A-3. Proportion of cause of death category of 'Communicable, Maternal, Perinatal and Nutritional Conditions' by Country, 2019



Note: Map created by Shapefile of Natural Earth (https://www.naturalearthdata.com/) using QGIS Geographic Information System.
Source: WHO (2020).

However, communicable diseases are not eradicated even in high-income countries. In 2019, a large portion was attributed to respiratory infections, which includes pneumonia – one of the significant causes of death of older persons. In addition, the coronavirus disease 2019 (COVID-19) pandemic started in 2020, raising the number of deaths caused by communicable diseases.

Globally, the top cause of death is ischaemic heart disease (16% of total deaths), followed by stroke (11% of total deaths; WHO, 2021a). On the contrary, in many ASEAN+3 countries, more deaths are caused by stroke than ischaemic heart disease, such as in Cambodia, China, Indonesia, Lao People's Democratic Republic (Lao PDR), Myanmar, and Viet Nam. In 1951, Japan's top cause of death became stroke, replacing tuberculosis. It was later surpassed by cancer in 1981. Stroke, a common risk in the region, is preventable by hypertension control and proper medical treatment. This means that countries with high numbers of deaths caused by stroke have the potential to lower the mortality rate in the coming years.

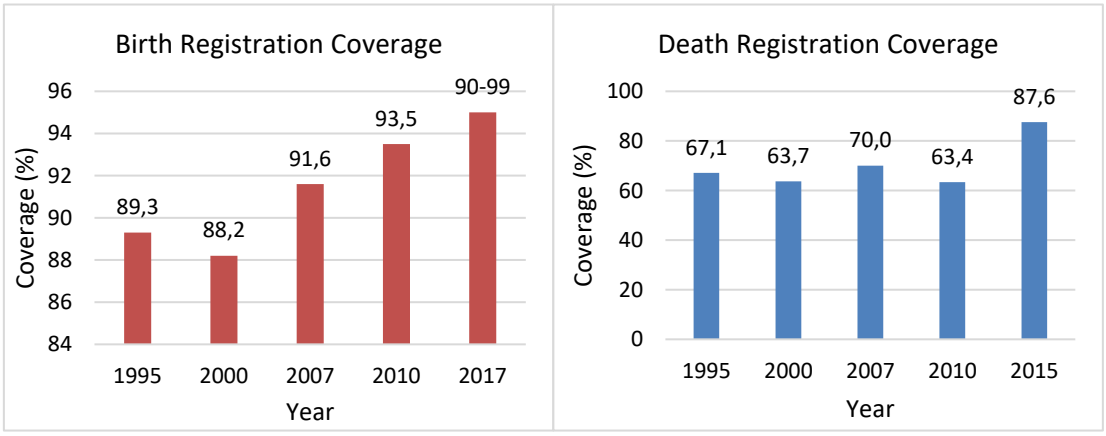
In the following chapter, the cause of death statistics system in each ASEAN+3 country is described in the order shown in Table A-1. Though WHO compiles the cause of death statistics in a comparable format, the source of data varies by country. Death registration and statistical procedures are inherent to each country and it is essential to know the original data made by the country authority. Also, the country statistics are released sooner than international compilations. A comparison of 2020 causes of death is conducted with countries with available data.

2. Country Situation

2.1. Philippines

The vital statistics system of the Philippines is rapidly progressing. Historically, births and deaths have been registered and compiled in reports since 1903, and the Civil Registry Law (Act No.3753) was implemented in 1930 (PSA, 2019a). In August 2015, the President declared the Civil Registration and Vital Statistics (CRVS) Decade. The Philippine Statistics Authority (PSA), which is in charge of vital statistics, made extensive efforts. For example, national workshops were organised bi-annually so that all the civil registrars in the country can update their activities, get the latest regulations, and discuss various issues to improve civil registration. Also, the PSA reaches out to overseas Filipinos through the Philippine Foreign Service Post so they can properly register their vital events. Through these practices, the coverage of births and deaths improved: from 89.3% in 1995 to 90%–99% in 2010 for births and from 67.1% in 1995 to 87.6% in 2015 for deaths (Figure A-4).

Figure A-4. Birth and Death Registration Coverage, Philippines, 1995–2015



Sources: Data for 1995 to 2010 from Orcilla (2016). Data for 2017 births and 2015 deaths from UN (2021).

The quality of cause of death statistics is also improving. WHO raised the quality level from category 2 in 2016 (WHO, 2018) to category 1 in 2019 (WHO, 2020). As shown in Figure A-4, the coverage of death registration increased but also there is certain progress of procedures. Since 2017, the automated coding system, IRIS[3], was introduced to determine the underlying cause of death (Mikkelsen, 2019). It reduced the length of time required to produce each year's cause of death statistics from 3 years to 1 year. The data is available on the PSA website in the form of reports or for download through OpenSTAT (PSA, 2021a). As of August 2021, the preliminary results for the the 50 leading causes of death in 2020 and detailed data for

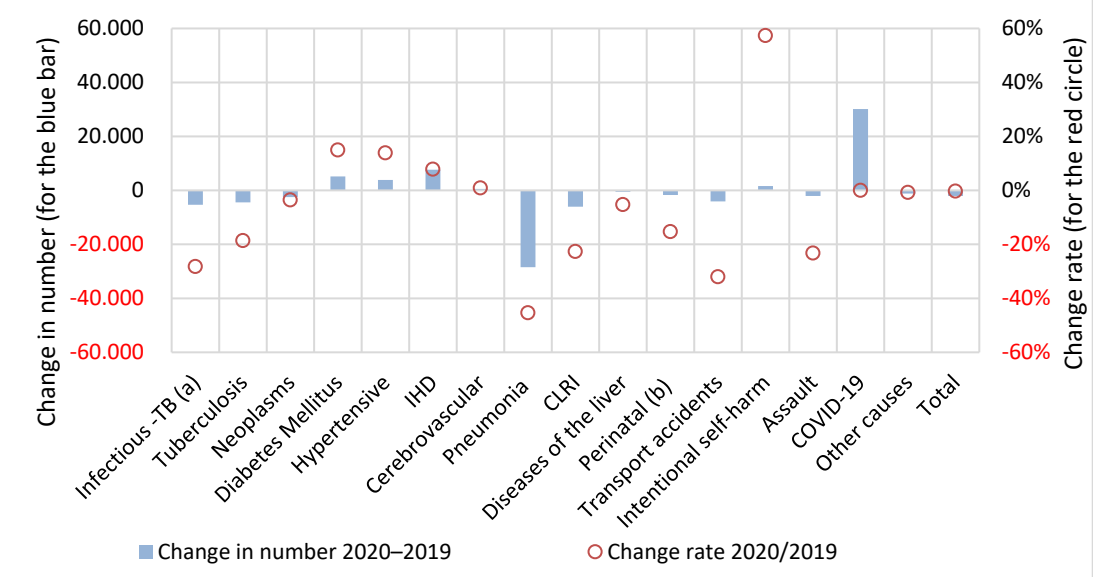
[3] IRIS is created by DIMDI Iris Institute and widely used in many countries to determine the underlying cause of death (WHO, 2021c).

2016 is downloadable through OpenSTAT.

According to the preliminary report for 2020, the total number of deaths in the Philippines decreased by 7,379 (1.2%) compared to 2019, despite an increase in the number of older persons with higher mortality (PSA 2019b). Pneumonia, which decreased the most by 28,468 deaths, was offset by 30,140 COVID-19 deaths (Figure A-5). The number of deaths by infectious diseases including tuberculosis and chronic lower respiratory infections also decreased. It can be assumed that the behaviour change to avoid COVID-19, such as wearing masks, washing hands, or refraining from meeting people, could have contributed to reducing these deaths. In addition, transport accidents and assault deaths decreased. The major causes of death in the Philippines, such as diabetes mellitus, hypertensive diseases, ischaemic heart diseases, increased substantially. The rising trend in ischaemic heart disease deaths from 2015 to 2019 continued in 2020. However, diabetes mellitus and hypertensive diseases were not on the rise in the past, and certain COVID-19 effects, such as not receiving necessary antihypertensive drugs or dialysis, might be suspected. Intentional self-harm (suicide) is not a significant cause of death in the Philippines, but it increased in 2020. Lack of socialisation, unemployment, and economic downturn might have caused this increase.

The decrease in the total number of registered deaths in 2020 could be due to the difficulties of registration, as people refrain from going to the municipal office to register the death. However, as the cause-specific number of deaths is not uniformly affected, it is highly plausible that the decline is not due to the registration problem but the actual decline of mortality.

Figure A-5. Change of Death by Cause, Philippines, 2019–2020



Note: IHD is ischaemic heart diseases. CLRI is chronic lower respiratory infections. Infectious -TB means infectious and parasitic diseases minus tuberculosis. Perinatal means conditions originating in the perinatal period.
Source: PSA (2021b).

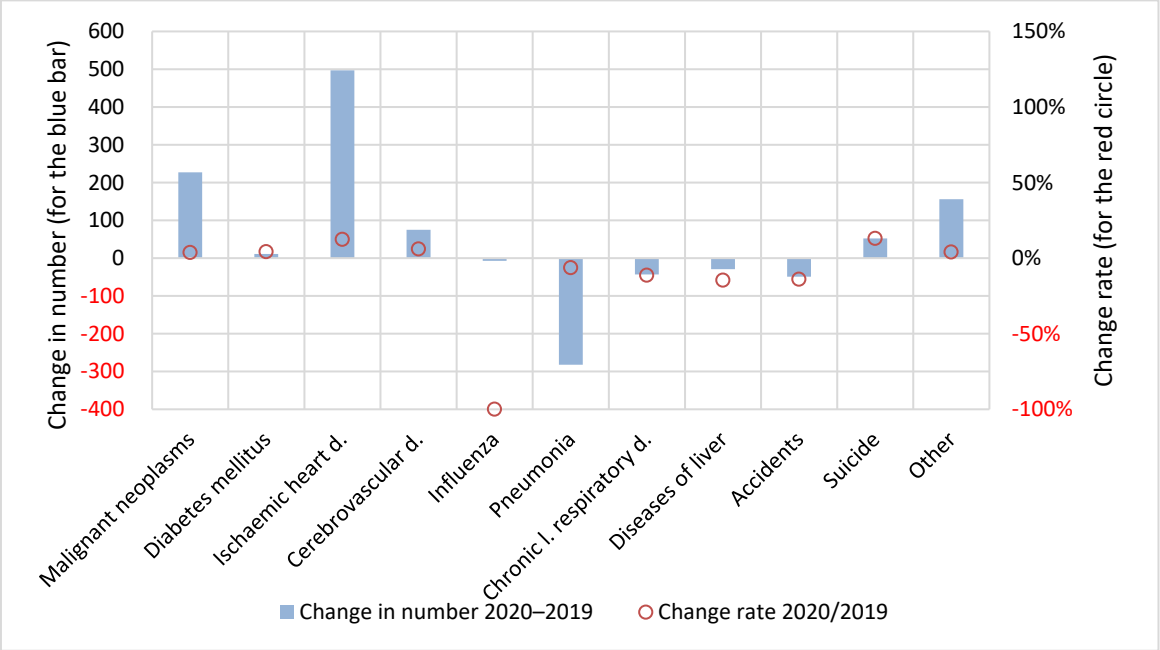
2.2. Singapore

The Immigration & Checkpoints Authority (ICA) of Singapore compiles and publishes vital statistics (ICA 2021). Cause of death statistics are published in the annual and quarterly reports online, and causes are classified by the WHO ICD-10 condensed list (103 causes)(WHO 2016). Data for the second quarter of 2021 was published online in August 2021, so the monthly data for cause of death is available after four months, at the latest. The number of deaths is disaggregated by ethnic group – Chinese, Malays, Indians, and Others – but not by citizenship. The annual data is for statistics on Singapore citizens and permanent residents, quarterly data is for statistics on Singapore citizens, permanent residents, and foreigners.

In 2020, there were 22,054 deaths in Singapore: 21,175 certified by doctors and 879 by coroners. Coroners certified all external causes of death. Amongst 73 ill-defined deaths – symptoms, signs, and abnormal clinical and laboratory findings not elsewhere classified – 12 are certified by doctors and 61 are certified by coroners. The number of ill-defined deaths is small and also well verified by doctors or coroners. Hence, the unknown causes are well suppressed amongst the Singaporean deaths.

In 2020, the number of deaths increased by 608, or 2.8%, from 2019. The ICA report did not disaggregate the number of COVID-19 deaths. However, based on the WHO COVID-19 dashboard data (WHO, 2021b), there were only 29 COVID-19 deaths in Singapore in 2020, and the increase of total number of death could not be due to COVID-19. Deaths caused by pneumonia also decreased substantially. There were seven influenza deaths in 2019 but none in 2020. The highest increases were deaths caused by heart & hypertensive diseases, malignant neoplasm, and cerebrovascular diseases, which are typical degenerative diseases. Age-standardised death rate in 2020 is lower than in 2019, so the increase of deaths in 2020 is due to the increasing number of older people. Compared to 2019, deaths by accidents decreased, but deaths by suicide increased in 2020. These trends are parallel to other Asian countries with avaialble data sets such as Japan and the Philippines.

Figure A-6: Change of Death by Cause, Singapore, 2019–2020



Source: ICA (2021).

2.3. Japan

The Ministry of Health, Labour, and Welfare (MHLW) in Japan compiles and publishes cause of death statistics (MHLW, 2021). The ministry releases three sets of data: rapid, which is released 2 months later from month of occurrence; approximate, five months later; and final data, September the following year. The three sets differ and earlier data contains less tabulation. All three data sets are on the ministry's website (MHLW, 2021) and *e-stat*, a portal site of official statistics of Japan in Japanese (Government of Japan, 2021). Final data is on the e-stat website in English.

The cause of death statistics started a few years after the family registry system began in 1872. The first Medical Act, or *Isei*, stipulated on 18 August 1874 ordered doctors in the country to report the cause of death within three days from when the death occurred. The first statistics covered only metropolitan areas of Tokyo, Kyoto, and Osaka with 8,594 deaths in the latter half of 1875, followed by an rapid increase in coverage. By 1882, almost all registered deaths in the country had a medical cause of death. In that year, there were 39,768 doctors in the country (Sanitary Bureau, 1883), or 1.1 doctors per 1,000 population, slightly above the criteria that WHO recommends at present.

The classification of cause of death used in Japan during the late 19th century is similar to that developed by Dr. William Farr (Farr, 1885). At the International Statistical Congress held in 1853 at Brussels, Belgium, Dr. William Farr and Dr. Marc d'Espine were appointed to propose a classification for causes of death (WHO, 2016). From 1871 to 1873, Dr. Sensai Nagayo joined the Iwakura Mission and visited the United States, United Kingdom, France, Germany, and the Netherlands (Nagayo 1902), where he might have learned the international trend on the cause of death classification. Upon returning to Japan, he drafted the Medical Act and

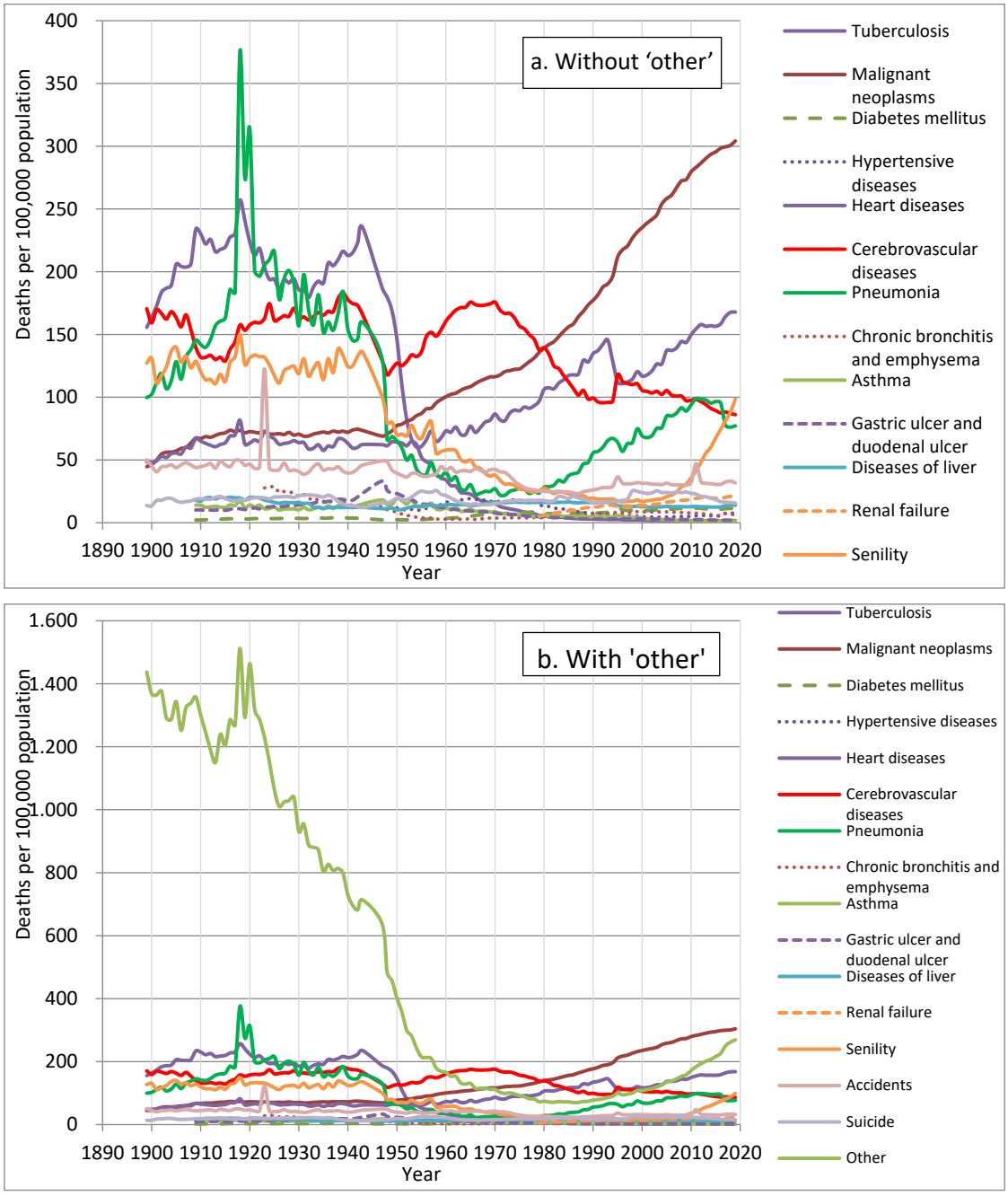
became the first Director of the Sanitary Bureau of the Home Department (Ministry of Health and Welfare 1988), which was in charge of the cause of death statistics.

The vital statistics started in 1899, and the Statistics Bureau became in charge until the Ministry of Health and Welfare succeeded it in 1946 (Statistics and Information Department, 2000). The transition was supported by the recommendation of the General Headquarters of the Supreme Commander for the Allied Powers (GHQ), which advocated vital statistics as an effective tool for public health (Phelps 1974).

The causes of death shifted from communicable diseases to non-communicable diseases, from pneumonia and tuberculosis to cerebrovascular diseases, malignant neoplasms, and heart diseases (Figure A-7a). At present, malignant neoplasm is the top cause of death. The second cause is heart disease, which surpassed cerebrovascular disease in 1985. This shift is attributed to the change in eating habits from salty Japanese food to fatty western food, as well as the expansion of Universal Health Coverage which promoted the spread of antihypertensive drugs (Ikeda 2008). Also, national stroke control programs implemented during the 1960s to 1970s contributed to the shift (Health and Welfare Statistics Association 1969–1990, Iso 1998).

Figure A-7a shows the trend of main causes of death chosen in the 1990s. However, in earlier times, there were many deaths which were not included in those main causes of 1990s. These deaths are grouped as ‘other’ and shown in Figure A-7b. The ‘other’ diseases include diarrhea and enteritis, meningitis, dysentery, and there were many ‘unknown diseases.’ The causes of death evolved with time, and it is not an easy task to trace the change for more than hundred years.

Figure A-7. Cause of Death Trend, Japan, 1899–2019



Source: MHLW (2021).

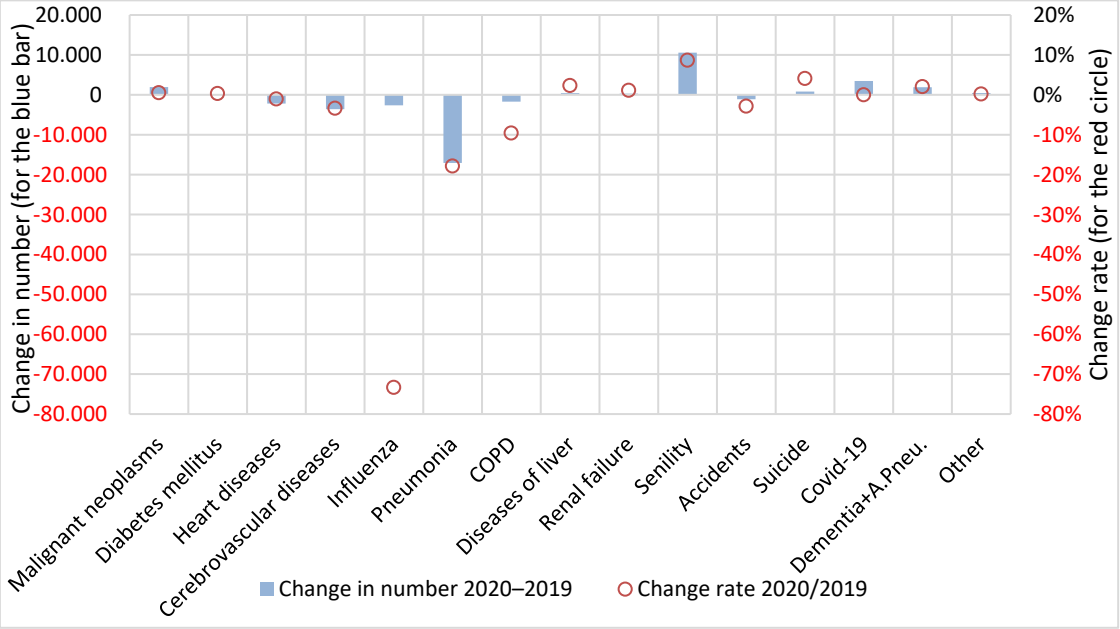
As the population ages in Japan, the higher number of very old persons increases the number of deaths caused by senility, which, in 2020, comprised 9.6% of total deaths. Senility is the most accepted cause of death for families of the deceased as it implies the fulfilment of a long life. However, senility, or R54 in ICD-10, is considered ill-defined and not a reasonable cause of death by WHO. Senility is an easy cause for doctors to write in death certificates, but it could hide the diseases or symptoms that caused the deaths. The abundance of senility deaths could deteriorate the quality of statistics. However, as humans are mortal, there could

be a 'natural' death', without any particular diseases but described only as senility. At the beginning of the discourse of cause of death classification, it was proposed that there were morbid and non-morbid deaths. Senility was included in the latter (d'Espine, 1858). While it is important to disclose the hidden medical conditions that lead to the deaths of old persons, it is equally important to reconsider the existing classification system.

In 2020, during the COVID-19 pandemic, the total number of deaths in Japan decreased by 8,445 (0.6%). COVID-19 deaths remained small, with 3,466, 0.3% of total deaths, while pneumonia deaths decreased from 95,518 in 2019 to 78,445 in 2020 (

Figure A-8). The most significant decrease was by 73.3% for influenza. Cerebrovascular diseases and heart diseases also decreased. Malignant neoplasms increased slightly, but this is due to the population ageing (age-standardised death rate decreased). Senility deaths increased in 2020. The increasing trend of senility death was not affected by COVID-19. Deaths by accident decreased, but suicide increased. The suicide increase is found amongst the youth, especially for women. Suicide increased for the first time since the national strategy on suicide prevention reduced the number of suicide in 2010. Unfortunately, the COVID-19 pandemic had a stronger influence on suicide rates than national preventive strategy.

Figure A-8. Change of Death by Cause, Japan, 2019–2020



Source: MHLW (2021).

2.4. Republic of Korea

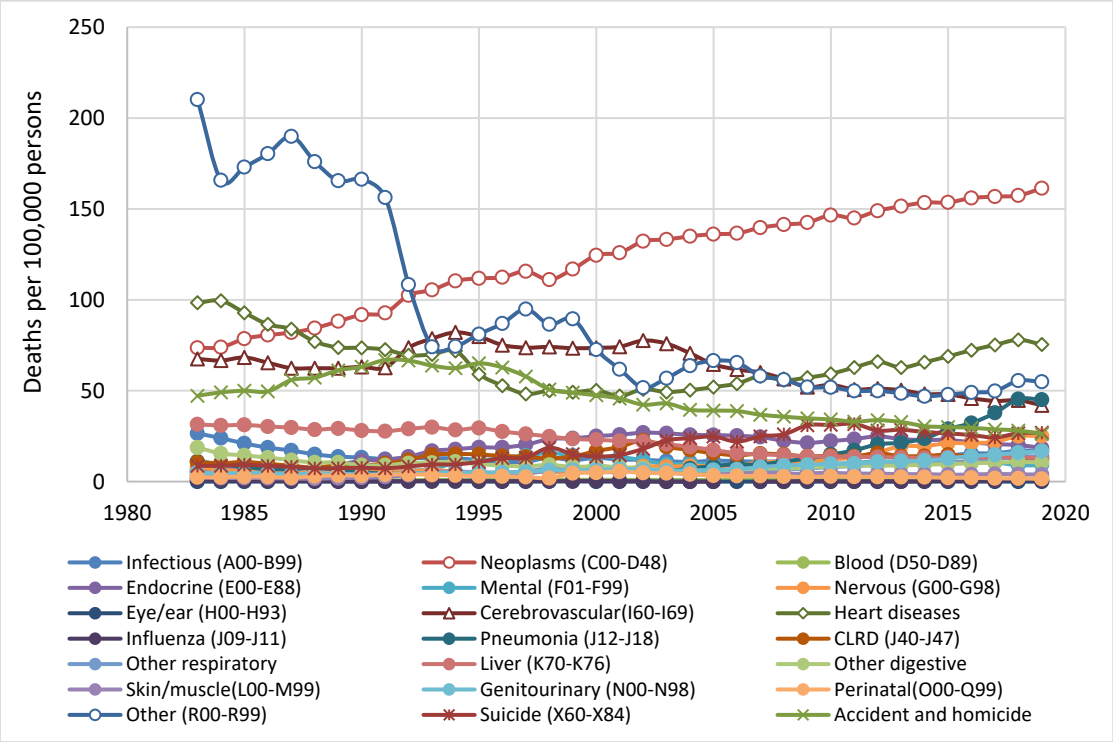
The cause of death statistics of the Republic of Korea is compiled and published by Statistics Korea, and results are on the website as reports or data (Statistics Korea, 2021). Death registration is complete for ages 15 and over (WHO, 2020), but some registration are missing for infant deaths (Statistics Korea, 2016). To determine the underlying cause of death, the death certificate information is supplemented with 22 administrative data such as national health insurance, cancer registration, and criminal investigation.

Statistics Korea has published cause of death statistics starting from 1983. However, much older statistics exist. The modern population registration system started following the renovation of the Family Register in 1894 (Choe, 1996). In 1937, the vital statistics regulation was promulgated. Until 1942, the vital statistics, including the cause of death statistics, was of good quality (Ishi, 1972). Then, after the Korean war, the population registration and vital statistics system collapsed. The registration coverage was estimated to be 30%–70% from 1958 to 1967, and the registered data was not usable for vital statistics. To improve the registration, the vital events declaration form stipulated by the Economic Planning Board was integrated into the Family Register Declaration Form in 1970, in collaboration with the Ministry of Justice. Quarterly sample surveys were also conducted from 1963, which became monthly from 1978 (Statistics Korea, 1992). Publication of the annual report on the causes of death for 1980 began in 1982 (Statistics Korea, 2017).

In 2019, the top cause of death was neoplasms, followed by heart disease (Statistics Korea 2021). The third cause is ‘other’, which pertains to symptoms, signs, and abnormal clinical and laboratory findings not elsewhere classified (R00–R99). The fourth cause is pneumonia, which was increasing rapidly but decreased slightly in 2019. This peculiar movement is also found in Japan from 2016 to 2017 due to the change of coding rules of the underlying cause of death. The same statistical procedure might be involved in this stagnation of pneumonia deaths in the Republic of Korea. The fifth cause is cerebrovascular diseases, which has continued to decline since 2002.

From 1983 to 2019, the cause of death structure changed (Figure A-9). The neoplasms almost constantly increased whereas heart diseases decreased from 1983 to 1997, then increased after that. The opposite trend is found in cerebrovascular diseases, which increased during the 1990s and declined since 2002.

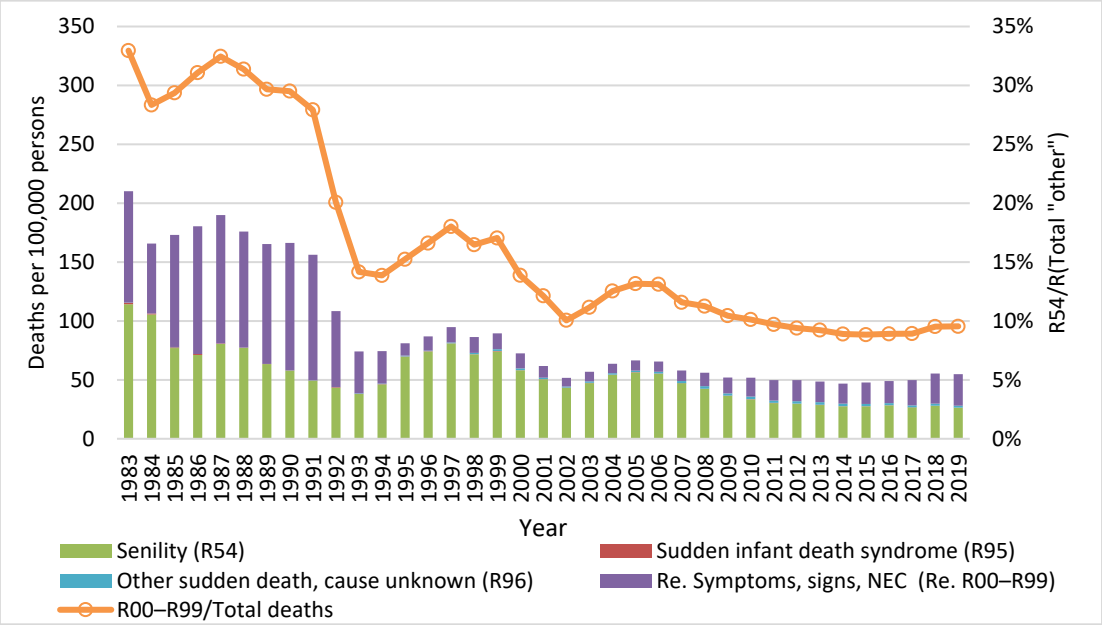
Figure A-9. Causes of Death Trend, The Republic of Korea, 1983–2019



Note: ICD-10 code is in (). 'Heart diseases' is diseases of the circulatory system (I00–I99) minus cerebrovascular diseases (I60–I69). 'Other respiratory' is diseases of the respiratory system (J00–J98, U04) minus Influenza (J09–J11), Pneumonia (J12–J18) and Chronic lower respiratory diseases (here, labelled as 'CLRD', J40–J47). 'Other digestive' is diseases of the digestive system (K00–K92) minus diseases of the liver (K70–K76). 'Accident and homicide' are external causes of morbidity and mortality (V01–Y89) minus Intentional self-harm (here, labelled as 'suicide', X60-X84). The cause of death by 103 items.
Source: Statistics Korea (2021).

Causes of death classified as 'other' was the top cause of death, comprising 30% of total death in the 1980s but drastically decreased in 1990s. In 2019 'other' cause of death is the third largest cause of death comprising close to 10% of total death (Figure A-10). Senility death was half of the total 'other' deaths in the 1980s, increased around 1997 and 2005, then have been decreasing since then. The rising number of deaths of very old persons pushed up the unclassifiable deaths slightly, but not senility deaths, unlike Japan.

Figure A-10. 'Other' Cause of Death, Republic of Korea, 1983–2019



Note: The cause of death by 236 items.
Source: Statistics Korea (2021).

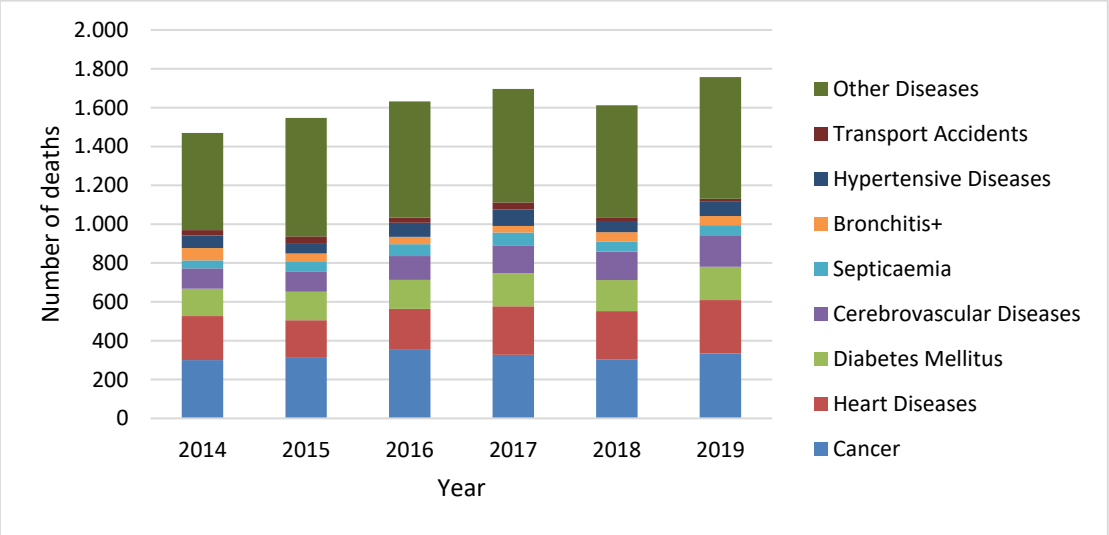
In response to the COVID-19 pandemic, the number of deaths were released weekly to compare excess mortalities with other countries (Jdanov et al., 2021). As of August 2021, cause of death statistics for 2020 have not been published.

2.5. Brunei

Death registration coverage is complete in Brunei (UN, 2021), and vital statistics are with medically certified causes (UNESCAP, 2021). The Laws of Brunei, Births, and Deaths Registration, Chapter 79 is the legal framework, and local area registration offices are in charge of registration. The Department of Economic Planning and Statistics (DEPS) under the Ministry of Finance and Economy publishes cause of death statistics regularly. As of August 2021, the latest statistics available are for 2019, which had 1,757 deaths (DEPS, 2020). In 2019, the largest cause of death was cancer, followed by heart diseases, diabetes mellitus, and cerebrovascular diseases (Figure A-11). There are many deaths with 'other diseases', but their details are not published online.

Verbal autopsies, the method to ascertain the cause of death based on an interview with family member or other caregivers, are adopted and conducted for unexpected maternal and child death (UNESCAP, 2019).

Figure A-11. Top Causes of Death, Brunei



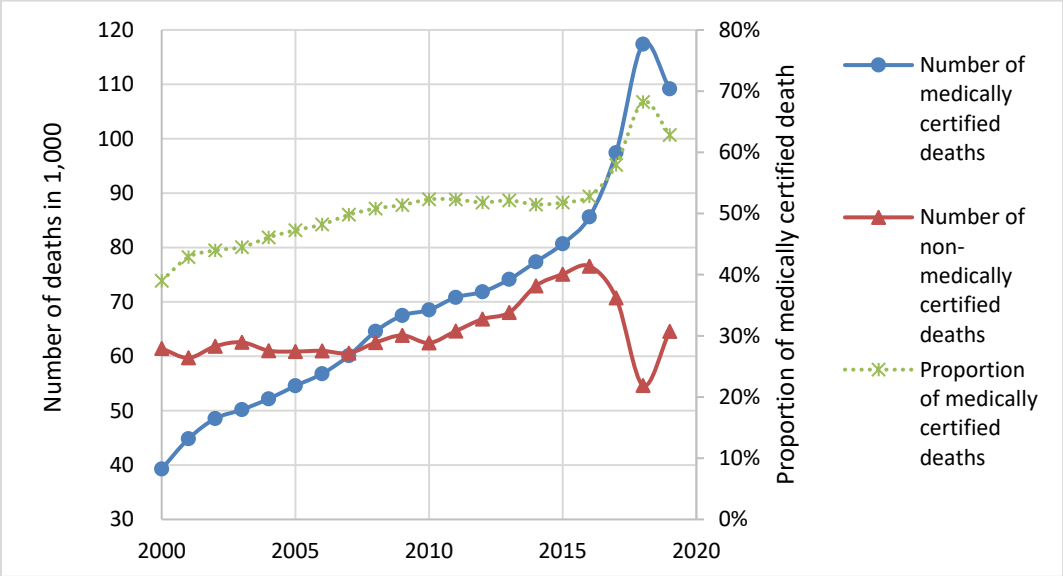
Note: Bronchitis+ is Bronchitis, Chronic & unspecified Emphysema & Asthma. Cancer is malignant neoplasms. Heart diseases includes acute rheumatic fever.
Source: DEPS (2020).

2.6. Malaysia

The death registration coverage of Malaysia is 90% – 99% complete (UN, 2021). The Department of Statistics Malaysia, in collaboration with the National Registration Department and the Ministry of Health, publishes the annual report regularly online (Department of Statistics Malaysia, 2020). WHO raised the quality category of cause of death statistics for Malaysia from 4 in 2016 to 2 in 2019 (WHO, 2020).

In Malaysia, not all deaths are medically certified, i.e. the causes of death are not verified by a medical officer or a coroner. Informants, such as police or laypersons, verify cause of death. Due to efforts by the Ministry of Health to increase medical verification, the proportion of medically certified death increased from 39.0% in 2000 to 68.2% in 2018 (Figure A-12). There was a sudden increase in 2017 and 2018, which might be due to the series of research on cause of death conducted during the period (Omar, 2019). However in 2019, the proportion and number of medically certified deaths declined with no explanation in the official report.

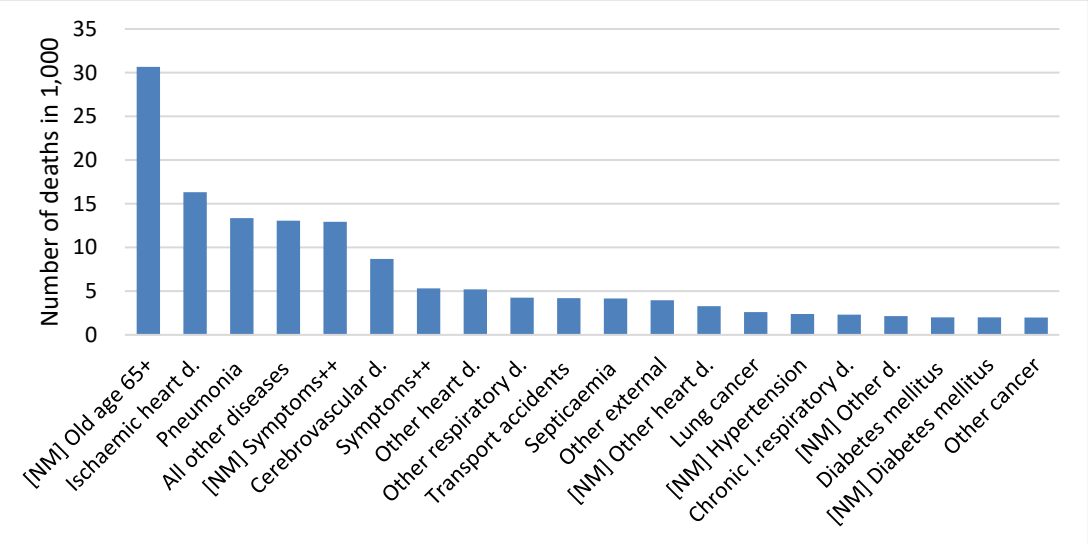
Figure A-12. Trend of medically and non-medically certified deaths, Malaysia, 2000–2020



Source: Department of Statistics Malaysia (2020).

The causes of death significantly differ between medically certified and non-medically certified deaths. Still, when combined, the largest cause of deaths in Malaysia is the non-medically certified 'old age 65 years and over' in 2019 (Figure A-13), comprising 17.7% of total deaths. The second cause is ischaemic heart disease and third is pneumonia.

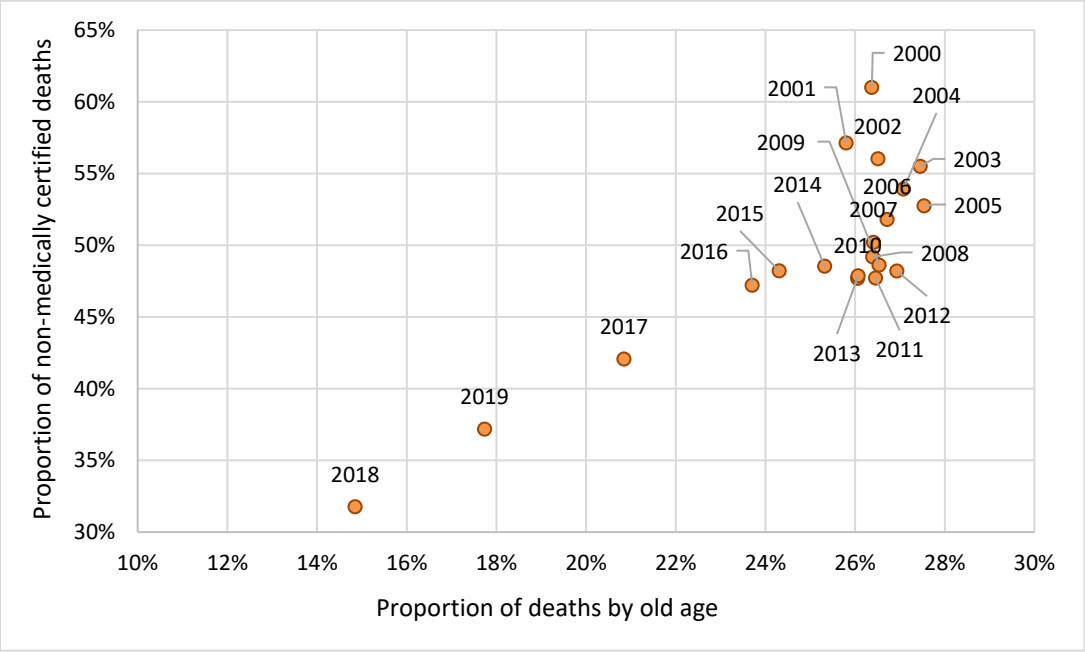
Figure A-13. Top 20 Causes of Death, Malaysia, 2019



Notes:
1. [NM] is not medically certified cause.
2. Symptoms++ means 'symptoms, signs and abnormal findings' for not medically certified cause, 'symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified' for medically certified cause.
3. 'd.' stands for 'diseases.'
Source: Department of Statistics Malaysia (2020).

With population ageing, deaths caused by 'old age' are increasing in many countries. Even in countries where all deaths are medically certified, these deaths are often coded as 'senility', 'dementia', 'heart failure', or 'pneumonia.' However in Malaysia, the proportion of deaths due to 'old age' is directly linked with the proportion of non-medically certified deaths (Figure A-14). 'Old age' is an ambiguous cause, and there should be proper medical causes behind it. Clarifying these causes would further reduce preventable deaths.

Figure A-14. Proportion of Deaths by Old Age and Non-Medically Certified Causes



Source: Department of Statistics Malaysia (2020).

According to WHO, data from Malaysia is 50%–51% complete and only 32%–40% usable, and it is not integrated into WHO's Global Health Estimates (WHO, 2020). Up to present, one-third of deaths are not medically certified. Verbal autopsy was implemented since 2017 for deaths occurring outside the health facility, without the attention of a medical practitioner (UNESCAP, 2019). The Malaysian death certificate form does not conform with the WHO format. It only provides one line for the cause of death.[4] As deaths in Malaysia are registered almost completely, the remaining challenge is how to increase the medical death certification in compliance with ICD-10.

2.7. Thailand

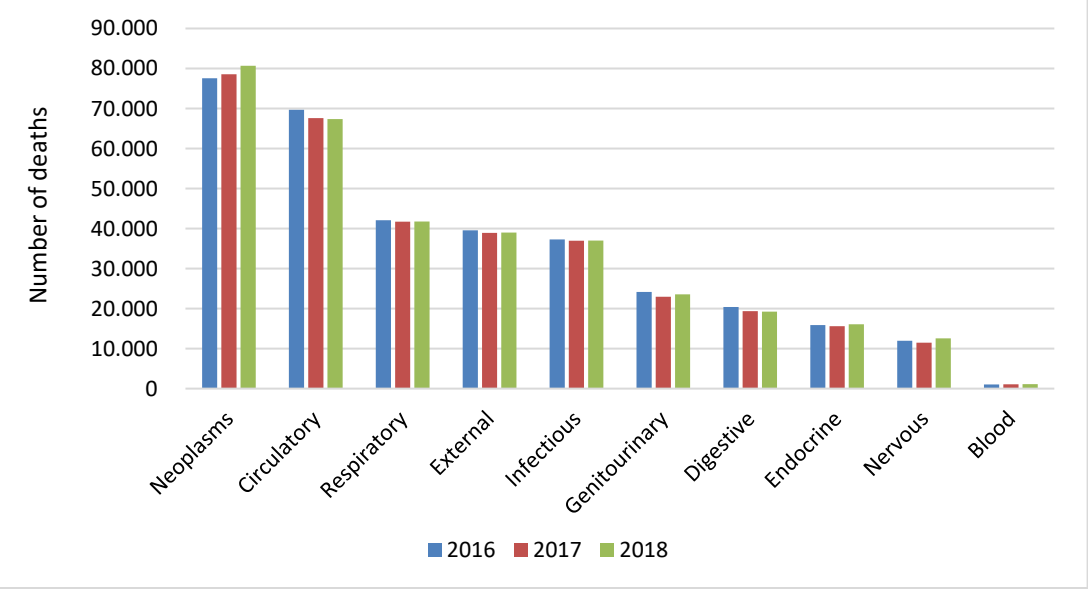
In Thailand, the Bureau of Registration Administration has been in charge of population registration since 1988. Statistics captured through registration such as population by age,

[4] WHO recommends 4 parts to provide the chain of events which led to death in addition to another line for other significant conditions contributing to death.

birth, marriage, or divorce are published online, except for death statistics (DOPA 2021). The Office of the Permanent Secretary, Ministry of Public Health is in charge of death statistics with agreement from the Provincial Administration Department, Ministry of Interior to use the civil registration database. So far, the summary of vital statistics is published online in the Statistical Yearbook (NSO, 2020).

As of August 2021, the number of births and deaths from 2014 to 2018 is published, and cause of death statistics from 2016 to 2018 is available for the ten leading causes (NSO, 2020). These causes are 72.4% of total deaths in 2016, 73.0% in 2017, and 73.3% in 2018. They are increasing slightly but are almost the same level each year. Amongst the ten causes classified by the ICD-10 chapter-level, the most important cause is neoplasms, followed by the diseases of the circulatory system. From 2016 to 2018, the number of deaths by neoplasms increased, and circulatory system diseases decreased (Figure A-15). So far the published data is not disaggregated by more detailed causes, sex, and age.

Figure A-15. Ten Leading Causes of Death, Thailand, 2016–2018



Source: NSO (2020).

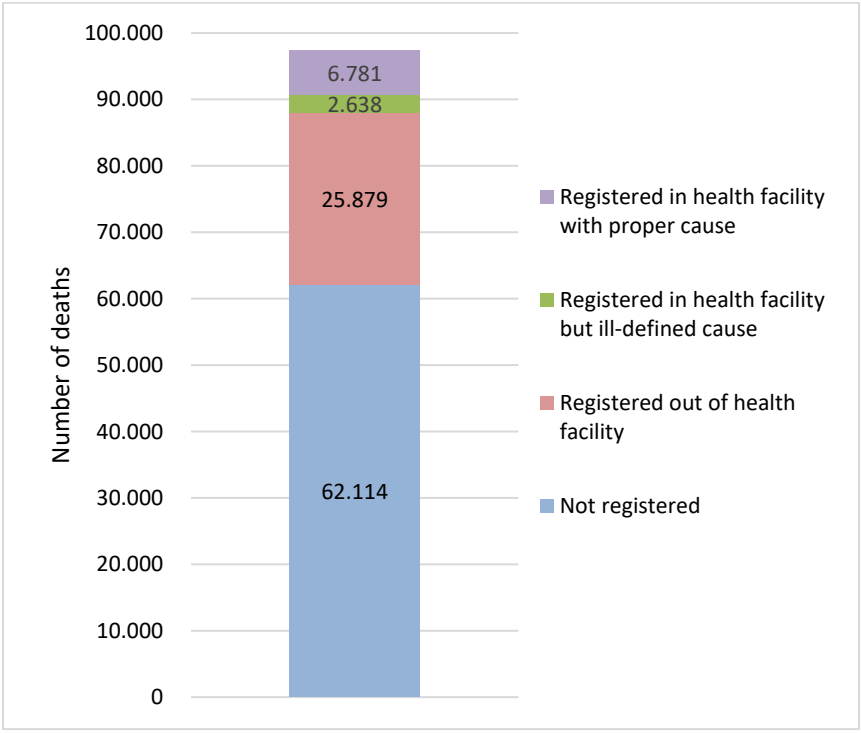
According to the UN Statistical Division, birth registration coverage is at 100% and 85% for death in 2012 (UN, 2021). According to WHO, data from Thailand is in quality category 3; while the completeness of death data for ages 15 and over is 91%–100%, only 34%–65% is usable. The registered data is not used for WHO compilation (WHO, 2020). In 2018, amongst the 461,818 deaths registered by civil registration system, 97% were recorded by the health sector. Verbal autopsy is performed for some of the deaths occurred outside hospital but not integrated in the civil registration data (UNESCAP, 2019).

2.8. Cambodia

The register-based cause of deaths statistics is yet to be published by the General Department of Identification, Ministry of Interior, or Ministry of Health, which are in charge of the Civil Registration and Vital Statistics (CRVS).

In 2018, amongst an estimated 97,412 deaths, 35,298 (36.2%) deaths were registered (UNESCAP, 2019). The health sector registered 9,419 deaths, but 2,638 of them are ill-defined (Figure A-16).

Figure A-16. Death Registration Status, Cambodia, 2018



Source: UNESCAP (2019).

While the country needs more effort to achieve full coverage, Cambodia already achieved their target of registering at least 30% of all deaths by 2024. Further progress in death registration coverage and the implementation of the certification system to medically certify causes of death, in accordance with ICD, would enrich vital statistics from Cambodia. The cloud-based CRVS database was introduced (UNESCAP, 2017) but the statistics out of this database is not yet published.

2.9. China

In China, the National Health and Family Planning Commission, Ministry of Public Security, and Ministry of Civil Affairs jointly issued the 'Notice Regarding the Medical Death Certificate' in 2013 (National Health Regulation [2013] No. 57), which requires all death registrations to

be submitted with a medical death certification. However, cause of death statistics is compiled only using sample surveys with 605 monitoring points, composed of county-level municipalities which are chosen to be nationally representative. According to the Chinese Center for Disease Control and Prevention (CCDC) and National Health Commission of the People's Republic of China (NHC), the population at these 605 sites is 24% of the total population of China (CCDC & NHC, 2020). The population and number of deaths registered in these monitoring points are published and available online for the years 2017 and later (CCDC & NHC, 2021). The abridged results of death rates by cause are also published on the Health Statistical Yearbook from 2011 (NHC 2021) and Statistical Yearbook of China from 2010 (NBS 2021).

Historically, the oldest cause of death statistics in China seems to be the result of a nation-wide survey conducted from 1973 to 1975, led by the National Cancer Control Office, published in 1976 (Zhou, 1985). From 1973 to 1975, the number of deaths rose to 18.4 million, which was divided into 20 major and 56 minor causes of death classifications. However, the summary table was published not as the number of deaths but as the rate. Looking at the mortality rates for the major causes of death (Table A-2), heart disease was the highest in both men and women, followed by respiratory diseases and cancer.

Table A-2. Top Ten Causes of Death, China, 1973–1975

Cause of Death	Male			Female			Total		
	Crude[a]	Adjusted[b]	Comp.[c] (%)	Crude	Adjusted	Comp. (%)	Crude	Adjusted	Comp. (%)
Heart Disease	117.72	105.94	15.35	141.09	108.75	19.23	129.11	106.98	17.20
Respiratory Disease	117.52	132.14	15.33	118.20	119.27	16.11	117.85	125.44	15.70
Cancer (Malignant Neoplasm)	87.77	81.90	11.45	65.96	55.99	8.99	77.14	68.73	10.28
Accident (Unintended Death)	82.01	89.90	10.69	58.61	65.93	7.99	70.60	78.12	9.40
Digestive Disease	72.60	73.65	9.47	60.62	55.86	8.26	66.76	64.73	8.89
Infectious Disease	64.08	81.90	8.36	63.40	55.99	8.64	63.75	68.73	8.49
Cerebrovascular Disease	59.73	51.52	7.79	65.55	45.37	8.93	62.57	48.23	8.34
Neonatal Disease	50.98	107.50	6.65	41.51	88.58	5.66	46.36	98.33	6.18
Tuberculosis	46.01	43.72	6.00	40.44	36.36	5.51	43.29	39.89	5.77
Urinary Disease	15.11	13.83	1.97	12.92	10.85	1.76	14.04	12.22	1.87

[a] Crude = Crude death rate per 100,000 population.
[b] Adjusted = Standardised mortality rate by 1964 population structure of China
[c] Comp = composition rate
Source: Zhou (1985).

The current cause-of-death monitoring system started in 1978 as an experiment in Dongcheng District and Tong County (now Tongzhou District) in Beijing. In 1989, the number of monitoring points expanded to 71 in 29 provinces, autonomous regions, and directly controlled cities. In 1990, with the support of the World Bank, 145 monitoring points were chosen to represent all provincial, autonomous regions, and directly-controlled cities, covering 1% of China's total population at that time. In 2003, there were 161 monitoring points covering 6% of the total population. By 2013, it became the current 605 monitoring points (CCDC & NHC, 2020).

The latest available cause of death statistics is for 2019. Although the number of monitoring points is stable at 605, population covered and registered deaths are increasing (Table A-3).

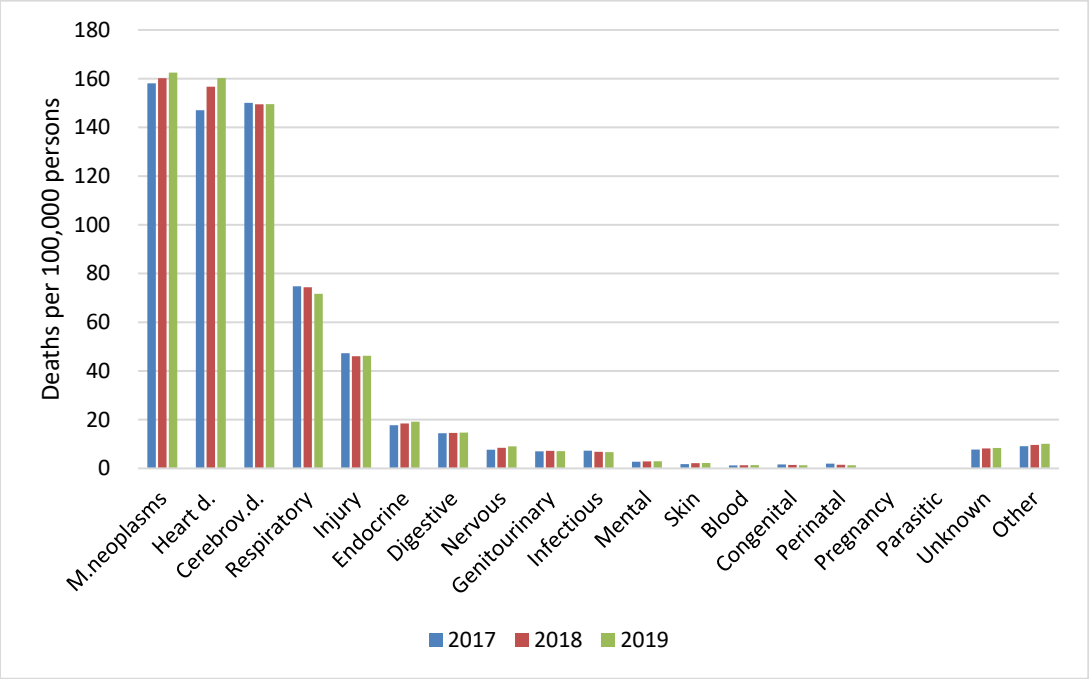
Table A-3. Population Covered and Number of Registered Deaths in Monitoring Points, China

	2014	2017	2018	2019
Population covered (a)	253,610,895	271,135,671	272,254,849	276,873,145
Registered deaths (b)	1,643,377	1,783,455	1,822,530	1,867,524
Crude death rate (b/a) per 1,000	6.48	6.58	6.69	6.75

Source: CCDC & NHC (2020).

In 2019, the top cause of death was malignant neoplasm, followed by heart diseases and cerebrovascular diseases. In 2017, the second cause was cerebrovascular diseases, which was replaced by heart disease in 2018 due to the rapid increase of heart disease, not by the extensive reduction of cerebrovascular diseases (Figure A-17). Infectious diseases, congenital malformation, perinatal conditions, and pregnancy-related causes declined significantly for a short period from 2017 to 2019. The unknown cause is only 1.2% of total deaths.

Figure A-17. Death Rate by Cause, China, 2017–2019



Note: M(alignant) neoplasms C00–C97; Heart diseases I05–I09,I11,I20–I27,I30–I52; Cerebrovascular diseases I60–I69; Respiratory diseases J00–J99; Injury V01–Y89; Endocrine (nutritional and metabolic diseases) E00–E90; Digestive K00–K93; Nervous (system disorders) G00–G99; Genitourinary N00–N99; Infectious A00–A99,B00–B49,B90–B94, B99; Mental (disorders) F00–F99; Skin (and subcutaneous tissue, musculoskeletal system and connective tissue) M00–M99; Blood (and immune disorders) D50–D89; Congenital (malformations) Q00–Q99; Perinatal P00–P96; Pregnancy (childbirth and the puerperium) O00–O99; Parasitic B50–B89; Unknown R00–R99.
Source: CCDC & NHC (2020).

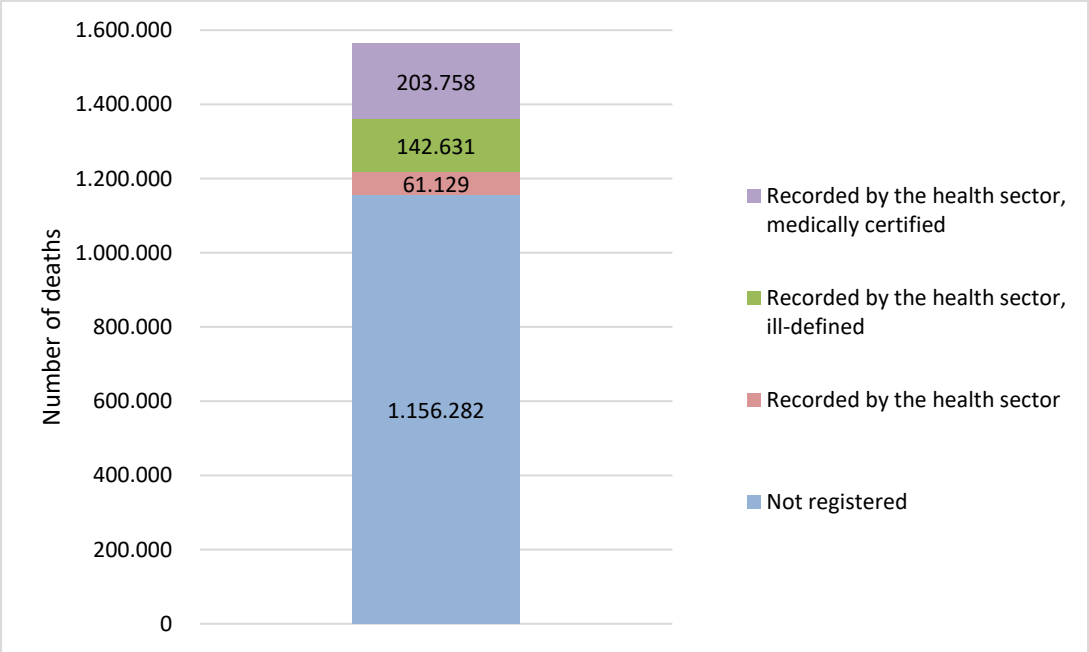
2.10. Indonesia

As a middle-income country that is very aware and responsive to the global development agenda, Indonesia has prioritised death registration for infant and maternal mortality. Each infant or maternal death must be reported by community health centres (Puskesmas) guided by a medical doctor within 24 hours. Apart from those deaths, the registration practice was not prevalent. Since the Sample Registration System (SRS) was implemented in 2014, births and deaths occurring in the nationally representative 128 subdistricts, which covers 8 million people, were registered. The cause of death information was collected by verbal autopsy conducted at the village level. This system was managed by the National Institute of Health Research and Development, based on the joint decree between the Ministry of Health and the Ministry of Home Affairs in 2010 (Usman, 2019). It was estimated that 51%–55% of deaths occurred in the sample areas were registered. However, the data was not published after 2018 (Sorchik, 2019). In the Statistics Yearbook of Indonesia, compiled by the *Badan Pusat Statistik* (Central Bureau of Statistics) with the collaboration of all ministries, there is no section concerning vital statistics, except for marriage and divorce statistics (BPS 2021).

In 2018, amongst the estimated total number of deaths of 1,563,800, a quarter (407,518)

were registered. Amongst the registered deaths, half were medically certified (UNESCAP, 2019, Figure A-18).

Figure A-18. Death Registration Status, Indonesia, 2018



Source: UNESCAP (2019).

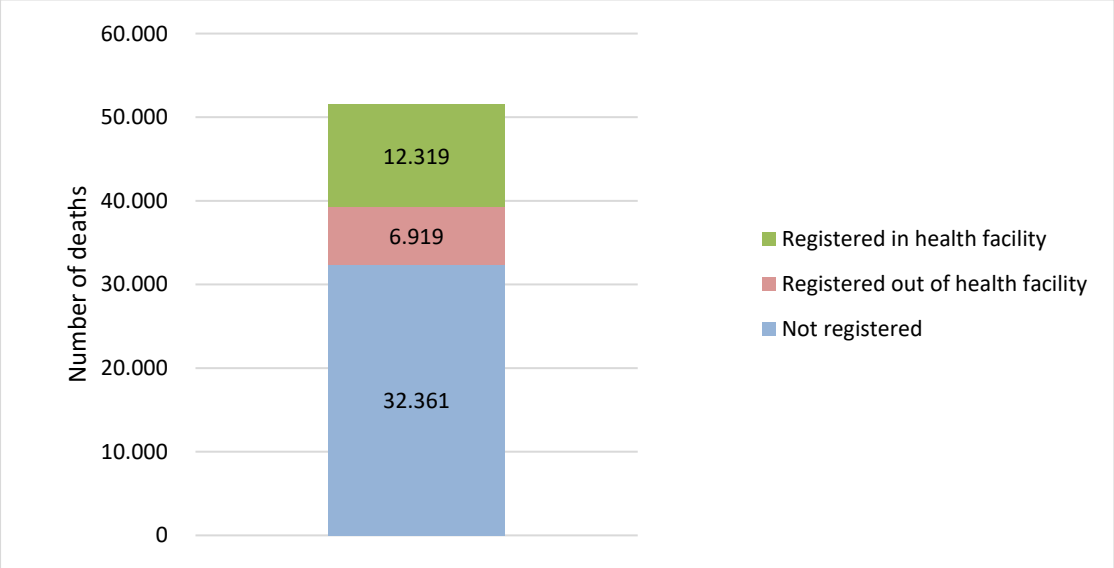
In 2019, the national strategy to strengthen the CRVS system was launched by Presidential Regulation No. 62/2019. The national coordination mechanism was formed with the Ministry of Planning (BAPPENAS), the Directorate General of Population and Civil Registration (DUKCAPIL), and the Ministry of Home Affairs as focal points. DUKCAPIL is in charge of issuing KTP-el, the national electronic identity card and promoting civil registration using KTP-el. As of December 2020, the 98.0% of Indonesian population, 192,468,599 persons, were registered (DUKCAPIL 2021).

2.11. Lao People's Democratic Republic

The Ministry of Home Affairs and Lao Statistics Bureau are in charge of the national CRVS coordination mechanism for Lao People's Democratic Republic (Lao PDR). The mechanism was established in 2015 with the participation of seven ministries. In 2018, amongst an estimated 51,599 total deaths, 37.3% were registered. Amongst the registered deaths, 64.0% were recorded in health facilities (UNESCAP, 2019, Figure A-19). However, it is not sure how many of them include cause of death information. Following the CRVS ministerial declaration in Asia and Pacific adopted in 2014, Lao PDR set its 2025 target for 60% death registration coverage, 85% of them recorded with the medically certified cause of death. In March 2020, the World Bank launched a project on civil registration and vital statistics with a $25 million

budget to upgrade the national civil registration system (World Bank 2021). This project is aimed to improve the civil registration coverage with the establishment of an electronic civil management information system. It is hoped that a functional CRVS system will be constructed by the end of the project in March 2025.

Figure A-19. Death Registration Status, Lao People's Democratic Republic, 2018



Source: UNESCAP (2019).

2.12. Myanmar

Statistics from Myanmar are published regularly online. So far, only registered deaths for urban areas include cause of death statistics (CSO, 2021). The coverage is estimated at 12%–14% of total deaths. The top causes of these registered deaths were cerebrovascular diseases, followed by other cardiovascular diseases and hypertensive diseases in 2018 (Table A-4).

Table A-4. Major Causes of Death and Data Coverage, Urban Myanmar, 2014–2018

Cause Group	Number of Deaths, Urban				
	2014	2015	2016	2017	2018
Cerebrovascular disease	10,776	11,398	10,528	10,136	10,714
Other cardiovascular diseases	9,291	8,339	6,783	6,885	7,683
Hypertensive disease	8,508	7,170	5,879	5,879	6,476
Cirrhosis of the liver	4,846	5,162	4,474	4,597	4,625
Ischaemic heart disease	3,718	3,728	3,562	3,730	4,008
Other digestive diseases	2,895	3,716	3,580	3,697	4,286
Diabetes mellitus	3,702	3,508	2,916	3,612	3,677
Road traffic accidents	2,668	3,097	-	2,754	2,803
Tuberculosis	3,486	3,038	2,963	2,582	2,584
Alcohol use disorders	3,010	2,611	2,134	2,183	2,525
Other infectious diseases	14,691	16,231	2,927	-	-
Ill-defined diseases (ICD10 R00–R99)	-	-	13,980	13,620	15,117
Total (a)	**67,591**	**67,998**	**59,726**	**59,675**	**64,498**
Registered Deaths in urban (b)	96,697	102,923	88,606	89,779	96,832
Registered Deaths (c)	213,085	225,526	213,187	231,210	264,620
Estimated Deaths (d)	477,993	490,493	488,268	485,288	478,706
Coverage a/b	69.9%	66.1%	67.4%	66.5%	66.6%
Coverage a/c	31.7%	30.2%	28.0%	25.8%	24.4%
Coverage a/d	14.1%	13.9%	12.2%	12.3%	13.5%
Coverage c/d	44.6%	46.0%	43.7%	47.6%	55.3%

Notes:
1. The 2014 Census single age population is used for the age distribution of 0–4 and 65+ to calculate estimated deaths.
2. Deaths by cause and registered deaths are by Central Statistical Organization.
3. Estimated deaths are calculated using age-specific mortality rate by Central Statistical Organization multiplied population estimate by Population Department.
4. '-' stands for nil or negligible**.**
Source: CSO (2021).

So far, the coverage of death registration with cause is low and not increasing from 2014 to 2018. However, the coverage of registered deaths, with or without cause, is increasing. At present, the number of registered deaths are published annually, and further development of mortality statistics, disaggregated by state and region, or by sex and age, which include causes of death, would be beneficial for implementing health policies.

2.13. Viet Nam

In Viet Nam, 14.4% of deaths occurred in health facilities, and 77.6% of deaths occurred at home (Hoang, 2017). According to the Health Statistics Yearbook of 2017, the most frequent deaths in hospitals are intracranial injury, followed by pneumonia, and 'conduction disorders and cardiac arrhythmias' (Ministry of Health 2017). From these descriptions, it is apparent that Viet Nam hospitals do not use the cause of death classification of ICD-10. As for the deaths at home, they are registered by village health workers with the routine report of form A6/YTCS and 10/BCX, which are sent to district, provincial, then to the central level (Hoang, 2017). So far, these home death registrations are not published as statistics.

Verbal autopsies are being tried to obtain the causes of deaths occurred in the community (Hong, 2018) and interventions were made to improve the hospital deaths statistics quality (Walton, 2016). In 2018, the General Statistics Office (GSO) began to publish the registered number of deaths by province in the Statistical Yearbook (GSO, 2018). Using the population and crude death rate in the 2020 Statistical Yearbook, registered deaths are now 98.1% of calculated deaths, up from 88.4% in 2018 (Table A-5). Although the source of the crude death rate is not mentioned in the Statistical Yearbook, the coverage of death registration is becoming almost complete.

Table A-5. Registered and calculated number of deaths, Viet Nam, 2018–2020

	2018	2019	2020
Registered deaths (person, a)	569,338	556,015	583,751
Crude death rate ‰	6.8	6.3	6.1
Population (person)	94,666,000	96,484,000	97,582,700
Calculated deaths(b)	643,729	607,849	595,254
Calculated coverage a/b (%)	88.4%	91.5%	98.1%

Source: GSO (2018).

3. Conclusion

Although every country is at a different stage, substantial progress has been made for civil registration and vital statistics during the CRVS Decade, 2015–2024, for Asia and the Pacific. For countries with low civil registration coverage, ICT based national ID system is now being developed such as in Cambodia, Indonesia or Lao PDR, and it could be the driving force to improve the system. Online publication of vital statistics is becoming a standard, facilitating quick and affordable dissemination. Also, it lowers the language barrier as the texts and documents online usually are machine-readable, enabling online translation.

Within the civil registration system, there is a global tendency that the birth registration develops first, then the death registration. Cause of death registrations are more challenging because they require medical certificates, delivered by doctors. In circumstances where those

medical death certificates could not be delivered, the verbal autopsy has been experimented in some countries. While countries such as Brunei and Malaysia, with full death registration coverage, use verbal autopsy for deaths occurring in remote areas, countries such as Indonesia and Viet Nam, which use verbal autopsy to improve the death registration, are facing challenges of sustainability.

Sample registration is another strategy. China has set up its system, and the data are well produced and published regularly. Indonesia conducted a sample registration system, but the publication ceased. It needs national government dedication to continuing the practice. The sample registration clarifies the structure of causes of death, but it does not cover every death. In the long run, the sample should be expanded to cover all deaths.

Malaysia's approach is unique. All deaths are registered but with medically certified causes and non-medically certified causes separately. The death registration form used by Malaysia contains only one part for cause, instead of four parts recommended by WHO, and one-third of deaths are not medically certified. However, the simpler form might have facilitated a higher number of registrations. Other countries could consider this example of using a simpler form first to increase the registrations. Countries can later improve the quality of cause of death information once the registrations have increased.

Amongst countries WHO placed in category 1, i.e. countries with multiple years of data with high completeness and quality, the Philippines, Japan, and the Republic of Korea have an increasing number of deaths in the categories 'unknown' or 'other.' The quality of cause description as well as a rising number of very old people are the cause of this increase. However, the proportion of these 'unknown' or 'other' causes in Singapore and China remains low. In light of population ageing in the region, a comparative approach would improve the quality of cause of death.

As of August 2021, cause of death statistics from Japan, the Philippines, and Singapore are available for 2020. The number of deaths decreased in the Philippines and Japan but increased in Singapore. However, when the population age structure is adjusted, Singapore's death rate also declined in 2020. Deaths due to pneumonia declined in all three countries. Another common feature is the decline of accidents and increase in suicide. In 2020, the COVID-19 death toll was not catastrophic in the ASEAN+3 countries compared to Europe and American countries. While preventing COVID-19 is the current major challenge of health systems, the common feature of death patterns in ASEAN+3 countries is worth investigating further.

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Part B

Demand and Supply of Long-Term Care for Older Persons in Asia (Updated)

1. Introduction

In 2018, this research team compiled data on population ageing and long-term care in East and Southeast Asia on the following population aspects (Hayashi et al., 2019):

1) the proportion of older persons in target countries by subnational level
2) the proportion of older persons living alone by subnational level
3) long-term care workforce
4) long-term care facility population

This updated version extends the comparisons to South and West Asia. The available census data reached 4.133 billion people, 89.1% of the total population of Asia (Table B-1).

Table B-1. List of Covered Countries with Available Census Data, Asia

Region **Country**	**Pop in 1,000**	**Source**	**Latest Year**
Eastern Asia			
China	1,439,324	COSC 2012	2010
China, Hong Kong SAR	7,497	PCO 2012	2011
China, Macao SAR	649	SCS 2012	2011
China, Taiwan Province of China	23,817	DGBAS 2012	2010
Dem. People's Republic of Korea	25,779	CBS 2015	2014
Japan	126,476	SB 2017	2015
Mongolia	3,278	IPUMS	2000
Republic of Korea	51,269	SK 2017	2010
South-Eastern Asia			
Cambodia	16,719	IPUMS	2013
Indonesia	273,524	IPUMS	2010
Lao People's Democratic Republic	7,276	IPUMS	2005
Malaysia	32,366	DS 2011	2010
Myanmar	54,410	DP 2015	2014

Philippines	109,581	IPUMS	2010
Singapore	5,850	SDS 2011	2010
Thailand	69,800	NSO 2011	2010
Viet Nam	97,339	IPUMS	2009
Southern Asia			
Bangladesh	164,689	IPUMS	2011
India	1,380,004	IPUMS	2009
Iran (Islamic Republic of)	83,993	IPUMS	2011
Nepal	29,137	IPUMS	2011
Sri Lanka	21,413	DCS 2015	2012
Central Asia			
Kyrgyzstan	6,524	IPUMS	2009
Western Asia			
Armenia	2,963	IPUMS	2011
Jordan	10,203	IPUMS	2004
State of Palestine	5,101	IPUMS	2007
Turkey	84,339	IPUMS	2000
Total Covered	4,133,321		
Total Asia	4,641,055	(89.1%)	

Sources:

COSC: Census Office under the State Council, Department of Population and Employment Statistics, National Bureau of Statistics, The People's Republic of China, (2012), Tabulation on the 2010 Population Census of the Peopole's Republic of China. China Statistics Press. http://www.stats.gov.cn/tjsj/pcsj/rkpc/6rp

PCO: Population Census Office, Census and Statistics Department, The Government of the Hong Kong Special Administrative Region, (2012), 2011 Population Census. https://www.censtatd.gov.hk/en/scode170.html

SCS: Statistics and Census Service, Government of Macao Special Administrative Region (2012), Results of 2011 Population Census. https://www.dsec.gov.mo/Statistic/Demographic/PopulationCensus/2011PopulationCensus.aspx

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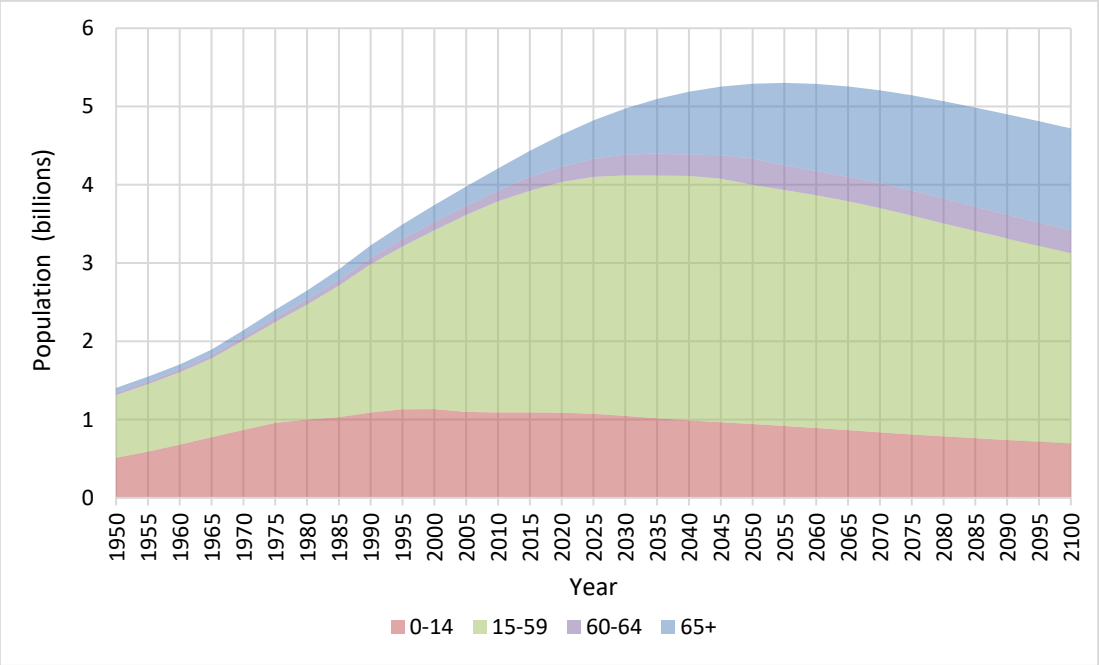
2. The General Trend of Ageing

2.1. Population by Broad Age Group

Population ageing is proceeding in all parts of Asia. The ageing population can be expressed with various demographic indicators, with the number of older persons as the most fundamental indicator (Figure B-1).

Figure B-1. Population by Age Groups, Asia



Source: UN (2019).

In Asia – East, Southeast, South-Central, and West Asia combined – the number of young people, aged 0 to 14, has been declining since 2005, according to the population projections of the United Nations Population Division in 2019 (UN, 2019). The working-age population will start to decrease around 2045. The total population decline will start in 2060. Throughout the period from 1950 to 2100, the number of older persons, aged 60 years or 65 years and over, will continue to increase.

2.2. Definition of Older Persons

Internationally, older persons are defined as those either 60 or 65 years old and over. High-income countries, such as member countries of the Organisation for Economic Cooperation and Development (OECD), tend to adopt the 65 years and over definition. These countries are the forerunners of population ageing. During the 1950s, United Nation reports on ageing defined three broad age groups: 0-14, 15-64, and 65+ (UN, 1956). The pensionable age of the United Kingdom was by 65 years old at the time, and this age was taken as the definition of older persons by UN. In contrast, most middle and low-income countries define older persons

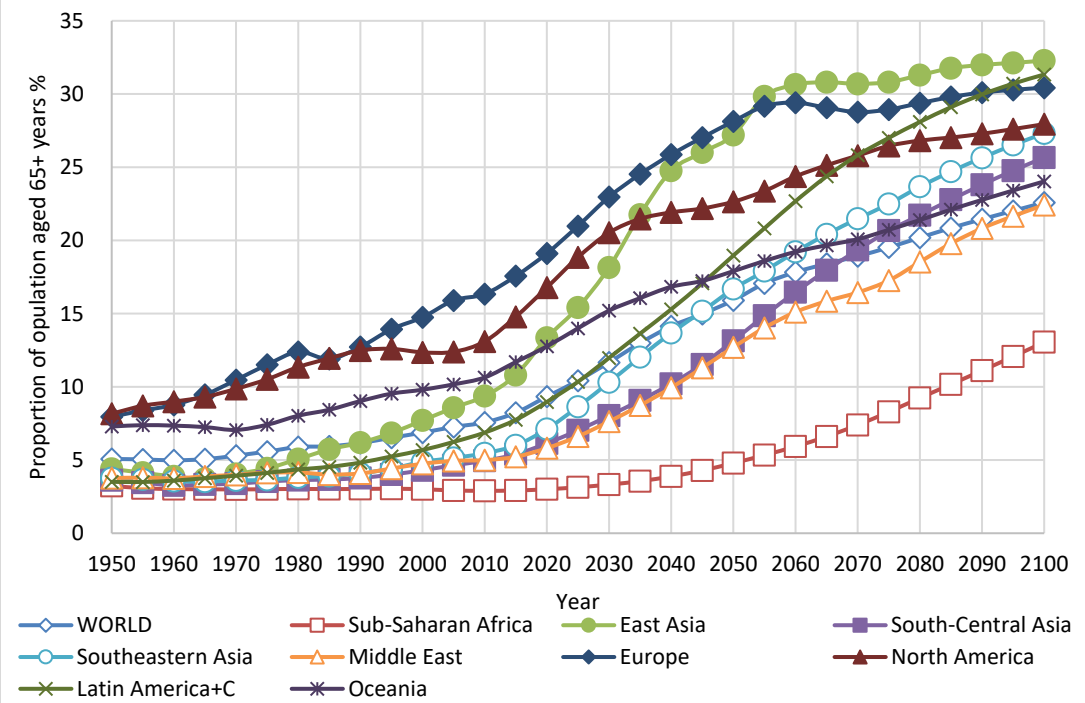
as those 60 years old or over, a definition that came from the World Assembly on Ageing held in Vienna in 1982. Both definitions, either 60 or 65 years old, came from United Nations but in different contexts in different periods.

Although around 70% of older persons reside in middle and low-income countries, indicators on population ageing have been using the 65 years old definition, which this report follows. However, wherever possible, both definitions should be taken into account.

2.3. The Proportion of Older Persons

Population ageing is usually expressed as the increase in the proportion of older persons to the total population. In all the world regions, the proportions of older persons have increased and are projected to increase (Figure B-2). This change is caused by declining fertility and mortality, fewer babies being born, and people living longer.

Figure B-2. Proportion of Older Persons aged 65+ Years, 1950–2100



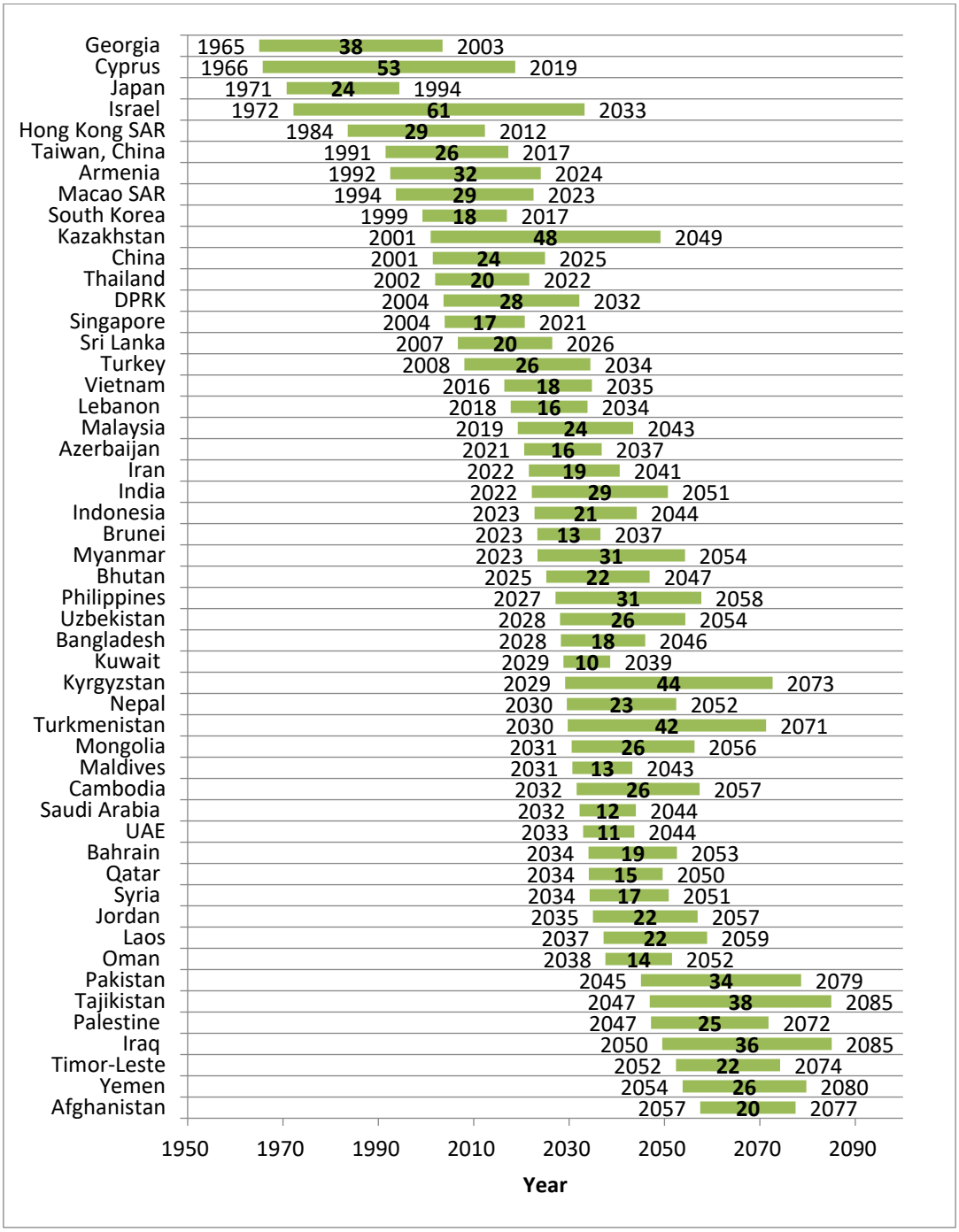
Latin America+C = Latin America and the Caribbean.
Source: UN (2019).

2.4. Ageing Speed

The speed of ageing matters. Compared to European countries, ageing in Japan was much quicker. However, many countries in Asia will age much quicker than Japan. As shown in Figure B-3, amongst the 51 countries in Asia, the fastest ageing country is Kuwait, which will take only ten years that the proportion of 65 years and over to rise from 7% to 14%. It is followed by United Arab Emirates (11 years); Saudi Arabia (12 years); and Maldives and Brunei

(13 years). Though ageing in Arab Gulf countries is not expected to start until the 2030s, it will be extremely rapid compared with East and Southeast Asia.

Figure B-3. Speed of Ageing, Asia



Note:

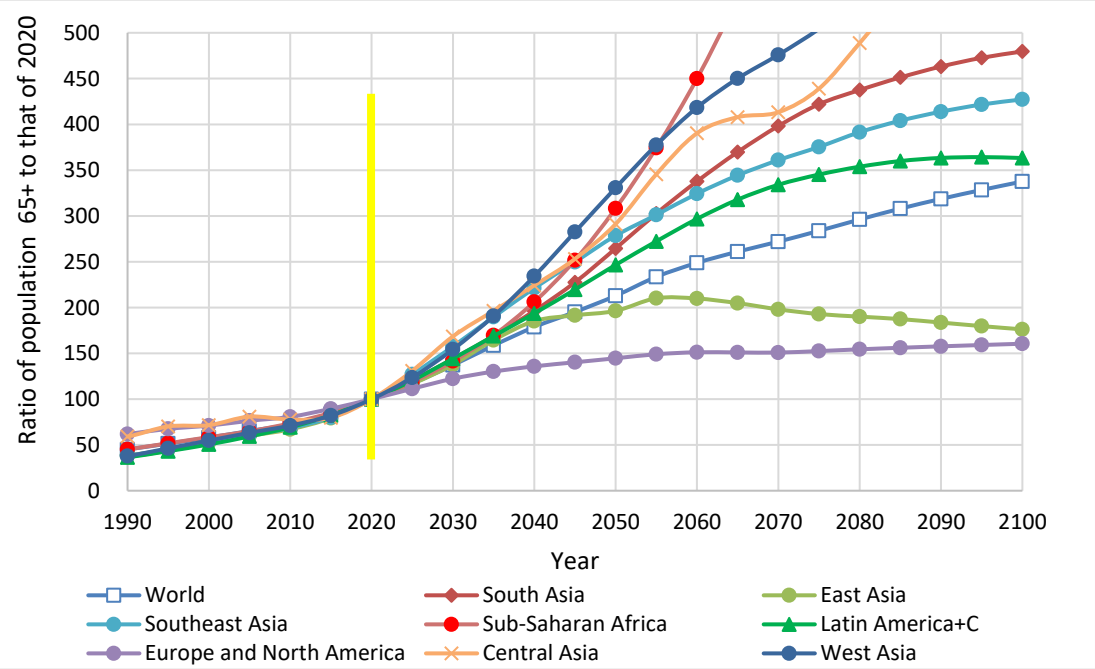
1. The year when the proportion of 65+ becomes 7% is labelled to the left of the green bar, 14% to the right of the bar.
2. Countries sorted by year when the share of older population reaches 7%.
3. Number of years for percentage to increase from 7% to 14% is indicated on the green bar.

Source: Calculated by Author, using data of UN (2019).

2.5. Ratio of Population Aged 65 Years and Over

In addition to the proportion of older persons, the actual number of older persons is also an important indicator. It is related to both the number of persons who need care and the corresponding supply of care. In regions such as Europe or North America, where ageing has already begun, the increase of older persons is not too much. However, in the regions with middle- and low-income countries, the number of older persons will rise sharply (Figure B-4), doubling from 2020 to 2040.

Figure B-4. Ratio of Number of Older Persons aged 65+ Years (2020=100)

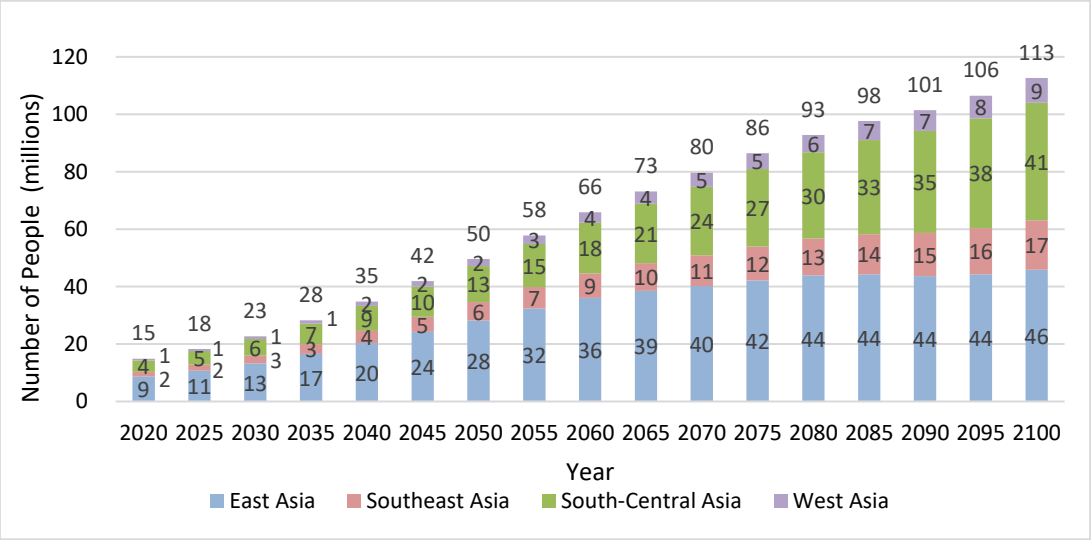


Latin America+C = Latin America and the Caribbean.
Source: Calculated by Author, using data of UN (2019).

3. Demand for Long-Term Care: Number of Older Persons Who Need Care

Following the methodology developed in the previous research project (Hayashi et al., 2019), demand for long term care for each Asian sub-region was calculated (Figure B-5). East Asia remains the region with the most need for care from 2020 to 2100, increasing from 9 million in 2020 to 46 million in 2100. However, the increase will slow down around 2065 and after. The second largest region is South-Central Asia, where the number rose from 4 million in 2020 to 41 million in 2100. For Southeast and West Asia, the number of older persons who need care will increase almost monotonically from 15 million in 2020 to 113 million in 2100.

Figure B-5. Older Persons who Need Care, Asia

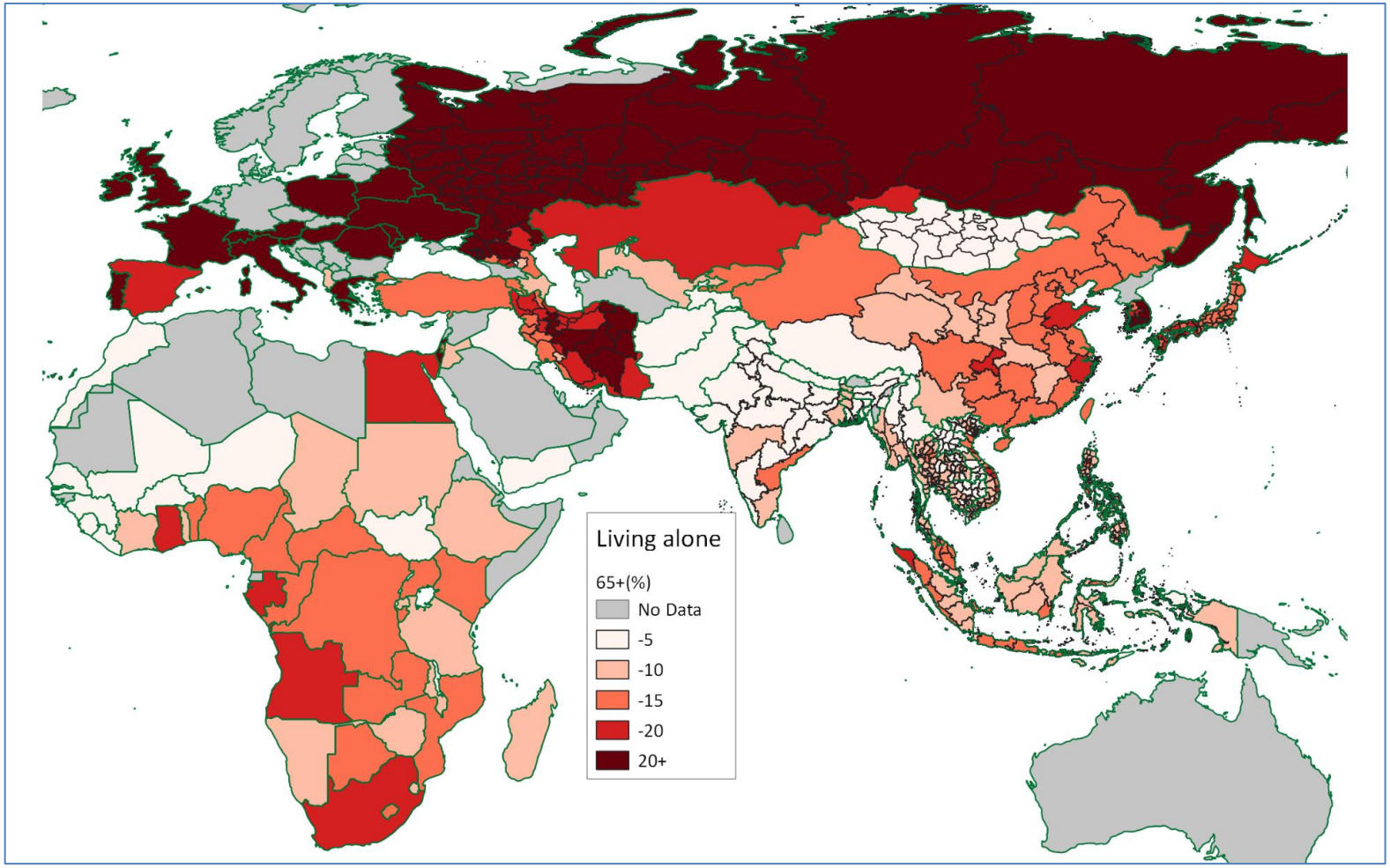


Note: Calculated by the method employed in Hayashi et al. (2019) using population projection by United Nations (2019).
Source:
1. Hayash, R. et al. (2019), 'Demand and Supply of Long-term Care for Older Persons in Asia', ERIA Research Project Report 2018, No.08. https://www.eria.org/publications/demand-and-supply-of-long-term-care-for-older-persons-in-asia/ (accessed 30 July 2021).
2. UN (2019).

4. Demand for Long-Term Care: Older Persons Living Alone

Figure B-6 shows the proportion of 65 years and over living alone in Asia, by subnational level where data is available. In FY 2018 study, it became apparent that older persons living alone in South Korea are more abundant than the neighbouring countries such as Japan (Hayashi et al., 2019). A not negligible number of subnational provinces/districts in East and Southeast Asia have a high proportion of older persons living alone. The difference becomes even more apparent when the scope is expanded to South, Central, and West Asia. The proportion is low in most of countries in South Asia, but high in Iran and countries in Central Asia. Outside of Asia, European countries have extremely high proportions of older persons living alone, while proportions in Africa vary substantially. In short, the proportion of older persons living alone varies amongst countries and is independent of the level economy or development.

Figure B-6. Proportion of Older Persons 65+ Years Living Alone



Note: Map created by shapefile of Natural Earth (https://www.naturalearthdata.com/) and GADM (https://gadm.org/) using QGIS Geographic Information System.

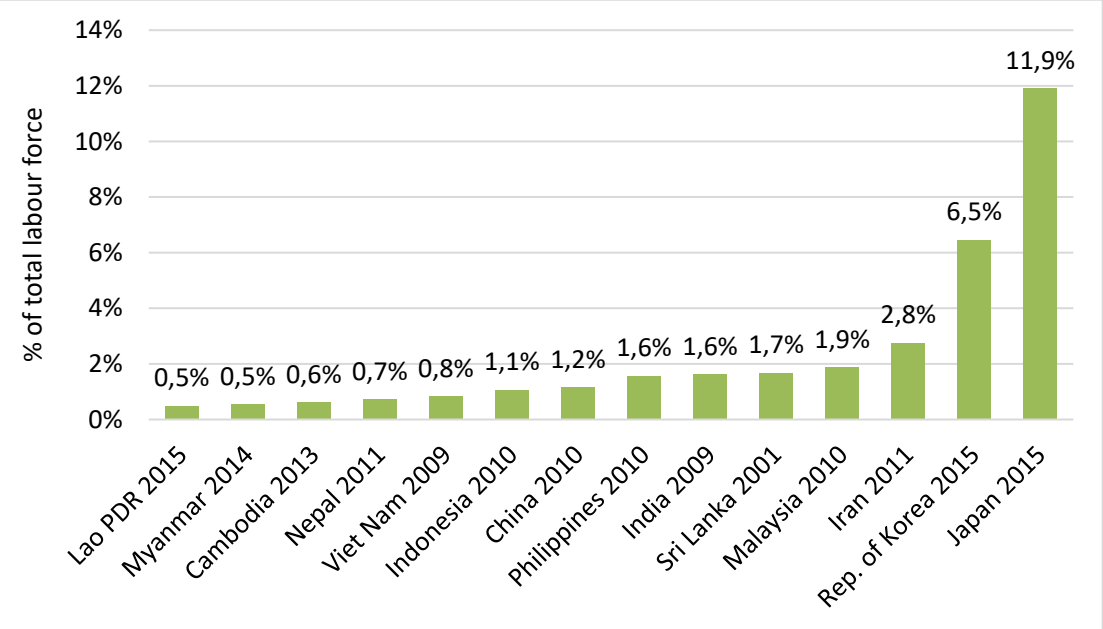
Sources:

Sub-national level data by censuses listed in Table B-1. Country-level data by United Nations, Department of Economic and Social Affairs, Population Division (2018), Households and Living Arrangements of Older Persons 2018. https://population.un.org/LivingArrangements/index.html#!/countries/840.

5. Supply of Long-Term Care: Workforce

The size of the health and social work industry, as defined by the International Standard Industrial Classification of All Economic Activities (ISIC), depends largely on the development of society. Using available census data listed in Table B-1, the percentage of labor force employed in the health and social work industry is calculated. It spans from 11.9% in Japan, 6.5% in the Republic of Korea, 0.5% in Myanmar, to 0.2% in Laos (Figure B-7).

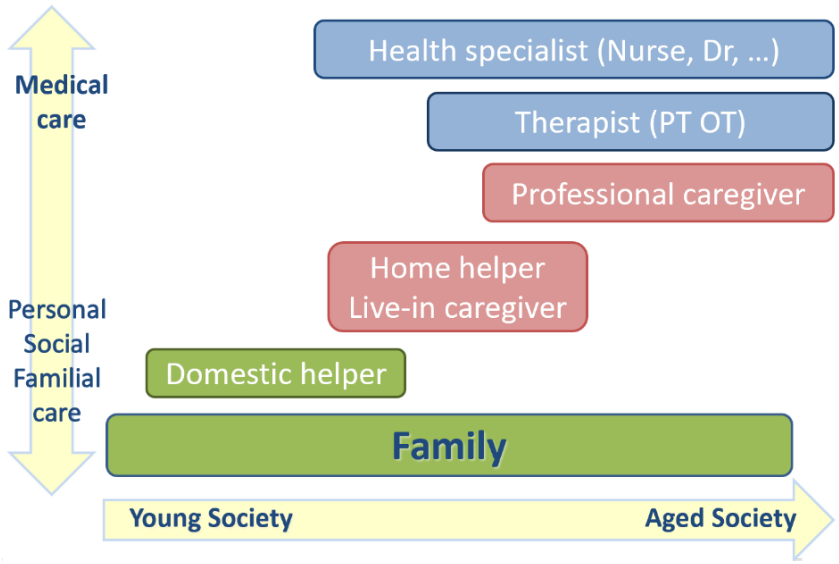
Figure B-7. Employed in Health Care and Social Work



Note: Lao PDR = the Lao People's Democratic Republic
Source: Population censuses listed in Table B-1.

Previously, it was found that long-term care workers are scarce in middle- and low-income countries (Hayashi et al.2019). Most of those employed in the health and social work industry are in health and medical services and those employed in social work, which includes long term care for older persons, are scarce. In some countries, where family members are expected to care for their elderly, occupation categories for long-term care of older persons do not exist. When the needs arise, for example, in China (including Taiwan and Hong Kong) or Singapore, the traditional domestic worker becomes a live-in caregiver. As the population ages, the professional caregiver emerges and coexists with health specialists such as nurses, doctors, and physical or occupational therapists. In young societies, where the need for long-term care is not prevalent, conventional domestic helpers take on the role of providing long-term care at home. In both societies, young or aged, family is always there to provide the care. These situations are summarised in Figure B-8.

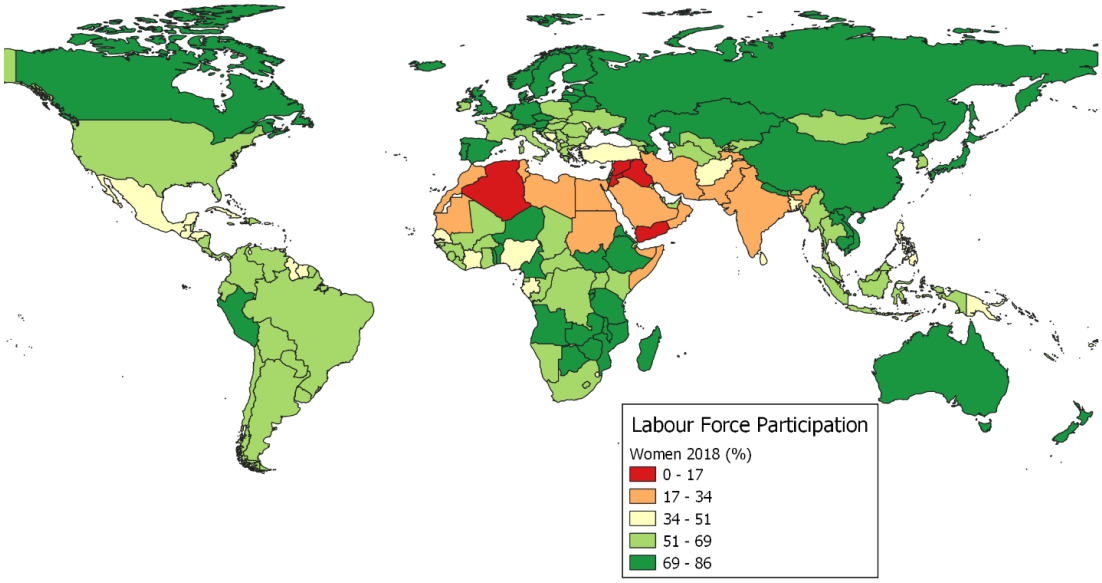
Figure B-8. Long-Term Care Providers for Older Persons



Source: Authors.

The situation in South Asia is similar to East and Southeast Asia. The family is in charge of long-term care, and the professions of long-term care workers are not yet developed. However, there are striking differences; in South Asia, the proportion of older persons co-habiting with family is very high and female labour participation is very low. Only 24.8% of Indians, 25.2% of Pakistani, 38.2% of Sri Lankan women participate in the labour force (Figure B-9). The proportion has declined even more in recent years (Dasgupta, 2016). West Asia also has low proportion of female in the labour force.

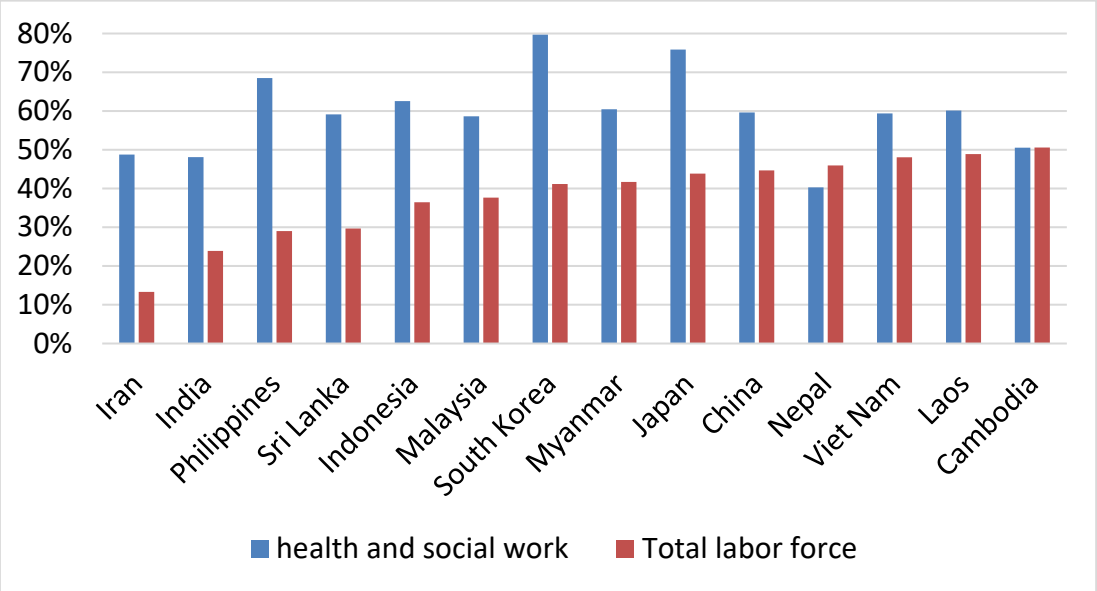
Figure B-9. Labour Force Participation of Women by Country, 2018



Note: Map created by shapefile of Natural Earth and GADM using QGIS Geographic Information System.
Source: World Development Indicators, modelled ILO estimate, Last updated 2019/7/10.

For example in Cambodia, the total labour force is half women (50.6%) and half men, but in India, only 23.9% of the total labour force is women. However, if we limit the labour force of the health and social work industry, a sector that requires both women and men to do the job, the share of females is not so different between countries. For instance, as shown in Figure B-10, the female proportion of the health and social work labour force is similar in Cambodia (50.5%) and India (48.1%). In many other countries, females comprise more than half of the labour force in the industry: 79.9% in South Korea, 75.9% in Japan, and 68.5% in the Philippines. There are occupation-specific gender imbalances; most doctors are men, and most nurses are women. Suppose there are many nurses in the workforce, the female dominancy increases, which would explain the case of South Korea and Japan. The occupational gender imbalance might cause various problems according to the country context. For example, if there are only male doctors, some women would refrain from getting necessary health care such as gynecological examination. If there are only women nurses, men who want to become a nurse are shut out from the workforce, and diversity in the workplace will be reduced. Although gender balance is becoming improved recently, so far at present, the health and social work industry is a promising field for women's participation in the labour force.

Figure B-10. Females in the Labour Force, Asia



Source: Population censuses listed in Table B-1.

6. Supply of Long-Term Care: Care Facilities

In societies where the family member provides care for the disabled older persons, the long-term care facility is not very common. However, even in these societies, the welfare facilities for older persons exist to provide a place to live for those who cannot live with their families for various reasons. These facilities are maintained either by the government as social welfare policy (e.g. Viet Nam and Japan before the Act on Social Welfare for the Elderly enacted in 1963); by religious organisations (e.g. Sri Lanka); or by charities (e.g. Bangladesh). Along with the increase in the number of older persons, elderly facilities specialised in giving long-term care emerge (e.g. China, Japan, South Korea, and many high-income countries). Figure B-11 shows examples of social welfare elderly facilities and specialised long-term care facilities. These two facility types are not necessarily related to each other, but in countries with limited resources where specialised long-term care facilities are not prevalent, social welfare elderly facilities can be the starting point in responding to the need.

Figure B-11. Elderly Facilities, Asia

(a) Social Welfare Facility

Ben Tre, Viet Nam	Gazipur, Bangladesh	Colombo, Sri Lanka

(b) Specialised Long-Term Care Facility

Hangzhou, China	Taiwan, China	Niigata, Japan

Source: Authors.

7. Conclusion

Asia must cope with the speed and surge of older persons, especially those who need care, as it faces waves of population ageing. The family is the base for giving long-term care, but the living arrangement of older persons differ considerably. The long-term care industry needs to be developed, but policy is needed to improve them, especially for the workforce that provides the care. Family support systems that utilise a network of community services are required. Existing welfare-based infrastructure should be recognised and developed to respond to increasing needs in the near future.

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Part C

Analysis of the Viet Nam Population Database

1. Introduction

Collecting accurate data on population is the first step to achieving Sustainable Development Goals (SDGs). In most countries of the world, population census, covering everybody living in the national boundary, is organised at least once in 10 years. The universal coverage of birth registration is one of the targets of the SDGs (16.9), and in many countries, the coverage has increased. However, death registration coverage remains low in many countries.

Various attempts are being made to improve population data in Asia. In Viet Nam, birth registration coverage is as high as 95%, but there is no official publication on death registration coverage (UN, 2021). So, there is ample space for the improvement of the death registration.

To obtain population information, the General Office for Population and Family Planning (GOPFP), Ministry of Health, Viet Nam, developed a system of population and family planning (PFP) database. It is based on Decision No.18/QD-TCDS dated 17/3/2016 of the General Department of Population, Ministry of Health. The PFP database covers the total population of Viet Nam through the activities of the GOPFP. The 150,000 PFP collaborators throughout the country collect population information while conducting Information Education Communication (IEC) activities for family planning and providing contraceptives (GOPFP, 2019). The information is reported from 11,159 communes to 713 districts in 63 provinces and integrated at the national level. The information collected is contraceptive use, birth, death, migration, along with basic demographic information.

This database is one of many databases existing in the country's ministries. Ministry of Health owns other databases on other health topics while the General Statistics Office (GSO) conducts censuses and sample surveys to obtain similar population information. Also, the Ministry of Justice and Ministry of Public Security are in charge of civil registration based population databases (Linh, 2017). At present, a coordination mechanism is deemed important.

As the PFP database covers the total population in Viet Nam with periodical updates by PFP collaborators, it can be a good data source and could improve the national population data infrastructure. This research aims to describe the PFP database system, its data quality, and its characteristics.

2. System of Information Collection and Database Structure

The PFP database is created with the information collected from each family in Viet Nam by PFP collaborators (Cộng tác viên, sometimes referred to as "CTV"), coordinated by one population officer at each commune. Then the information is gathered by districts in 713 *CƠ SỞ DỮ LIỆU* (CSDL), or database; by provinces in 63 CSDL; and, at the national level in one CSDL. The stored data in clouds are used through VPN-PFP by users (Figure C-1). The data is composed of following items (Figure C-2);

1. Nine basic items of information: address, name, relationship to the household head, sex, date of birth, ethnic, education, marital status, and resident status,
2. Contraceptive use for women 15-49,
3. Vital events (birth and death),
4. Moving in and out, and
5. Change of basic information.

The form, coded as A0, used by the PFP collaborators and the population officers, is shown in Figure C-3.

Figure C-1. System of Data Collection

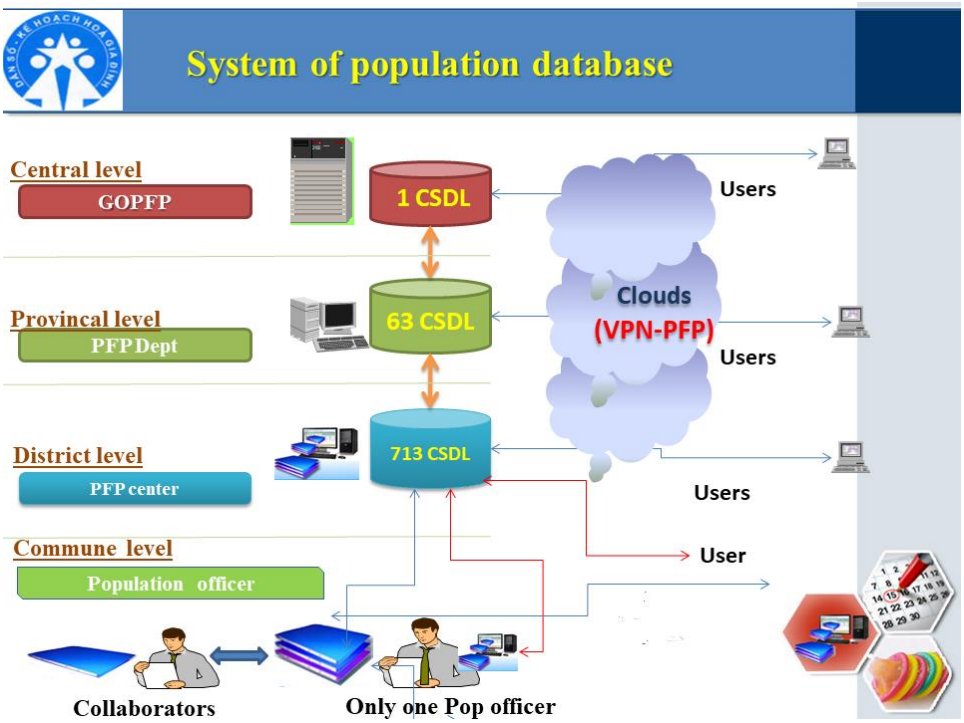


Figure C-2. Information Collected

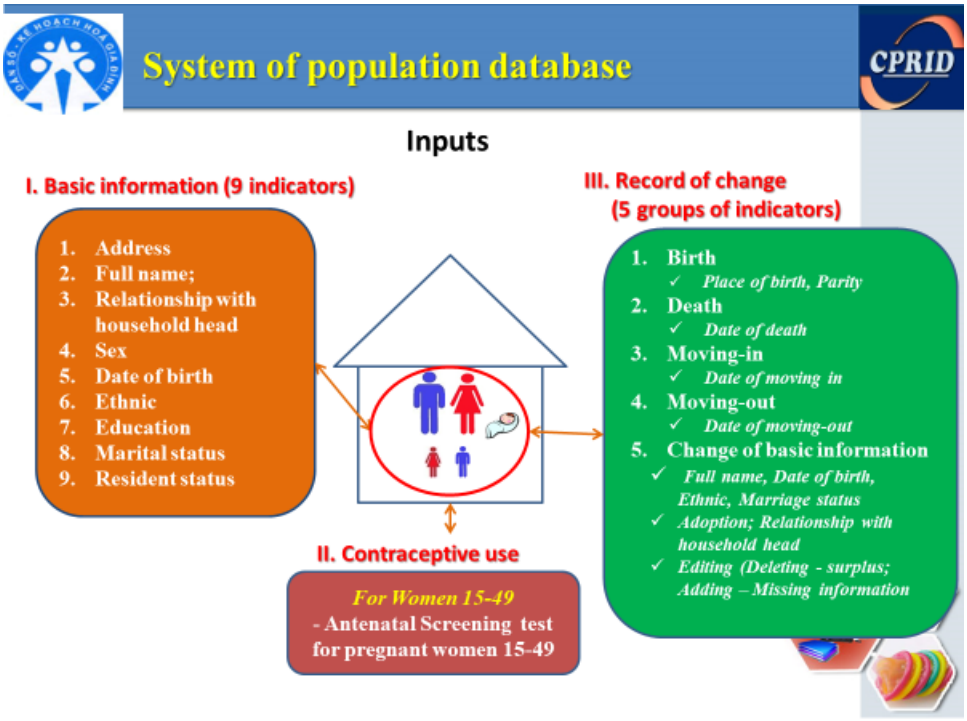


Figure C-3. Form A0 for Information Collection

Vietnamese

I - THÔNG TIN CƠ BẢN HỘ SỐ: 00003

Địa chỉ hộ: Trần Thị Điền, Kv Kim Châu1, Phường Bình Định

Số TT	Họ và tên	Quan hệ với chủ hộ	Giới tính	Ngày sinh	Dân tộc	Trình độ học vấn	Tình trạng hôn nhân	Tình trạng cư trú
1	TRẦN THỊ ĐIỀN	Chủ hộ	Nữ	15/11/1959	Kinh	TH/0	Có chồng	
2	NGUYỄN NGỌC LỰC	Chồng	Nam	10/10/1956	Kinh	CS/0	Có vợ	
3	NGUYỄN TIẾN NGHĨA	Con	Nam	06/06/1979	Kinh	CS/0	Có vợ	
4	PHẠM THỊ KIM HÀ	Con dâu/con nuôi	Nữ	19/10/1978	Kinh	CS/0	Có chồng	
5	VÕ THỊ ĐỒNG	Mẹ	Nữ	01/01/1940	Kinh		Góa	
6	NGUYỄN THÁI BÌNH	Cháu	Nam	06/02/2003	Kinh	CS/0		
7	NGUYỄN THU THẢO	Cháu	Nữ	18/07/2007	Kinh	TH/0		

II. THEO DÕI SỬ DỤNG BPTT

Họ và tên: PHẠM THỊ KIM HÀ
Năm sinh: 1978 BPTT: 5
Tháng năm bắt đầu SDBPTT : 00/09/2009

Tháng	Năm				
	2016	2017	2018	2019	2020
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

III. THEO DÕI CÁC THAY ĐỔI

1. Trẻ mới sinh

(1) Họ và tên :.....
- Ngày sinh :...../...../.....
đẻ tại TYT [ ] nhà [ ] nơi khác [ ]
là con thứ..... của bà mẹ
(2) Họ và tên :.....
- Ngày sinh :...../...../.....
đẻ tại TYT [ ] nhà [ ] nơi khác [ ]
là con thứ..... của bà mẹ

2. Người chết

(1) Họ và tên :.....
Ngày chết :...../...../.....
(2) Họ và tên :.....
Ngày chết :...../...../.....

3. Chuyển đến từ xã khác

(1) Họ và tên :.....
Ngày đến :...../...../.....
(2) Họ và tên :.....
Ngày đến :...../...../.....
(3) Họ và tên :.....
Ngày đến :...../...../.....

4. Chuyển đi khỏi xã

(1) Họ và tên :.....
Ngày đi :...../...../.....
(2) Họ và tên :.....
Ngày đi :...../...../.....
(3) Họ và tên :.....

5. Thay đổi thông tin cơ bản

- Họ, tên; ngày sinh; dân tộc; hôn nhân.
- Nhận con nuôi; quan hệ với chủ hộ.
- Sửa sai; xóa do ghi thừa; thêm do ghi thiếu.

Ngày tháng năm	Ghi thay đổi	Tên

English

I. Basic information on household

Địa chỉ hộ: Trần Thị Điền, Kv Kim Châu1, Phường Bình Định

Số TT	Full name	Relationship to household head	Sex	Date of birth	Ethnic	Education	Marital status	Resident status
1	TRẦN THỊ ĐIỀN	Chủ hộ	Nữ	15/11/1959	Kinh	TH/0	Có chồng	
2	NGUYỄN NGỌC LỰC	Chồng	Nam	10/10/1956	Kinh	CS/0	Có vợ	
3	NGUYỄN TIẾN NGHĨA	Con	Nam	06/06/1979	Kinh	CS/0	Có vợ	
4	PHẠM THỊ KIM HÀ	Con dâu/con nuôi	Nữ	19/10/1978	Kinh	CS/0	Có chồng	
5	VÕ THỊ ĐÓNG	Mẹ	Nữ	01/01/1940	Kinh		Góa	
6	NGUYỄN THÁI BÌNH	Cháu	Nam	06/02/2003	Kinh	CS/0		
7	NGUYỄN THU THẢO	Cháu	Nữ	18/07/2007	Kinh	TH/0		

II. Contraceptive use

Full name: KIM HA
Year of birth: T: 5
Beginning month: BPTT : 00/09/2009

Month	Year 2016	2017	2018	2019	2020
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

III. Record of change

1.New birth

(1) Họ và tên :..... Full name
- Ngày sinh :..... Date of birth

đẻ tại TYT [ ] nhà [ ] nơi khác [ ]
là con thứ..... của bà mẹ

(2) Họ và tên :.....
- Ngày sinh :...../...../.....

đẻ tại TYT [ ] nhà [ ] nơi khác [ ]
là con thứ..... của bà mẹ

2.Death

(1) Họ và tên :..... Full name
Ngày chết :...../...../..... Date of death

(2) Họ và tên :.....
Ngày chết :...../...../.....

3. In from another commune

(1) Họ và tên :... Full name
Ngày đến :... Date of moving in

(2) Họ và tên :.....
Ngày đến :...../...../.....

(3) Họ và tên :.....
Ngày đến :...../...../.....

4. Out to another commune

(1) Họ và tên :... Full name
Ngày đi :...../...../..... Date of moving out

(2) Họ và tên :.....
Ngày đi :...../...../.....

(3) Họ và tên :.....

5. Change of basic information

Full name; date of birth; Ethnic; marital status
Adoption, Relation to household head
Change; delete; add information

Date month year	Content of change	Name

Place of birth : health center of commune[ ] Home[ ] Other[ ]
The number order of child: [ ]th of mother

3. National Population

The PFP database was established in 1994, but the data is usable only since 2014. Out of the PFP database, the population and the number of deaths each year were tabulated for the period of 2014 to 2018. The tabulation summary is shown in Table C-1.

Table C-1. All Age Summary of Population and Deaths

Year	Population (p)	Pop. change	Survived births (b)	Deaths (d)	Cohort change (c)	Crude birth rate b/p	Crude death rate d/p	Cohort change rate c/p
2014	99,204,873		1,618,899	370,562		1.63%	0.38%	
2015	99,122,336	-82,537	1,581,897	374,279	1,664,424	1.60%	0.38%	1.68%
2016	98,140,948	-981,388	1,346,361	388,310	2,327,739	1.37%	0.40%	2.37%
2017	97,610,666	-530,282	1,326,236	377,942	1,856,508	1.36%	0.39%	1.90%
2018	97,453,401	-157,265	1,204,799	369,002	1,362,054	1.24%	0.38%	1.40%

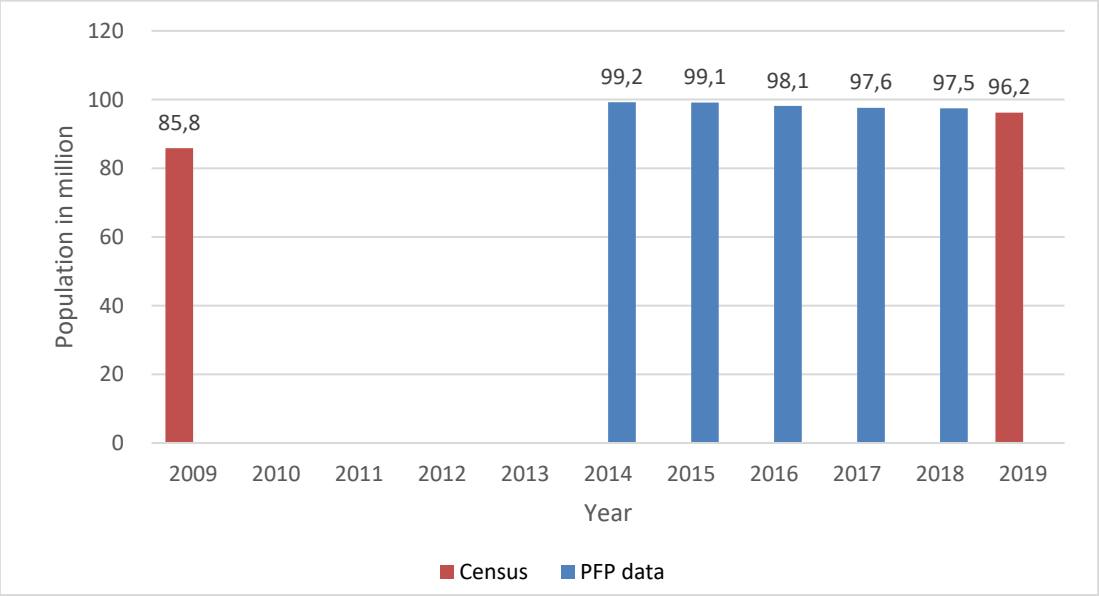
Notes:
1. Survived birth is defined here as the number of persons whose birth year is the same as the tabulation year.
2. Cohort change of year x is the sum of (population of year x – population of year x-1 – deaths) of each birth year.

Source: Population and Family Planning database tabulation.

Since the PFP database is counted at the end of each year and the population census of 2019 was conducted on April 1, there is only a three-month difference between them. The total population of 2018 in the PFP database is 97,453,401 and population census 2019 is 96,208,984 (GSO, 2020). The PFP data is only 1.2 million, or 1.3%, more than the population census.

The trends of the two data are opposite, but they converged. The population of PFP data declined from 2014 (99,204,873) to 2018, with an annual decrease rate of 0.44%. As for the population census, it increased from 85,846,997 in 2009 to 2019, an annual increase rate of 1.15% (Figure C-4).

Figure C-4. Population by PFP Database and Population Census



Source: Population and Family Planning database tabulation and population census by General Statistics Office.

In this study, the PFP database was tabulated to produce population and deaths by birth year. Birth data was not tabulated, but could be approximated by the number of births and deaths of the first birth year population. Thus approximated crude birth rate is 1.63% in 2014 and 1.24% in 2018, monotonously declining throughout the period. The rate is lower compared to the GSO survey rate of 1.60% in 2016 (GSO, 2017). However, as it did not include births that ended in death within the same year, the real birth rate can be higher and possibly the same level as the GSO survey indicator.

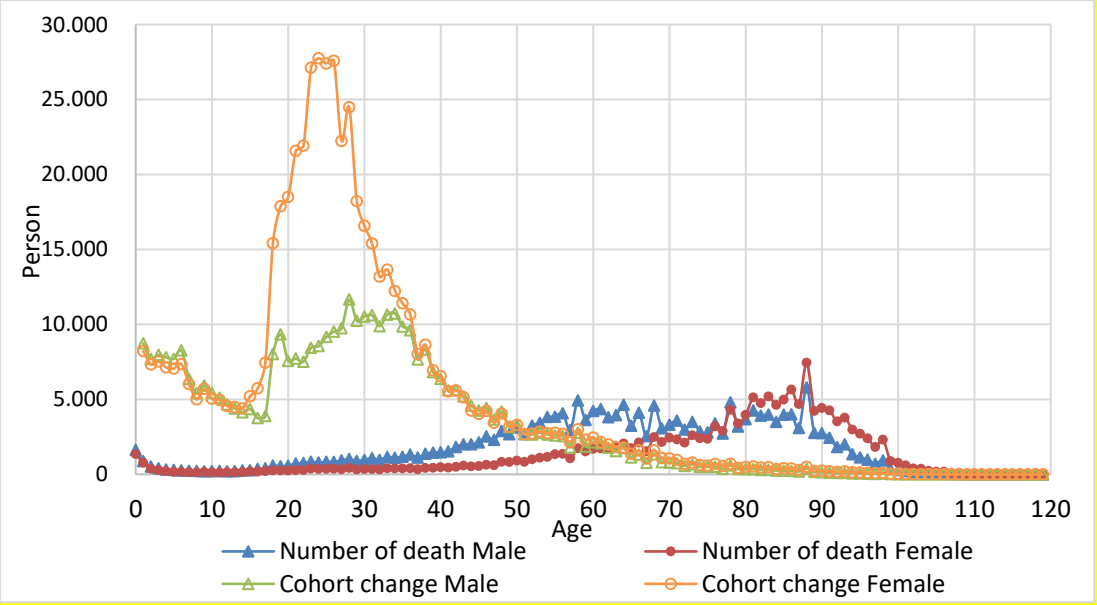
The crude death rate calculated from the PFP database (the sum of all deaths for all ages divided by total population) is within the range of 0.38 to 0.40%, substantially lower than the rate of 0.68%, reported by the GSO survey in 2016. This difference could be due to the under-registration of deaths.

On the other hand, as the PFP database tabulation includes population by birth year, we can calculate annual cohort change, the difference of population of birth year x in consecutive years. The cohort change is composed of deaths and international migration if the population is correctly registered. Figure C-5 shows the number of deaths and cohort change by age. The level of cohort change is high for young adults around their 20s, especially for women. For example, 27,751 women aged 24 (born in 1994) decreased in 2018 from 2017, not including those registered dead (362 persons). This high rate of 'disappearance' of young women in the database might be due to de-registration, considering the PFP database is for family planning. It would be improbable that so many young women move out of the country, more than the young men of the same age. Suppose we assume the cohort change is due to international migration, the number of international migrants becomes 993,062 or 1.02% of

the total population in 2018. It is around 12 times higher than the existing estimate of the United Nations, of 80,000 persons per year (UN, 2019).

The large cohort change decreases by age. For older age, the number of deaths is more than the cohort change.

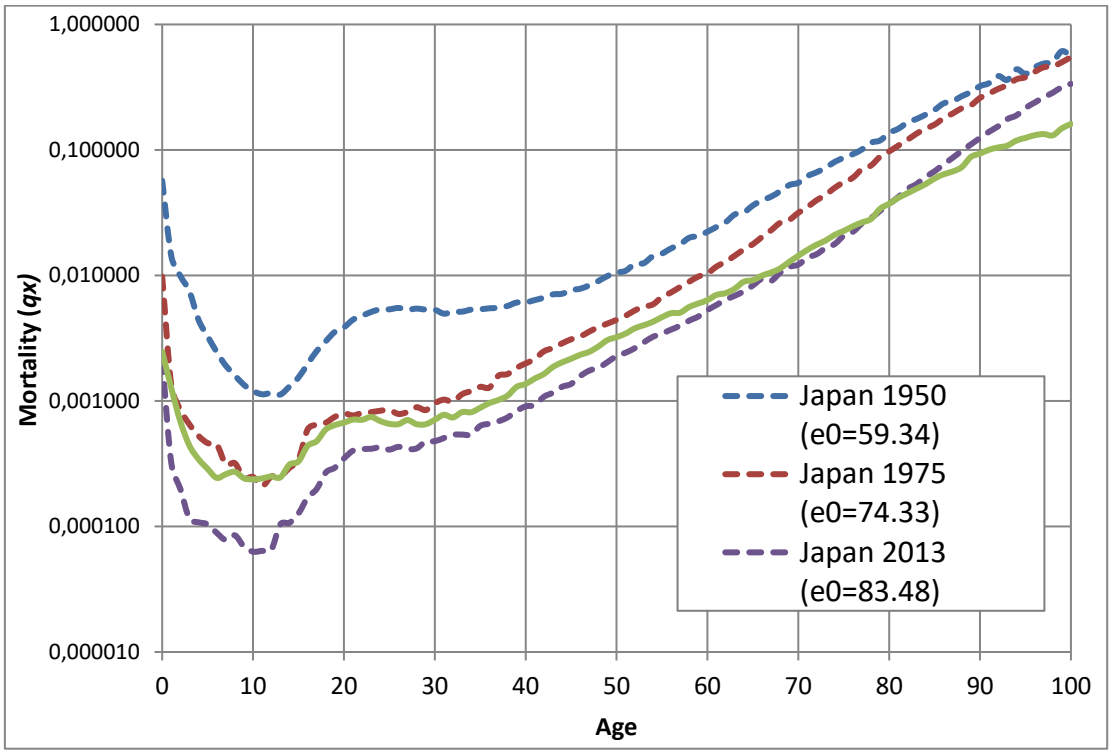
Figure C-5. Number of Deaths and Cohort Change by Age, 2018



Source: Population and Family Planning database tabulation.

Figure C-6 shows the age-specific mortality derived from PFP database compared with Japan for 1950, 1975, and 2013. Considering the life expectancy of Viet Nam in 2016 was 73.4 years (GSO, 2017), the mortality curve should be close to that of 1975 Japan, when the life expectancy was 74.33. Interestingly, the younger age up to 20s, the Vietnamese curve based on registered deaths is close to that of 1975 Japan. After that, the Vietnamese curve of registered deaths is substantially lower than that of Japan. From age 84, the Vietnamese mortality rate becomes lower than the 2013 Japanese mortality, which means that Vietnamese over 85 die less than Japanese, or death registration of old age is not complete in PFP database. Probably the latter might be true as the life expectancy in 2013 Japan is longer than Viet Nam in 2018.

Figure C-6. Age-specific Mortality, Viet Nam and Japan

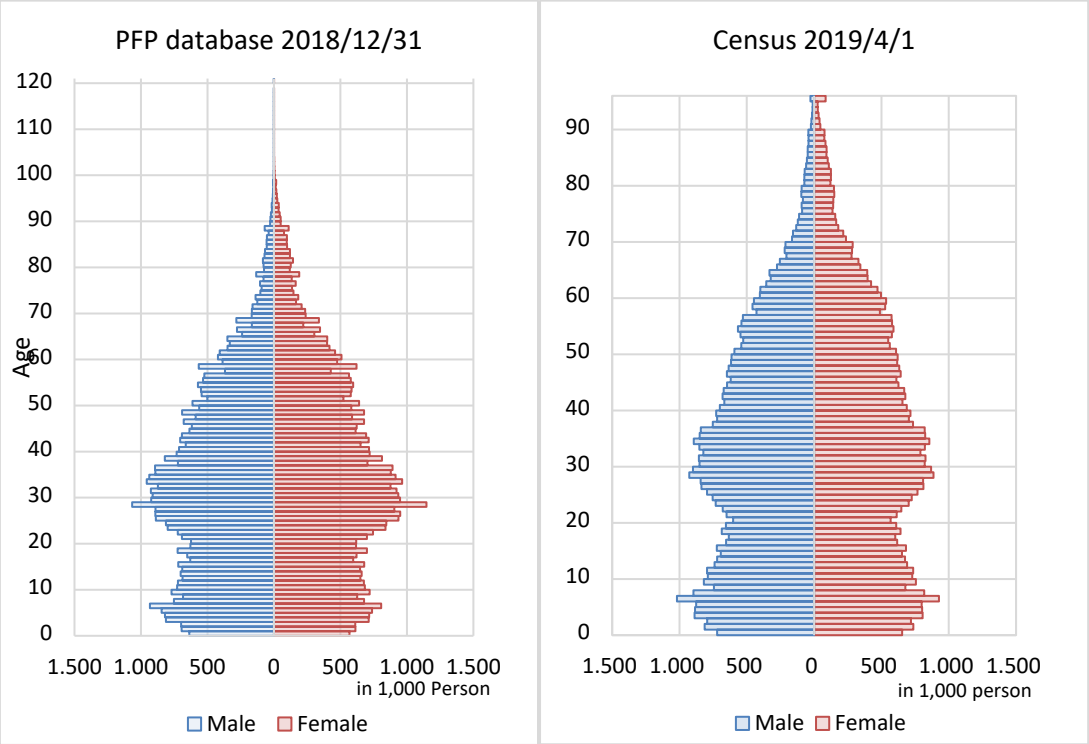


Sources: Population and Family Planning database for Viet Nam; Ministry of Health, Labour and Welfare, Japan (2021) Life Table.

The national population pyramid based on the PFP database, compared with that of the 2019 population census, is shown in Figure C-7. In the two pyramids, the overall age structure is similar. However, by age group, there are differences between the PFP database and population census. The percentage of children aged 0–14 is smaller, while persons aged 20–39 and elderly aged 75+ are larger in PFP data (Figure C-8). Although a significant decrease of young women cohort was found in the PFP 2018 data, the resulting population of that generation in the 2018 PFP data is larger than the census. It might suggest that PFP data overcounted young women of reproductive age, but the over-count is being corrected each year.

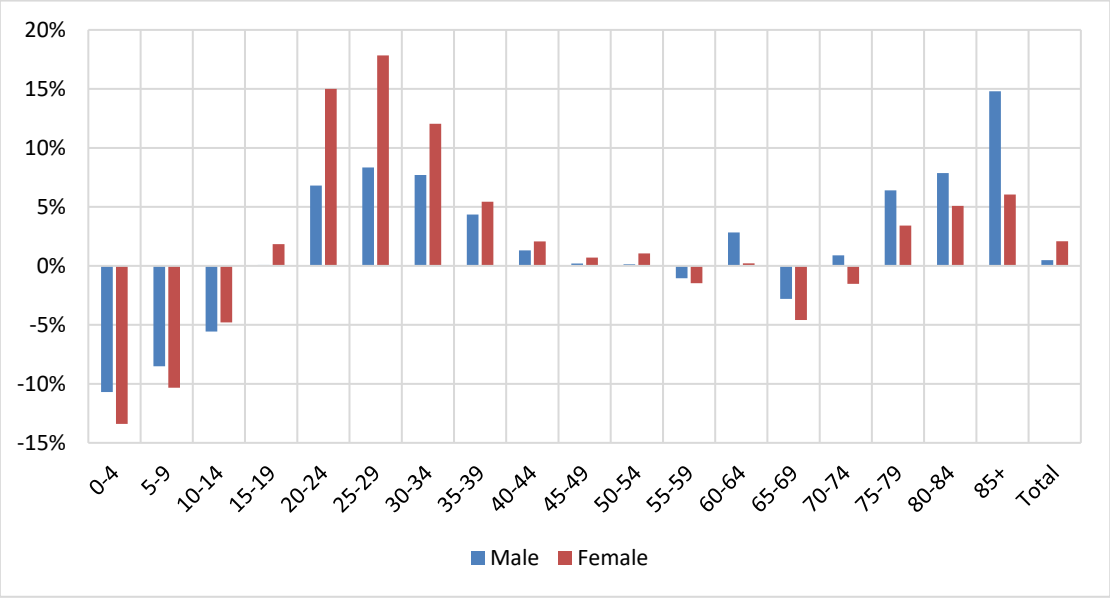
In the PFP data population pyramid, there is a striking increase of those born in 1990 for both men and women. The year 1990 corresponds to the silver horse year in the traditional calendar. Like the birth deficit of the fire horse year in Japan in 1966, or excess birth sex ratio in the Republic of Korea in 1990, the particular cultural aspect linked to the traditional calendar might have affected the number of babies in 1990. The absence of a sharp increase in the census population pyramid could be due to the difference in the survey date: census as of April 1 and PFP database as of the last day of the year.

Figure C-7. Population Pyramid, Viet Nam



Source: Population and Family Planning database tabulation and General Statistics Office of Viet Nam (2020), *Completed Results of the 2019 Viet Nam Population and Housing Census*.

Figure C-8. Difference of PFP Database (2018) and Population Census (2019) By Age Group

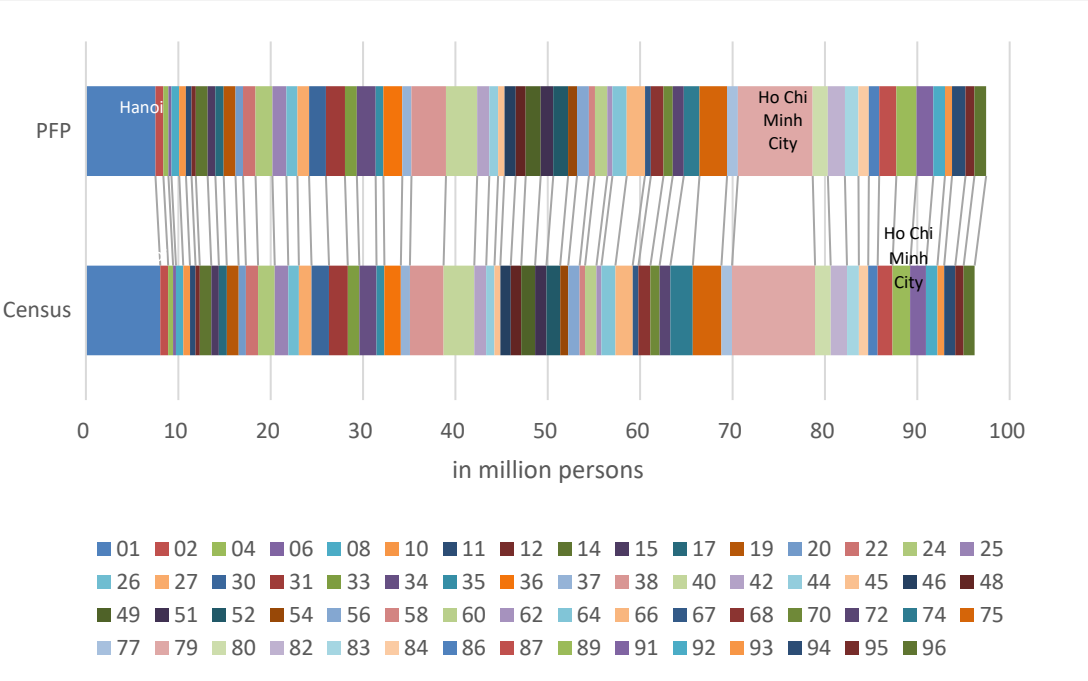


Source: Population and Family Planning database tabulation; General Statistics Office of Viet Nam (2020), *Completed Results of the 2019 Viet Nam Population and Housing Census*.

4. Provincial Population

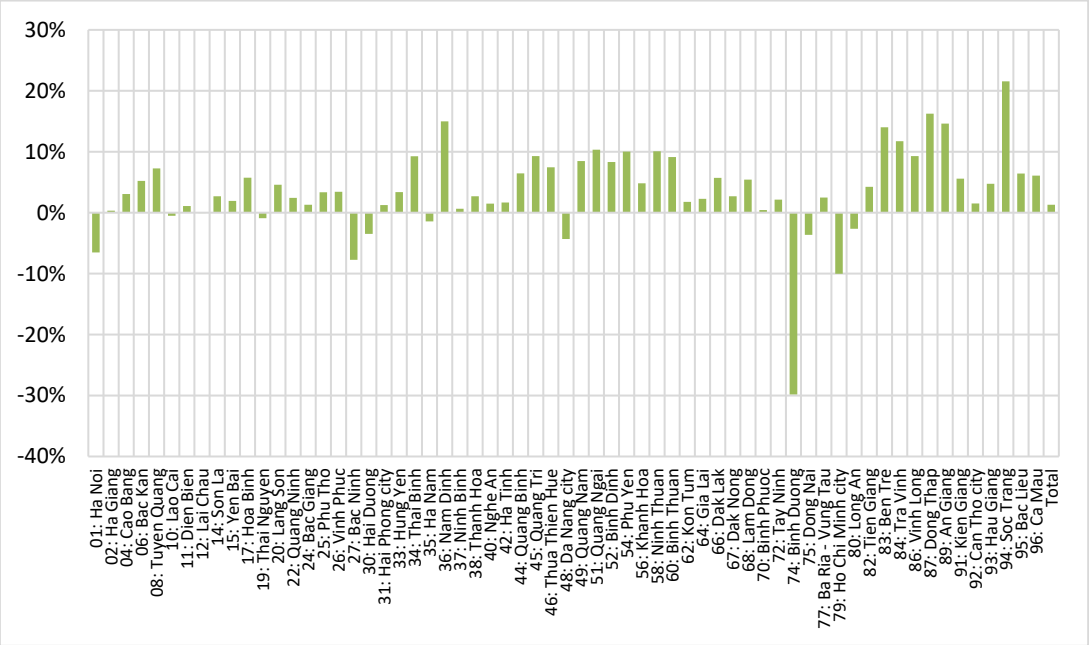
In this study, the PFP database was tabulated by 63 provinces. Compared to the 2019 population census, the composition of the provincial population of PFP data is similar (Figure C-9). The PFP data is larger for many provinces but smaller in some provinces (Figure C-10). In particular, Dinh Duong province population in PFP data is 30% smaller than census data (Figure C-11a). Dinh Duong province, situated at the north-east side of Ho Chi Minh City, the census figure grew substantially from 1.5 million in 2009 to 2.4 million in 2019. During the time, PFP data was stable around 1.7 million from 2014 to 2018. Possibly, the PFP database was not updated, or the counting method was different. In other provinces, population change in the PFP database from 2014 to 2018 is much smaller than census population change from 2009 to 2019.

Figure C-9. Population by Province, PFP Data (2018) and Population Census (2019)



Source: Population and Family Planning database tabulation; General Statistics Office of Viet Nam (2020), *Completed Results of the 2019 Viet Nam Population and Housing Census*.

Figure C-10. Difference of Population by Province, PFP Data (2018) / Population Census (2019)



Source: Population and Family Planning database tabulation; General Statistics Office of Viet Nam (2020), *Completed Results of the 2019 Viet Nam Population and Housing Census*.

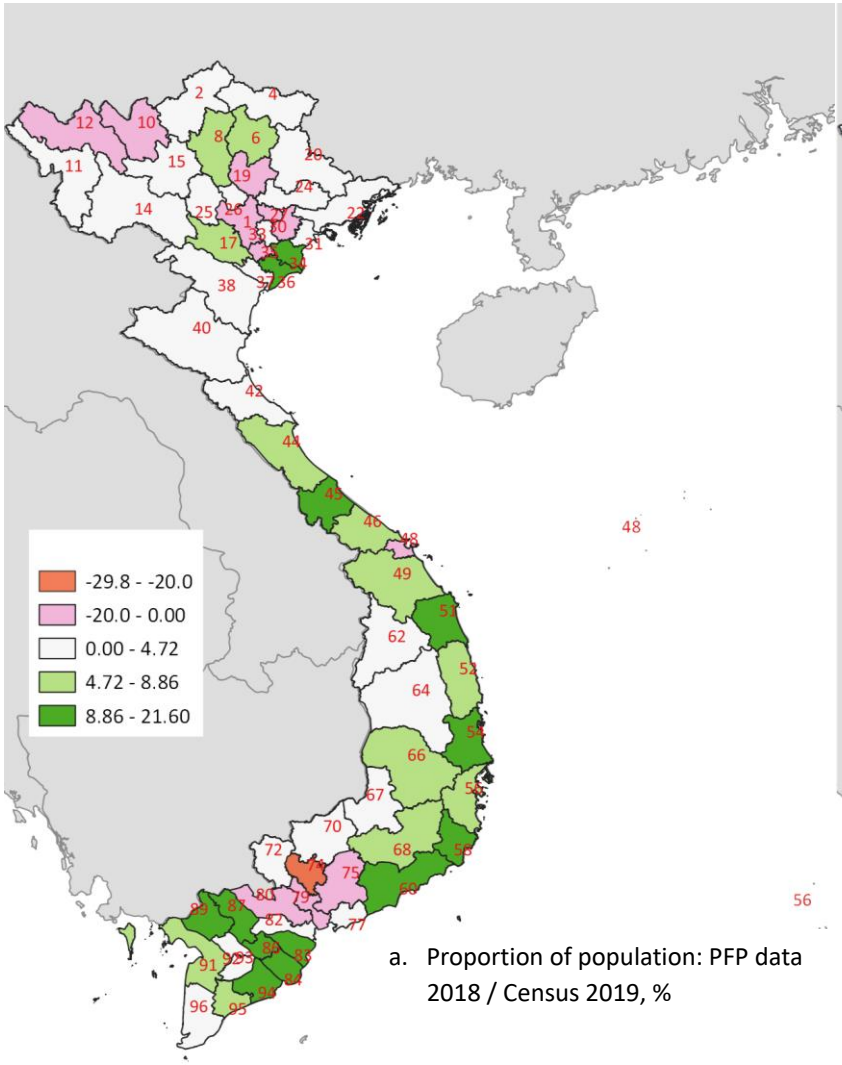
Provincial population pyramids share common traits (Annex Figure C-1). Two peaks of those born in 1990 (age 28) and 2012 (age 6) are observed. It can be the generational effect of the baby boom, with the first peak as the parents of the second. However, the relative size of the second baby boom is different for each province. There are even provinces where the second baby boom is hardly visible in the south, such as Ho Chi Minh City or Tien Giang. For the older generation, the decrease of people in their 50s in comparison to those in their 60s are visible in many provinces, notably in Hanoi.

Both crude birth rate and child-woman ratio show a low fertility trend in the southern provinces in the Mekong Delta region (Figure C-11c and 11d). On the contrary, both crude birth rate and child-woman ratio are high in the provinces in the Northeast region sharing the borders with China and the Lao People's Democratic Republic, and in the Central Highlands Region, especially Kon Tum Province.

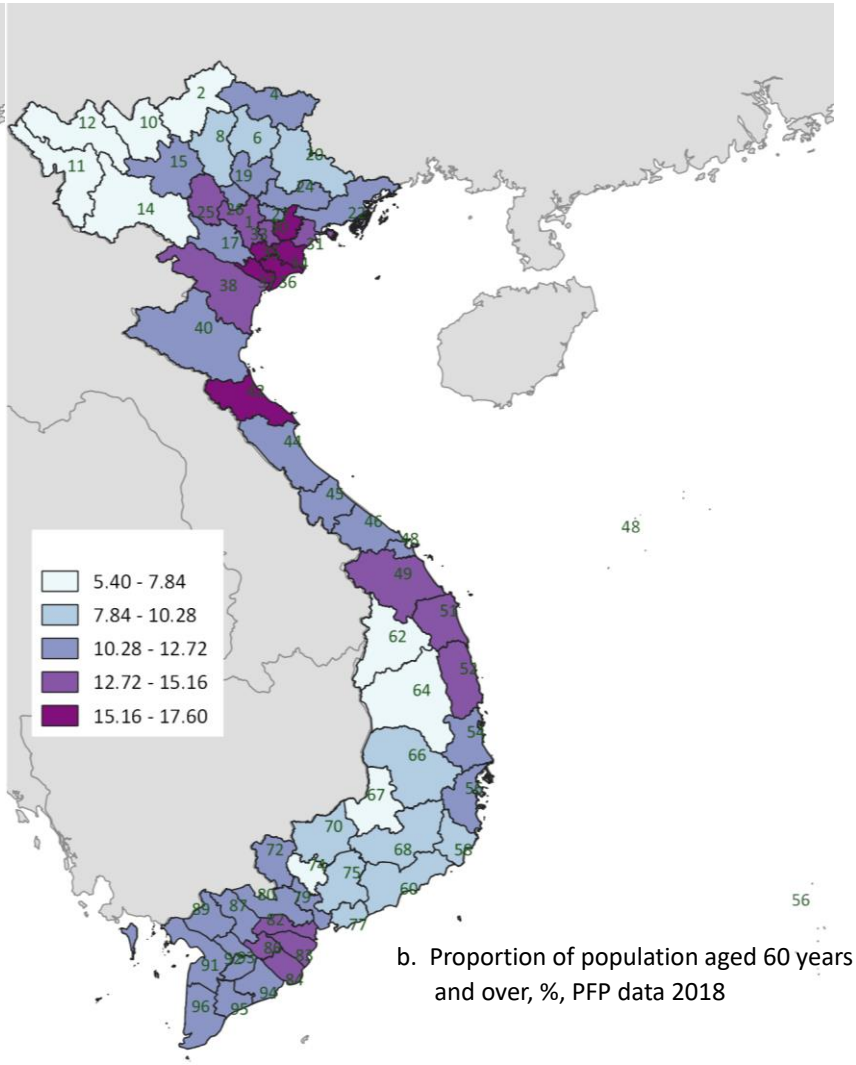
The mortality, measured as crude death rate and age-adjusted death rate, is high in the Northeast or Central Highlands regions and low in Hanoi or Ho Chi Minh City (Figures C-11e and 11f). This geographical distribution is the same as that of fertility. A clear correlation between fertility and mortality is found across provinces (Figure C-12).

The proportion of older persons aged 60 years and over is rather low in Hanoi and Ho Chi Minh City, but high in near-by provinces in the Mekong Delta and the Red River Delta Region (Figure C-11b). The high proportion of elderly in Ha Tinh Province is mysterious, as fertility and mortality are also high (Figure C-12).

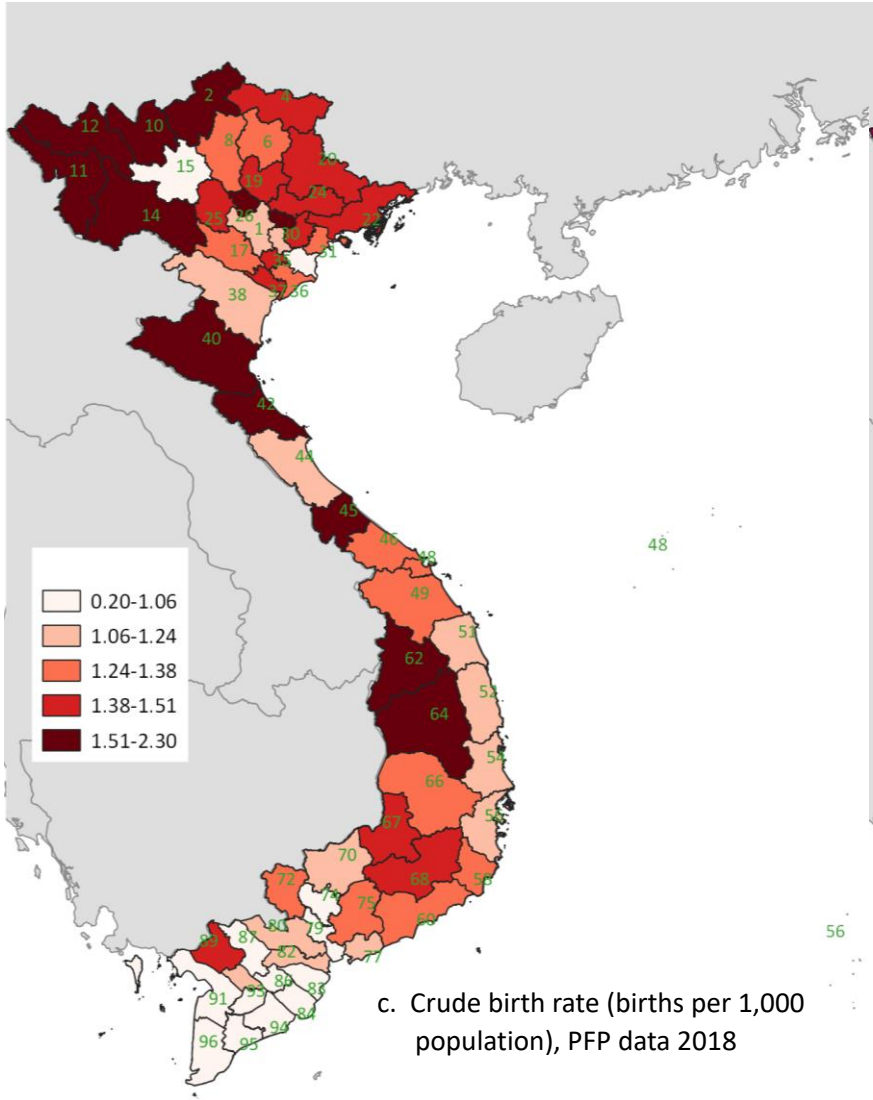
Figure C-11. PFP Data Indicators by Province, 2018



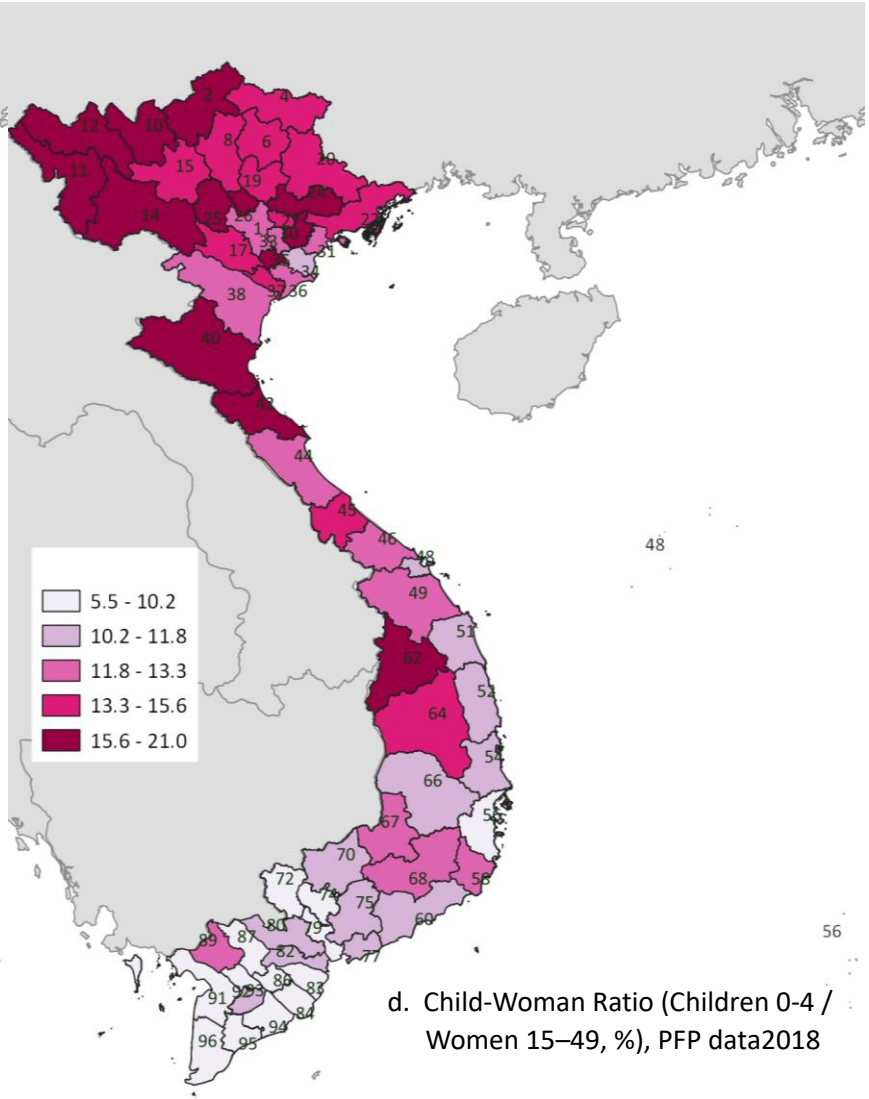
a. Proportion of population: PFP data 2018 / Census 2019, %



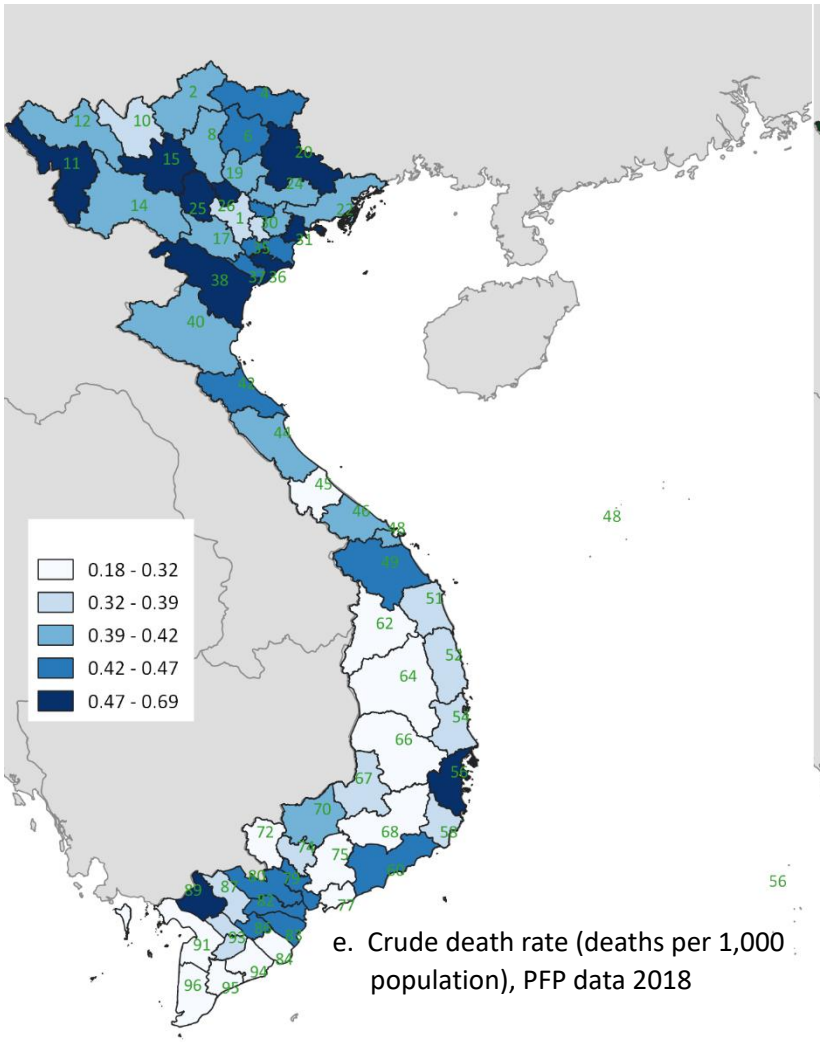
b. Proportion of population aged 60 years and over, %, PFP data 2018



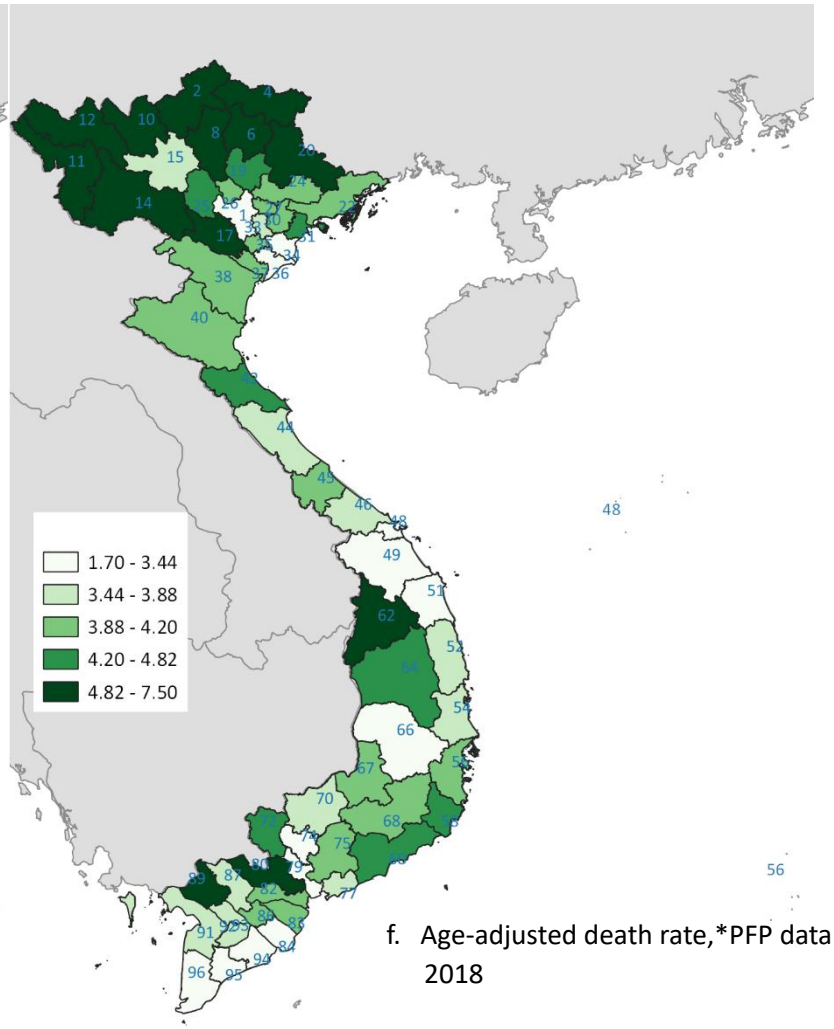
c. Crude birth rate (births per 1,000 population), PFP data 2018



d. Child-Woman Ratio (Children 0-4 / Women 15–49, %), PFP data2018



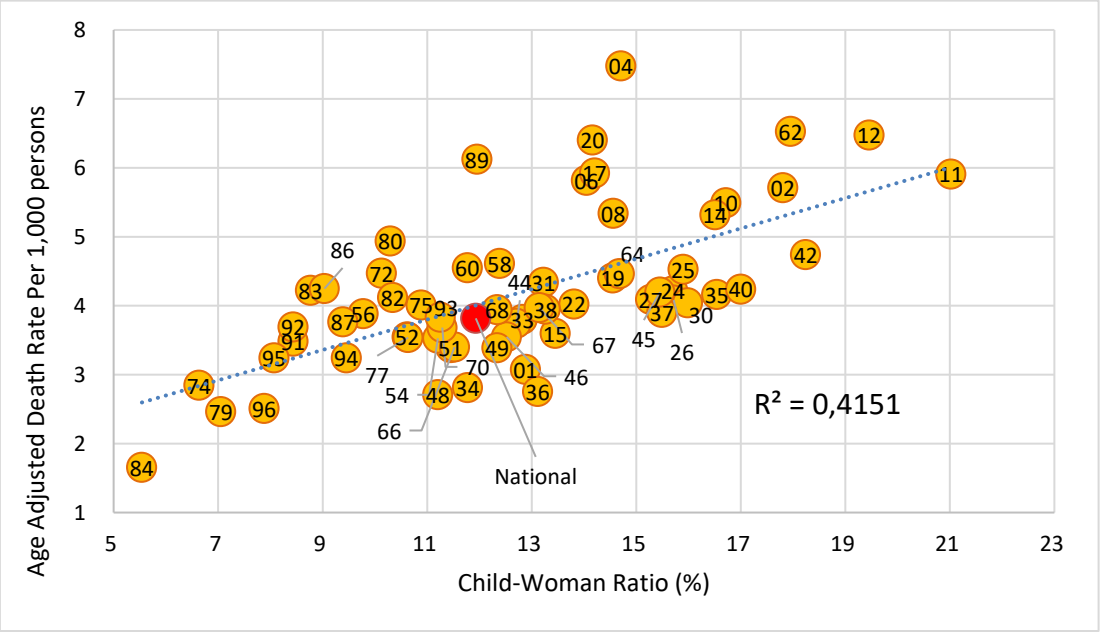
e. Crude death rate (deaths per 1,000 population), PFP data 2018



f. Age-adjusted death rate,*PFP data 2018

Note: Numbers on map are the province serial numbers listed in Table C-2.
Source: Population and Family Planning database tabulation

Figure C-12. Correlation of Fertility and Mortality, 2018



Note: Numbers are the province serial numbers listed in Table C-2.
Source: Population and Family Planning database tabulation.

Table C-2. Population of 63 Provinces, 2018

No	Province	Pop. 2018	No	Province	Pop. 2018
1	Ha Noi	7,527,455	49	Quang Nam	1,622,628
2	Ha Giang	857,459	51	Quang Ngai	1,359,091
4	Cao Bang	546,562	52	Binh Dinh	1,610,577
6	Bac Kan	330,265	54	Phu Yen	960,454
8	Tuyen Quang	841,826	56	Khanh Hoa	1,290,480
10	Lao Cai	726,706	58	Ninh Thuan	649,941
11	Dien Bien	605,418	60	Binh Thuan	1,343,181
12	Lai Chau	459,959	62	Kon Tum	550,059
14	Son La	1,281,986	64	Gia Lai	1,548,411
15	Yen Bai	836,881	66	Dak Lak	1,976,082
17	Hoa Binh	903,121	67	Dak Nong	638,933
19	Thai Nguyen	1,275,036	68	Lam Dong	1,367,311
20	Lang Son	817,514	70	Binh Phuoc	999,129
22	Quang Ninh	1,352,595	72	Tay Ninh	1,194,301
24	Bac Giang	1,827,489	74	Binh Duong	1,702,856
25	Phu Tho	1,512,937	75	Dong Nai	2,984,284
26	Vinh Phuc	1,190,592	77	Ba Ria - Vung Tau	1,176,818
27	Bac Ninh	1,263,026	79	Ho Chi Minh City	8,092,089
30	Hai Duong	1,826,500	80	Long An	1,644,097

31	Hai Phong city	2,054,170	82	Tien Giang	1,839,151
33	Hung Yen	1,294,958	83	Ben Tre	1,469,004
34	Thai Binh	2,032,704	84	Tra Vinh	1,127,467
35	Ha Nam	840,603	86	Vinh Long	1,117,830
36	Nam Dinh	2,047,159	87	Dong Thap	1,859,464
37	Ninh Binh	988,974	89	An Giang	2,187,237
38	Thanh Hoa	3,738,418	91	Kien Giang	1,819,240
40	Nghe An	3,377,609	92	Can Tho city	1,253,996
42	Ha Tinh	1,310,291	93	Hau Giang	767,821
44	Quang Binh	953,171	94	Soc Trang	1,458,350
45	Quang Tri	691,105	95	Bac Lieu	965,437
46	Thua Thien Hue	1,212,684	96	Ca Mau	1,267,228
48	Da Nang city	1,085,281		Total	97,453,401

Source: Population and Family Planning database tabulation.

5. Conclusion

In this study, the registered population database developed by the General Office for Population and Family Planning (GOPFP), Ministry of Health, Viet Nam, was examined in comparison to the population census and its characteristics were analyzed. From 2014 to 2018, the total population by the PFP database is slightly declining despite the increasing census population from 2009 to 2019. However, the latest PFP population in 2018 is close to the 2019 census population, with only a 1.3% difference. A significant cohort change is observed for the young women in PFP data, which might be due to the continuous update of the database to clear the over-registration in the prior period. The under registration of deaths is suspected especially in older ages.

The fertility and mortality trend is correlational and both rates are high in the Northeast and Central Highlands regions and low in Hanoi and Ho Chi Minh City. However, the proportion of elderly is high in the provinces near the two megacities, probably due to youth migration.

It is a common challenge to harmonise several population data based on census or registration in many countries. In Viet Nam, it is said that population registration is not universal, but many efforts are made by different authorities to measure population dynamics. The PFP database is one of those endeavours. While referring to the census, conducted every 10 years, the PFP database can monitor population trends annually or on the spot upon online registration. It provides vital statistics, the data on births, deaths, and migration by district, province and national level, which are the basic information on the population dynamics. It is a national framework of population base which are closely monitored by local authorities and PFP collaborators in the community. There would be great usefulness of the PFP database, which is an important information infrastructure for Viet Nam.

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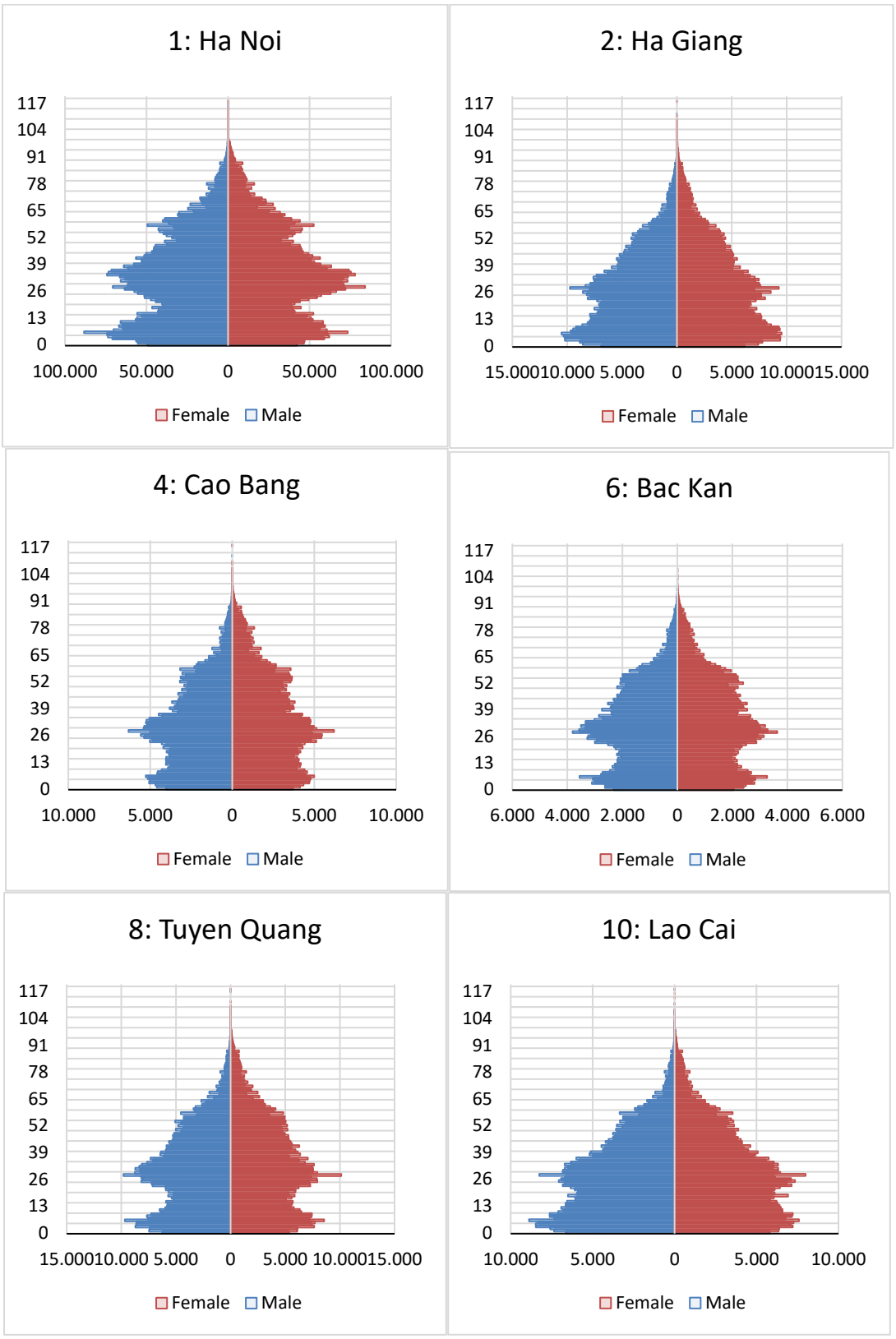
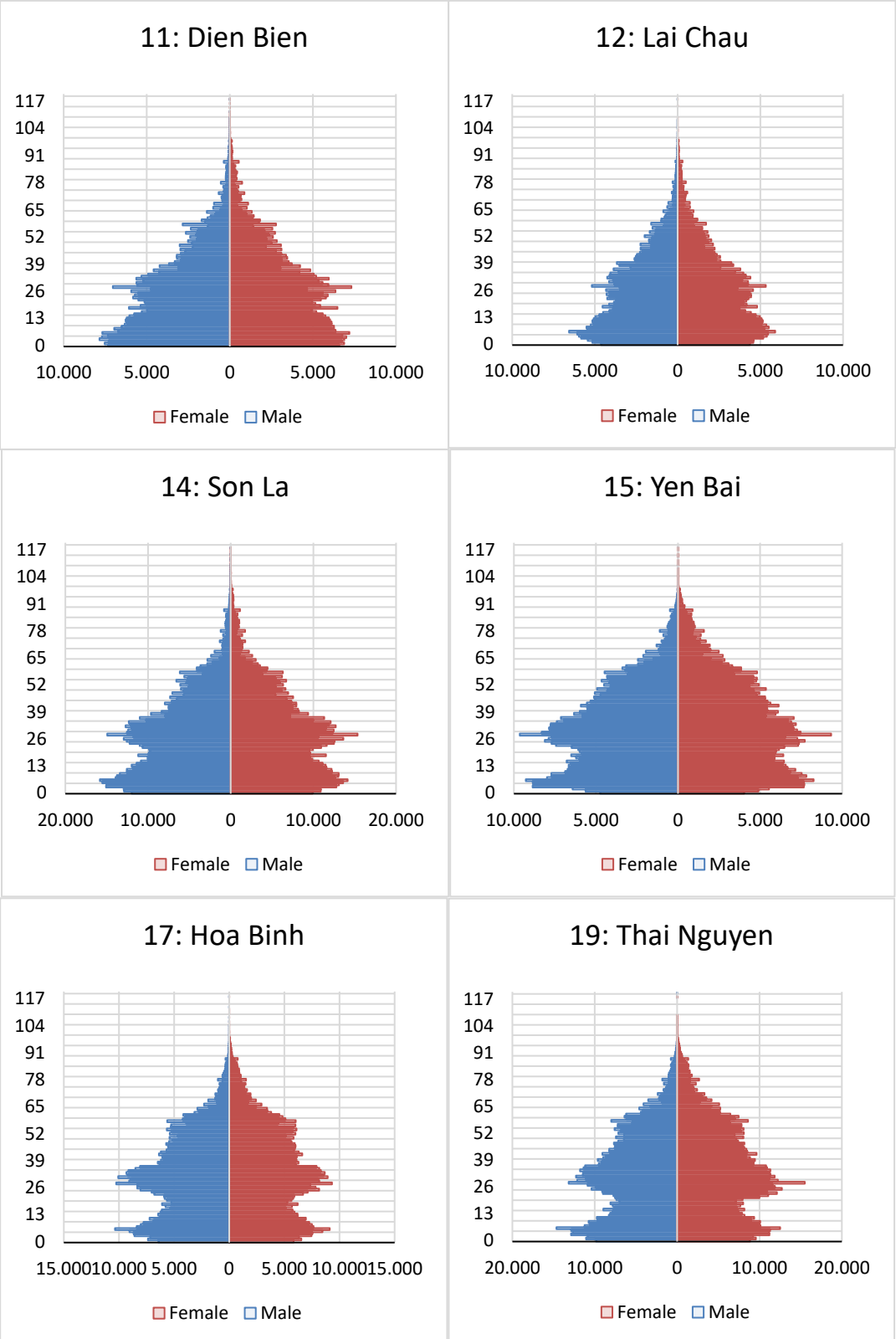
UN: United Nations, Department of Economic and Social Affairs, Statistics Division (2021), Coverage of Birth and Death Registration [data file]. https://unstats.un.org/unsd/demographic-social/crvs/index.cshtml.

UN: United Nations, Department of Economic and Social Affairs, Population Division (2019), *World Population Prospects: The 2019 Online Edition.* https://population.un.org/wpp/.

*All internet web addresses (URL) were accessed on 30 July 2021.

Annex Figure C-1. Population Pyramid by Province, 2018

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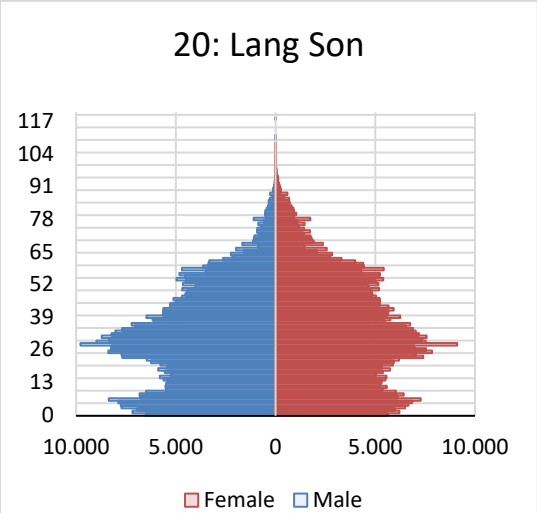
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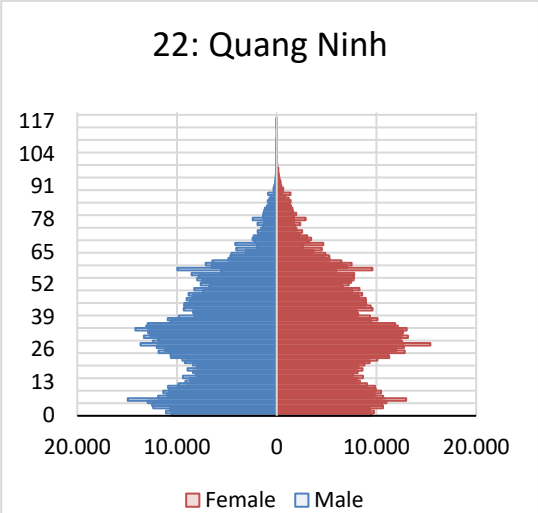
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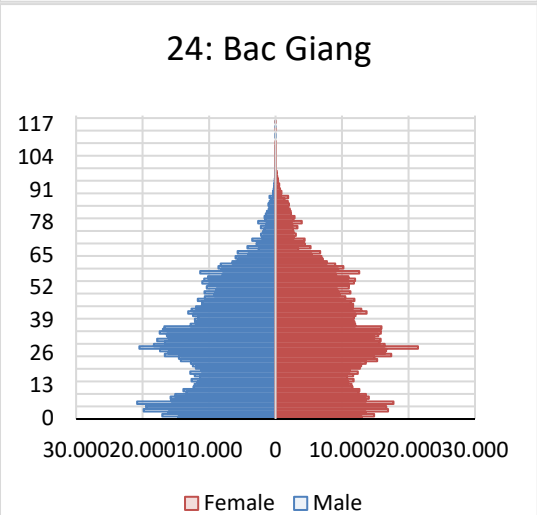
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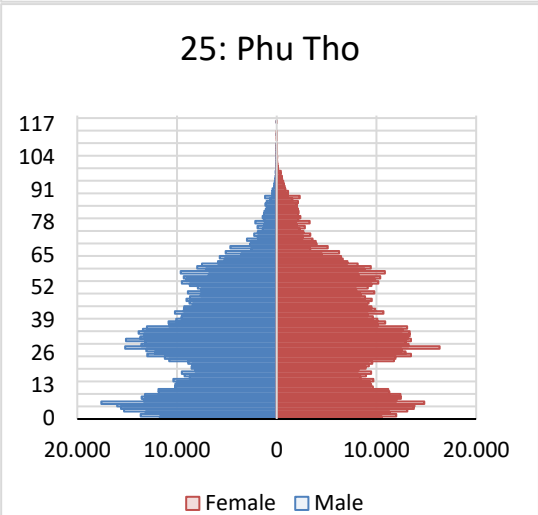
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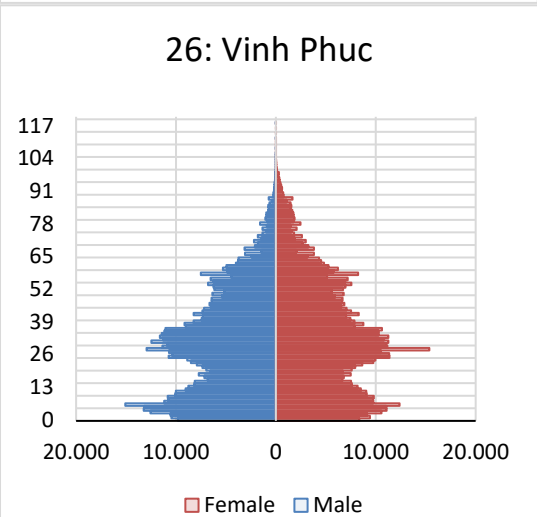
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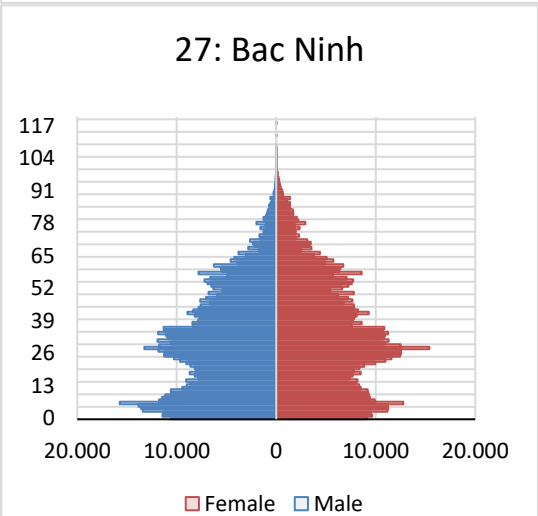
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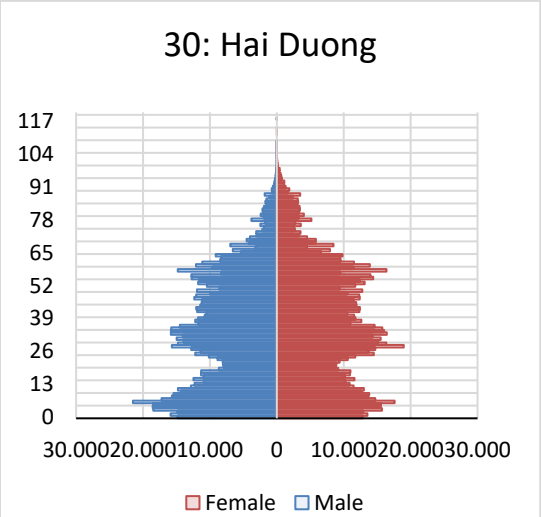
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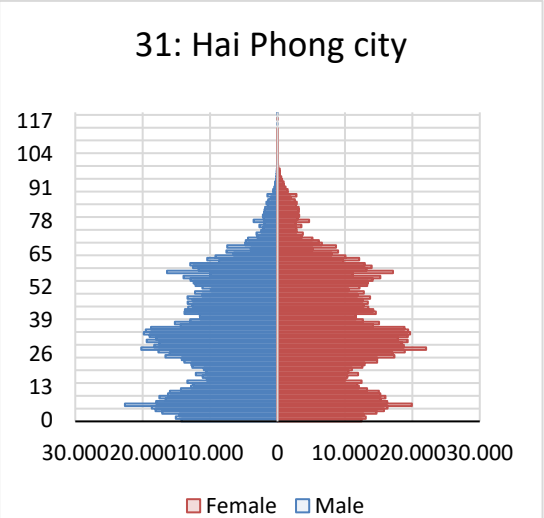
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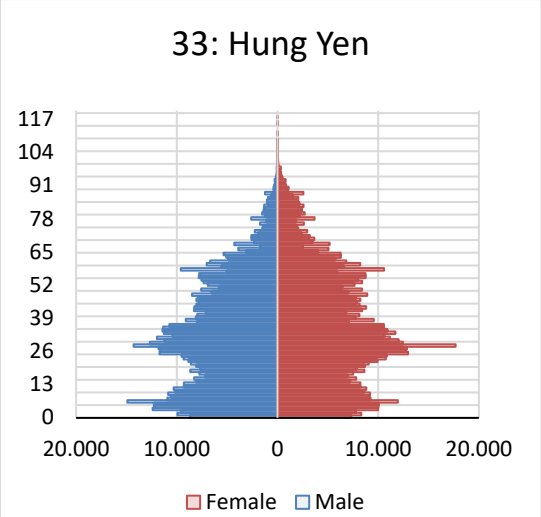
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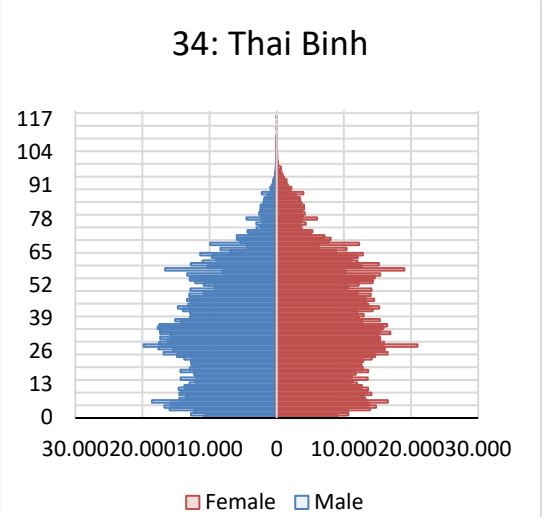
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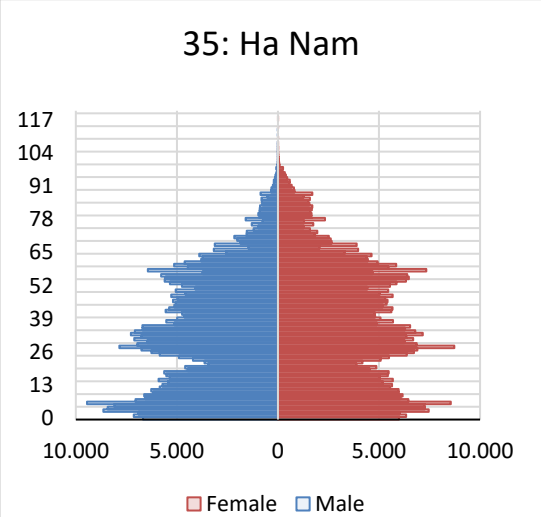
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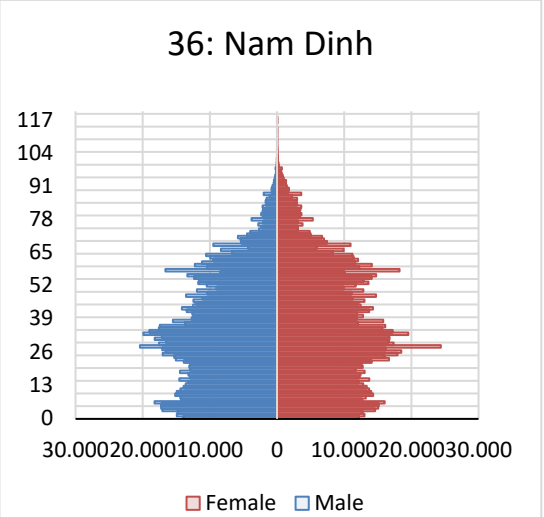
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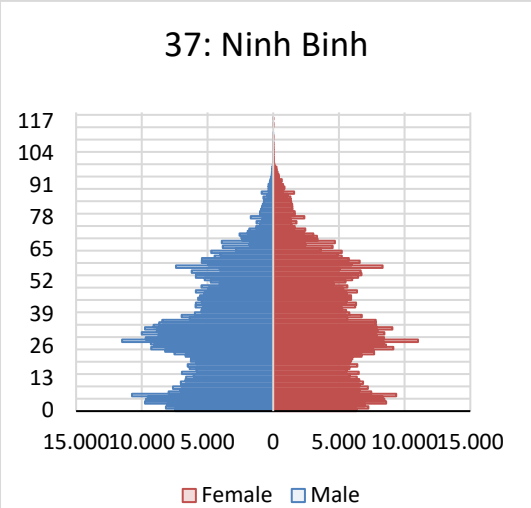
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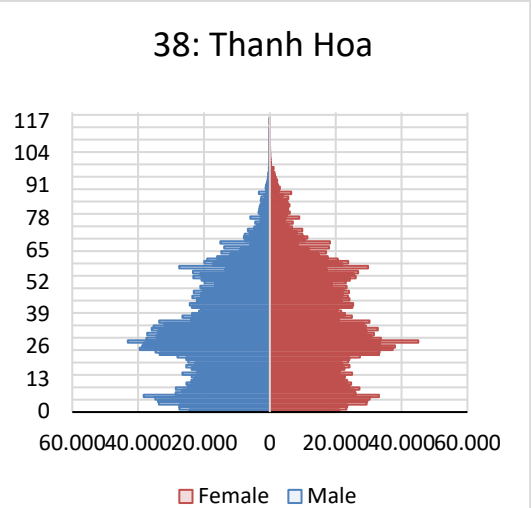
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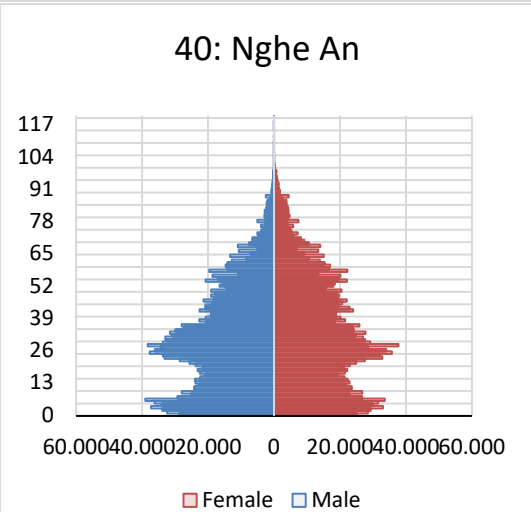
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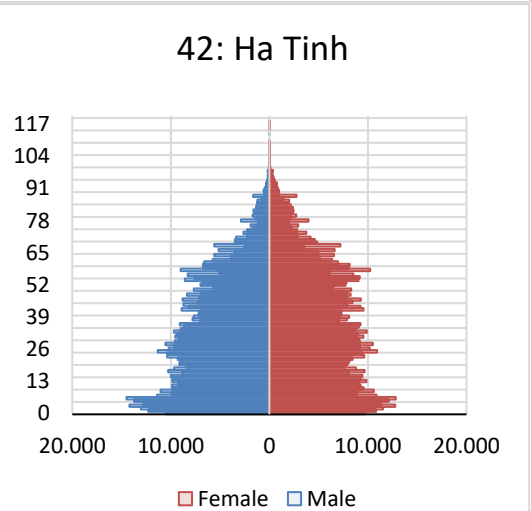
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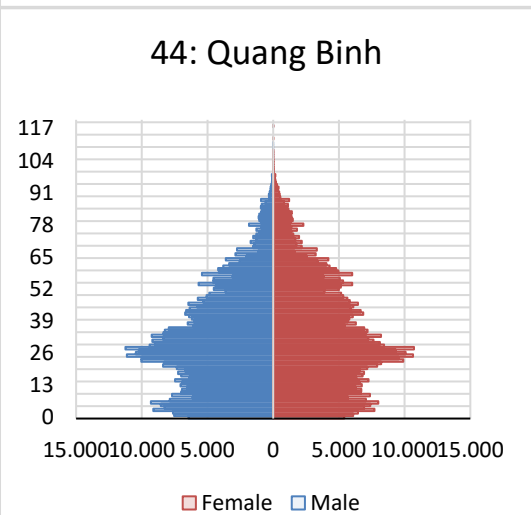
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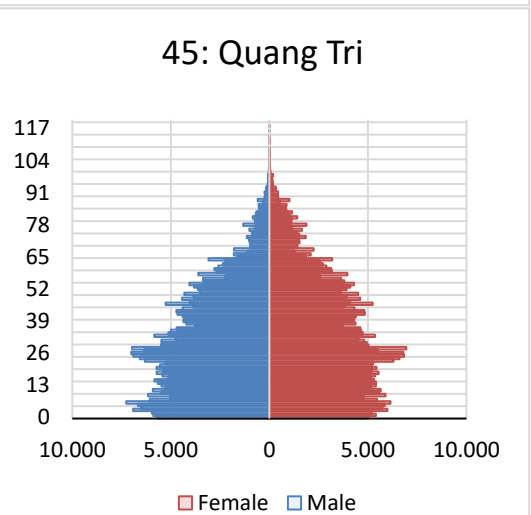
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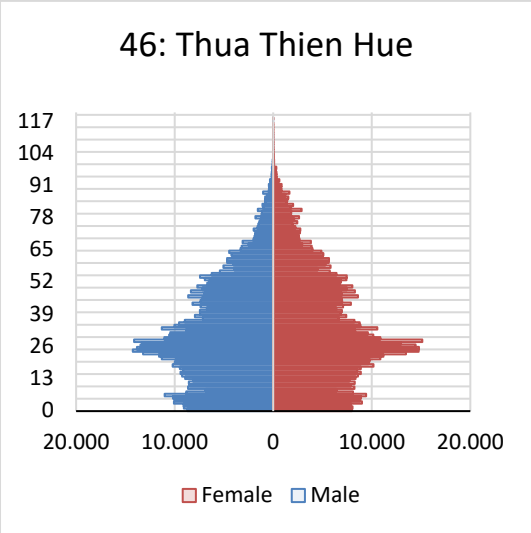
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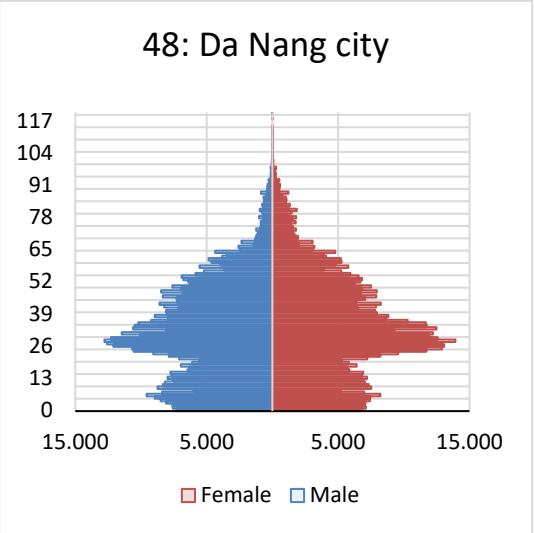
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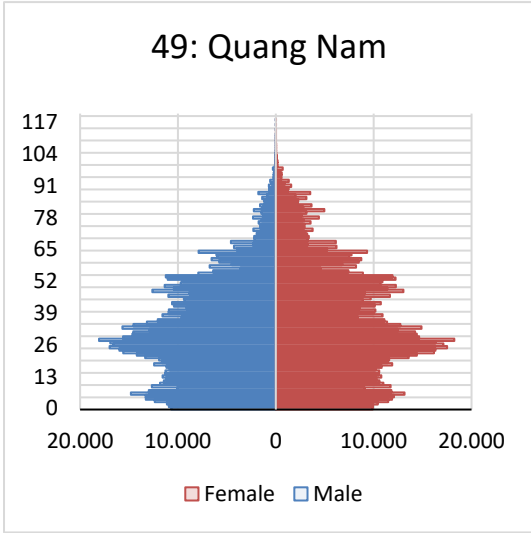
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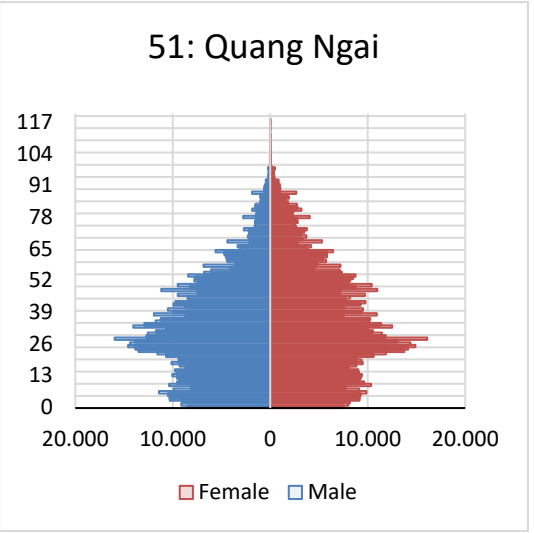
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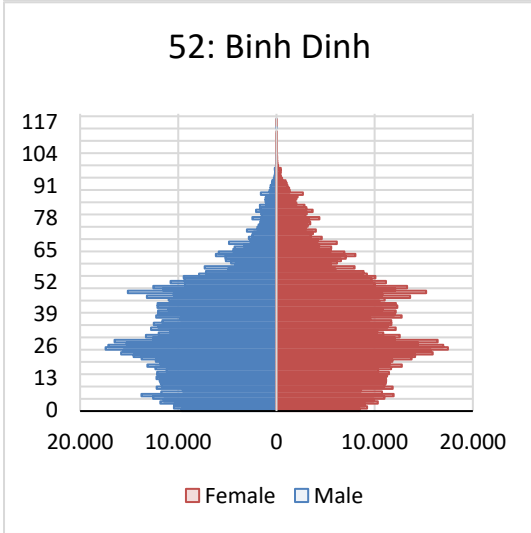
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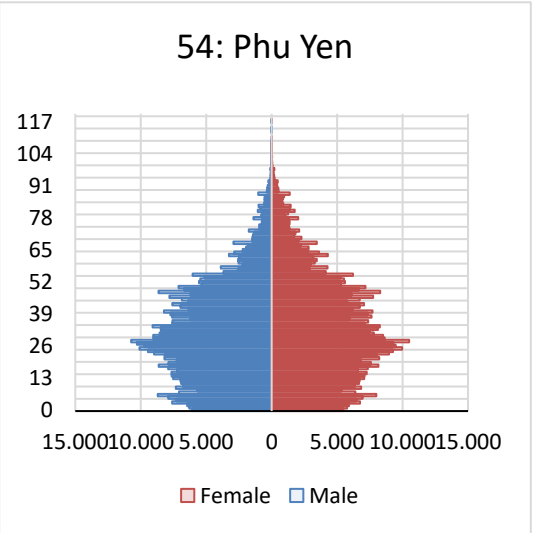
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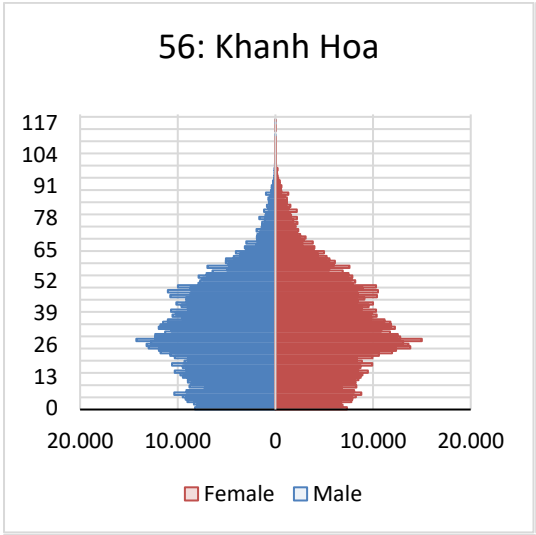
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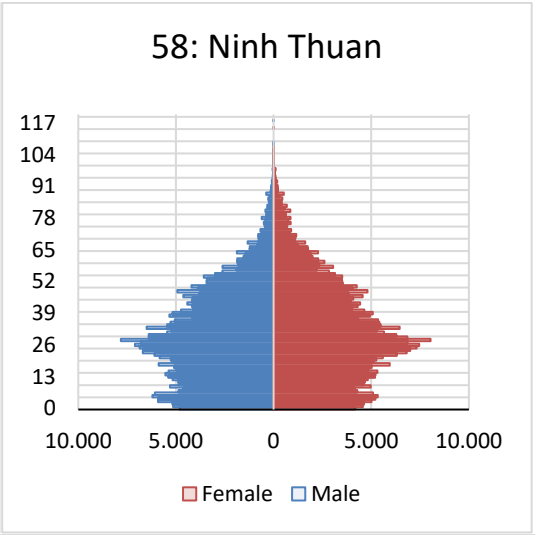
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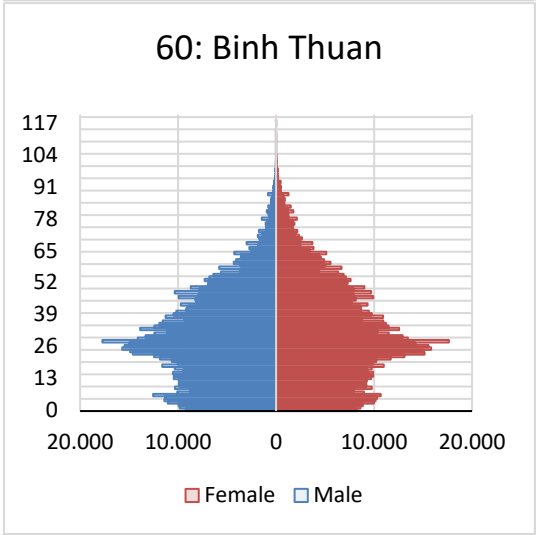
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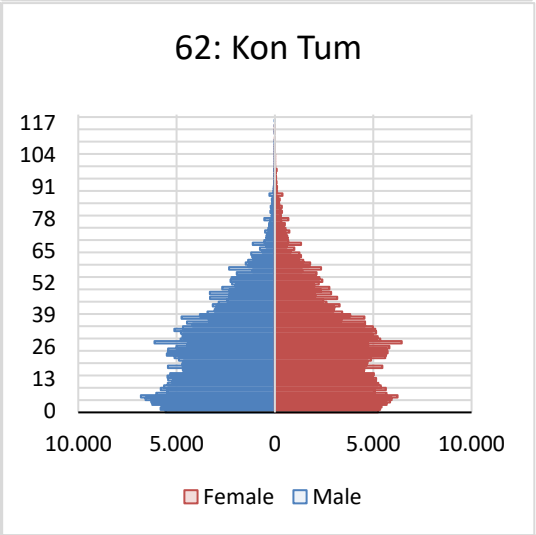
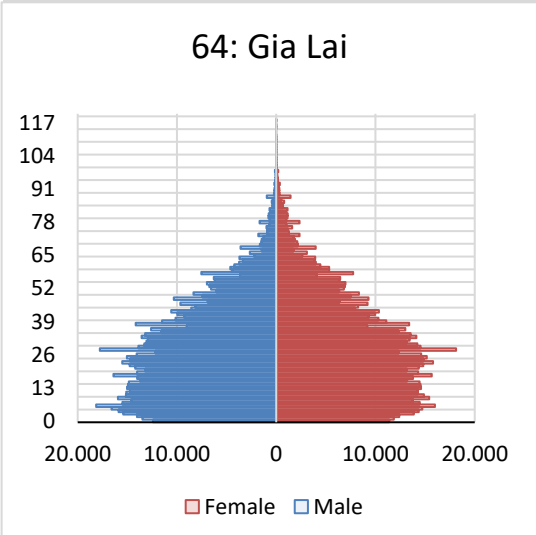
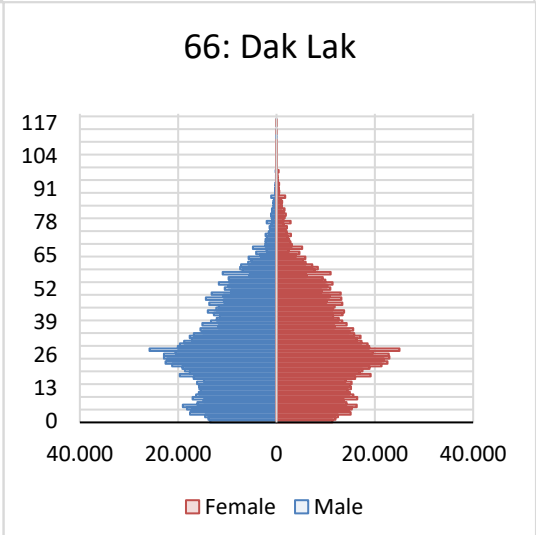
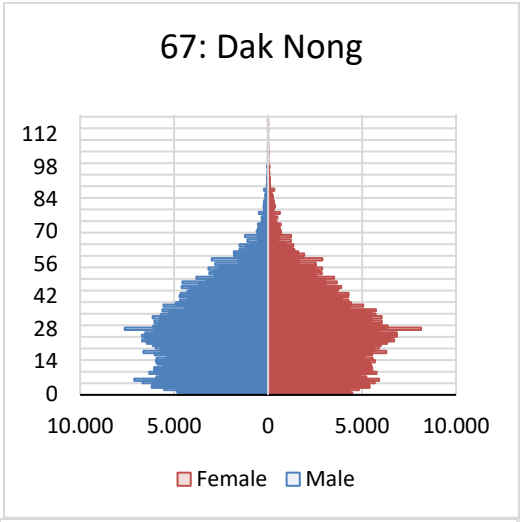
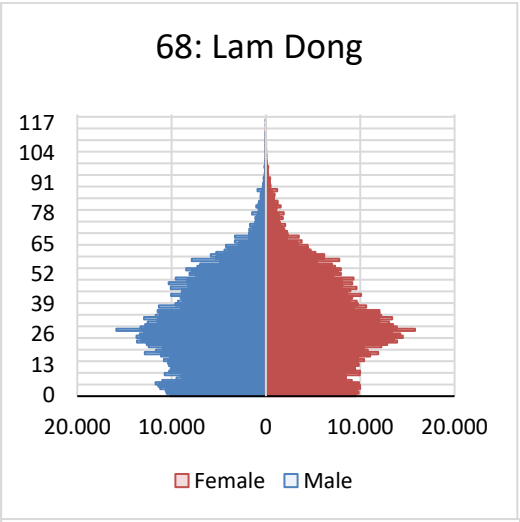
Female
Male

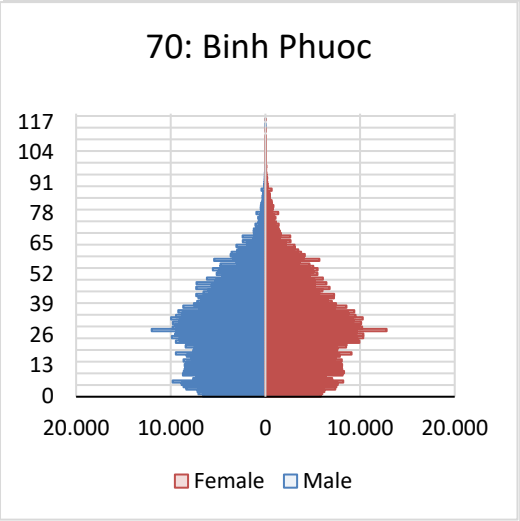

62: Kon Tum
117
104
91
78
65
52
39
26
13
0
10.000
5.000
0
5.000
10.000
Female
Male

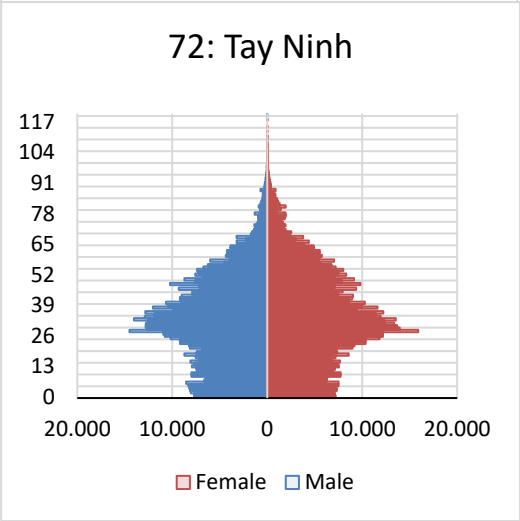

64: Gia Lai
117
104
91
78
65
52
39
26
13
0
20.000
10.000
0
10.000
20.000
Female
Male

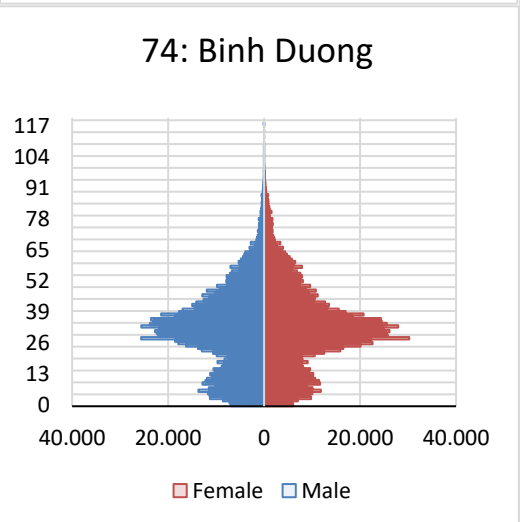

66: Dak Lak
117
104
91
78
65
52
39
26
13
0
40.000
20.000
0
20.000
40.000
Female
Male

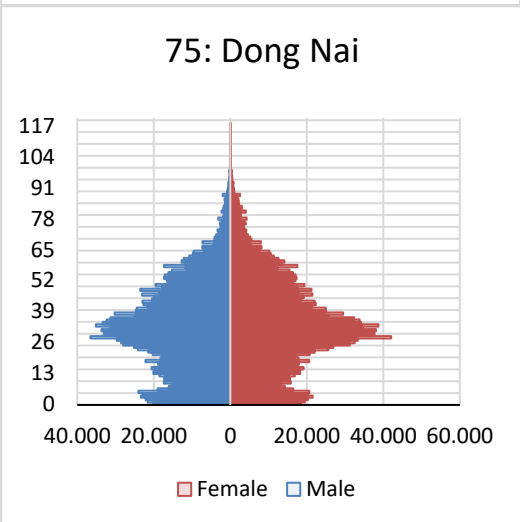

67: Dak Nong
112
98
84
70
56
42
28
14
0
10.000
5.000
0
5.000
10.000
Female
Male

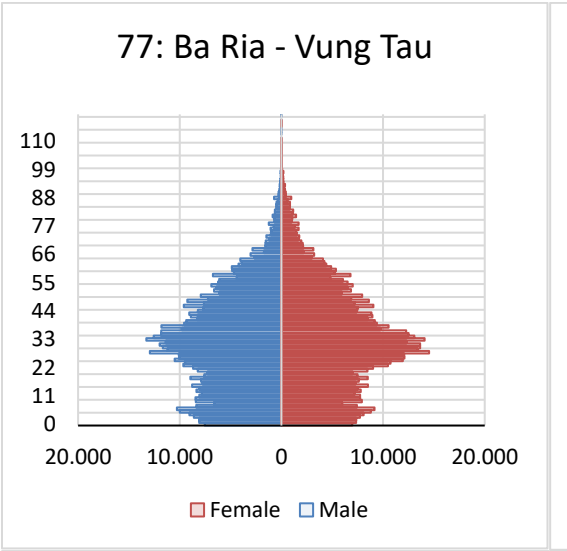

68: Lam Dong
117
104
91
78
65
52
39
26
13
0
20.000
10.000
0
10.000
20.000
Female
Male

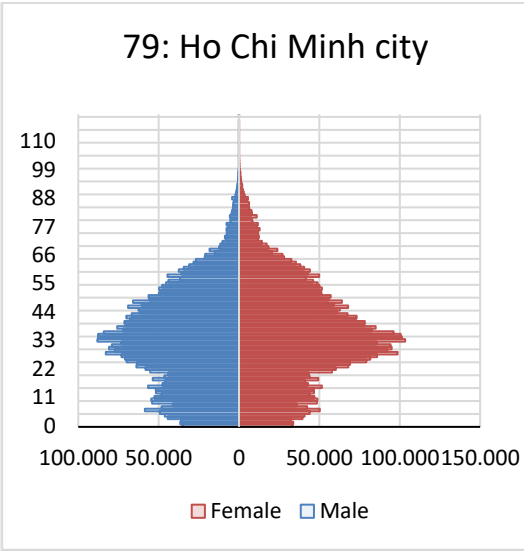

70: Binh Phuoc
117
104
91
78
65
52
39
26
13
0
20.000
10.000
0
10.000
20.000
Female
Male

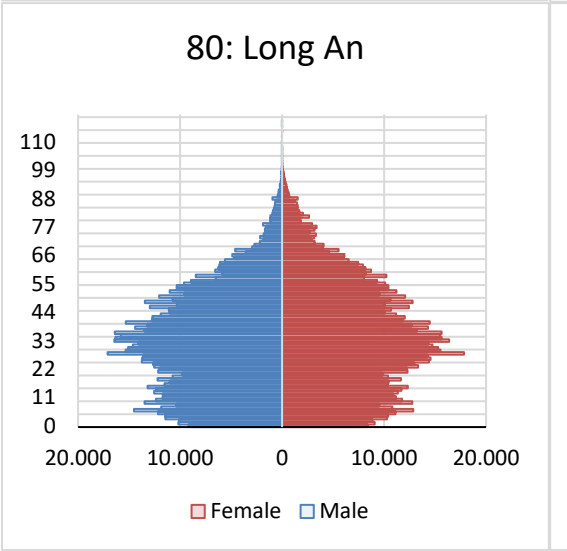

72: Tay Ninh
117
104
91
78
65
52
39
26
13
0
20.000
10.000
0
10.000
20.000
Female
Male

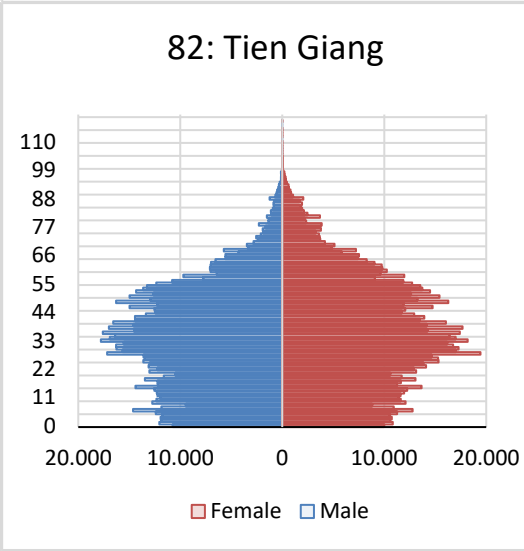

74: Binh Duong
117
104
91
78
65
52
39
26
13
0
40.000
20.000
0
20.000
40.000
Female
Male

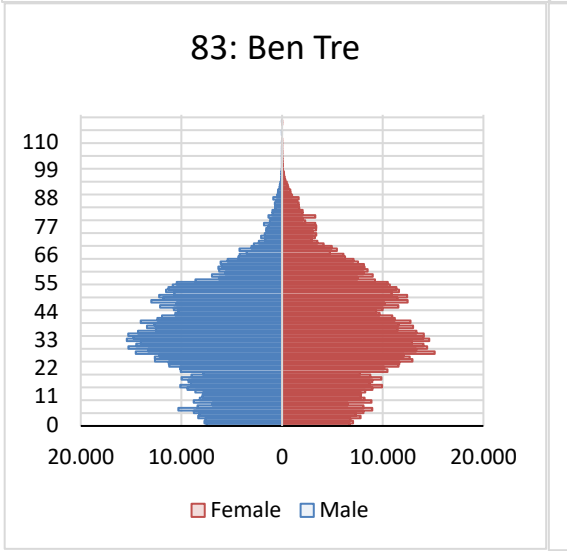

75: Dong Nai
117
104
91
78
65
52
39
26
13
0
40.000
20.000
0
20.000
40.000
60.000
Female
Male

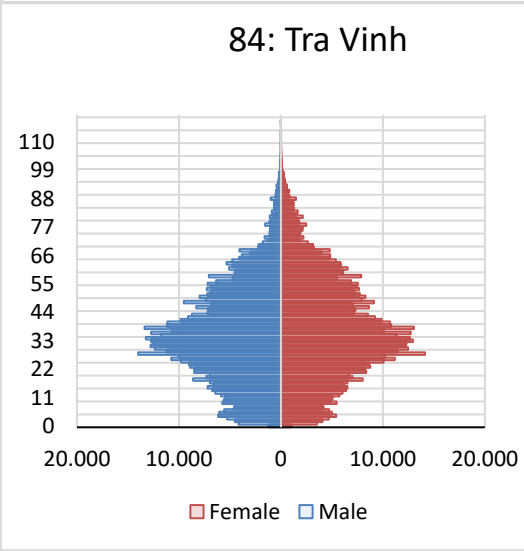

77: Ba Ria - Vung Tau
110
99
88
77
66
55
44
33
22
11
0
20.000
10.000
0
10.000
20.000
Female
Male

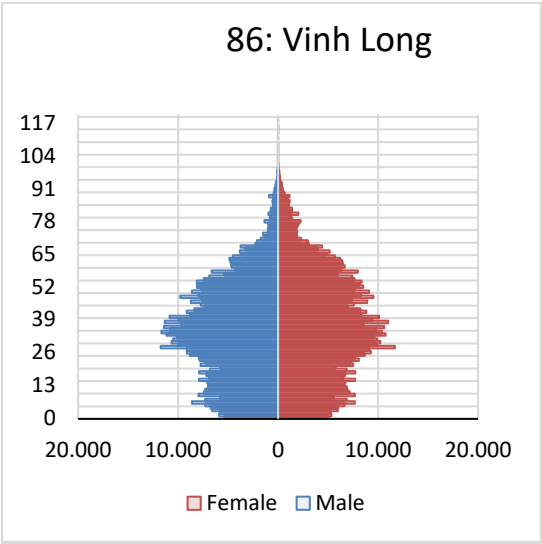

79: Ho Chi Minh city
110
99
88
77
66
55
44
33
22
11
0
100.000
50.000
0
50.000
100.000
150.000
Female
Male

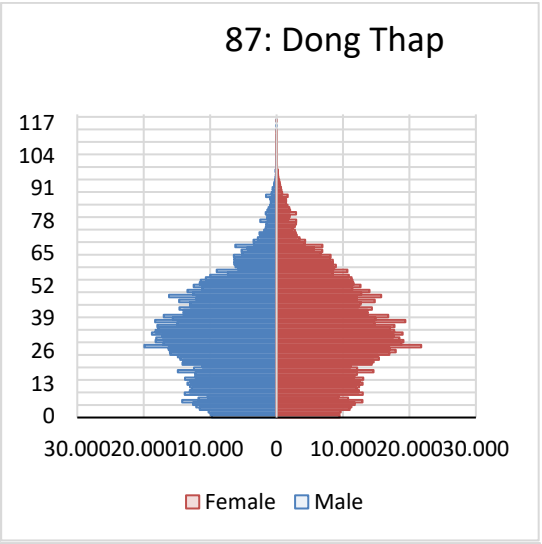

80: Long An
110
99
88
77
66
55
44
33
22
11
0
20.000
10.000
0
10.000
20.000
Female
Male

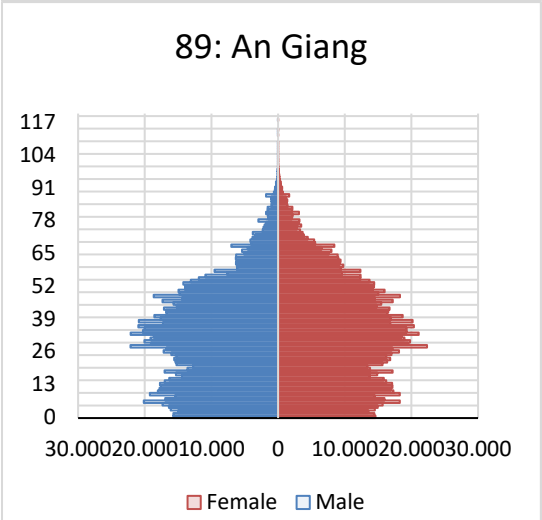

82: Tien Giang
110
99
88
77
66
55
44
33
22
11
0
20.000
10.000
0
10.000
20.000
Female
Male

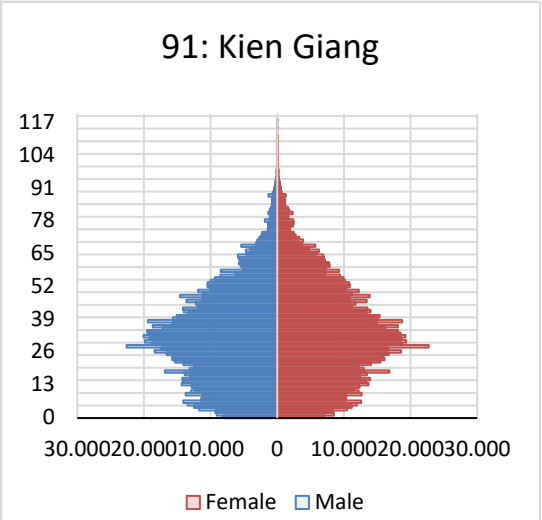

83: Ben Tre
110
99
88
77
66
55
44
33
22
11
0
20.000
10.000
0
10.000
20.000
Female
Male

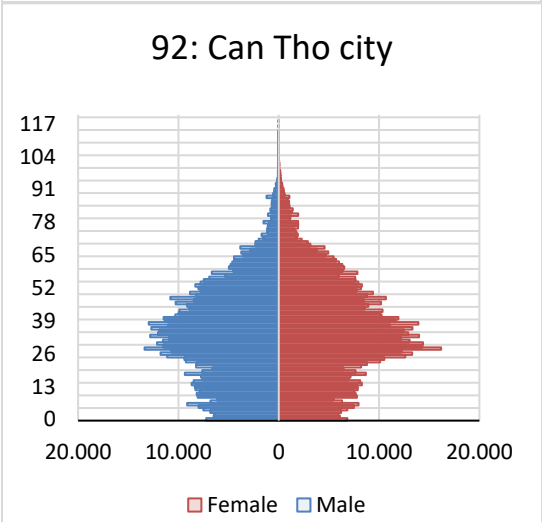

84: Tra Vinh
110
99
88
77
66
55
44
33
22
11
0
20.000
10.000
0
10.000
20.000
Female
Male

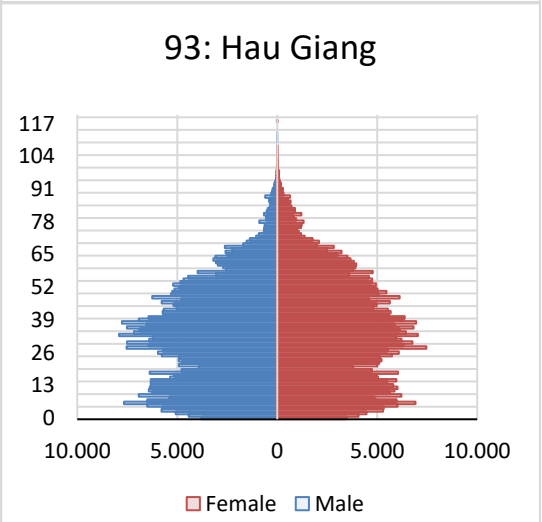

86: Vinh Long
117
104
91
78
65
52
39
26
13
0
20.000
10.000
0
10.000
20.000
Female
Male

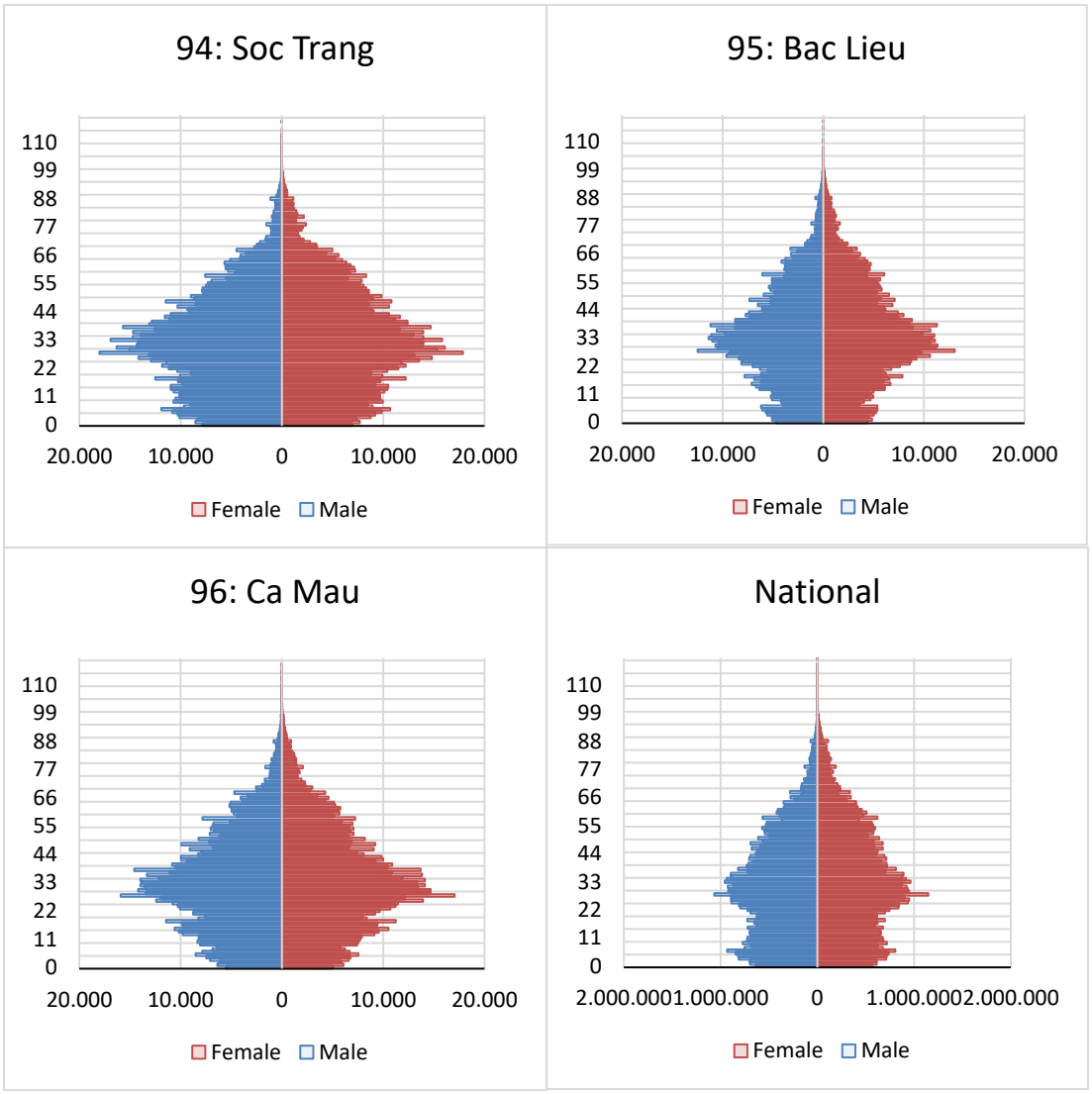

87: Dong Thap
117
104
91
78
65
52
39
26
13
0
30.00020.00010.000
0
10.00020.00030.000
Female
Male


89: An Giang
117
104
91
78
65
52
39
26
13
0
30.00020.00010.000
0
10.00020.00030.000
Female
Male


91: Kien Giang
117
104
91
78
65
52
39
26
13
0
30.00020.00010.000
0
10.00020.00030.000
Female
Male


92: Can Tho city
117
104
91
78
65
52
39
26
13
0
20.000
10.000
0
10.000
20.000
Female
Male


93: Hau Giang
117
104
91
78
65
52
39
26
13
0
10.000
5.000
0
5.000
10.000
Female
Male



Source: PFP database tabulation.