Chung Shan Medical Journal 2023; 34:113-124

Original Article

Trend Analysis for Notifiable Infectious Diseases Assessed in Taiwan in 2007 and 2017 Using Disability-Adjusted Life Years

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Purpose: This study uses disability-adjusted life years (DALYs), a measure developed by the World Health Organization, to quantify the disease burden from notifiable infectious diseases in 2007 and 2017 in Taiwan, and explores the factors that cause changes in the burden of disease.
Methods: Statistical data from the Ministry of Health and Welfare and the Ministry of the Interior were used to estimate the DALYs of notifiable infectious diseases, and divide them by transmission route, including sexual contact and blood transmission, air or droplet transmission, food and water-borne transmission, insect-borne infections, and contact transmission, to further discuss the relevant interplay between each route of infection and age and gender.
Results: In 2007, the burden of disease was 880.93 DALYs per million population. In 2017, it was 1,002.18 DALYs, 121.27 DALYs higher than in 2007. Years of life lost accounted for about 80% of DALYs in both years, and tuberculosis was the disease that caused the most DALYs. In terms of transmission routes, sexual contact and blood transmission changed the most, with an increase of 28% in 2017 compared to 2007. There were no significant changes in food and water-borne transmission, insect-borne infection, or contact transmission. Additionally, there were gender and age differences in sexual contact and blood transmission and air or droplet transmission. The burden of sexual contact and blood-borne diseases was mainly concentrated in young people, while the air or droplet infection route affected older adults. Males showed a greater burden of disease for these transmission routes.
Conclusion: An accurate estimate of the burden of infectious diseases can be used as a basis for public health policy formulation and to determine health planning priorities. The calculation of the burden of disease in this study can be used as a reference.

Keywords: burden of disease, disability-adjusted life year, notifiable infectious disease

1. Introduction

The movement of transnational populations across the world has become more frequent with the development of modern science and technology. Consequently, this has brought a more rapid spread of infectious diseases across borders (1). Understanding the leading causes of the burden of disease and their changes over time are essential for developing health plans and promoting human health. An accurate estimation of the burden of notifiable infectious diseases can be used as a reference for public health policy formulation and to determine health planning priorities. It also can be used as a basis for prioritizing health plans for disease prevention and control (2).

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Table 1. Incidence of notifiable infectious diseases

Transmission route	Diseases	Incidence rate (persons/per 100,000 population)	
		2007	2017
Sexual contact and blood transmission	Human Immunodeficiency Virus (HIV)	8.44	10.67
	Acquired Immunodeficiency Syndrome (AIDS)	4.63	5.9
	Acute Hepatitis B	0.88	0.64
	Acute Hepatitis D	0.00	-
	Syphilis	25.30	41.75
	Gonorrhea	6.29	19.53
Air or droplet transmission	Tuberculosis	63.18	41.43
	Pertussis	0.18	0.14
	Measles	0.04	0.03
	Rubella	0.24	0.01
	Mumps	5.27	2.70
	Influenza complicated by severe illness	0.11	5.77
Food and water-borne transmission	Typhoid	0.15	0.07
	Paratyphoid	0.03	0.02
	Acute Flaccid Paralysis/ Poliomyelitis	0.22	0.26
	Shigellosis	1.07	0.69
	Amebiasis	0.63	1.60
	Cholera	-	0.01
	Toxoplasmosis	0.01	0.09
	Acute Hepatitis A	0.89	1.57
Contact transmission	Leprosy	0.05	0.04
	Tetanus	0.04	0.05
Insect-borne infection	Dengue	9.56	1.46
	Malaria	0.06	0.03
	Japanese Encephalitis	0.16	0.11

- Represents no cases

Some diseases may have a high incidence with a low impact on health, while other diseases may have a high mortality rate but occur rarely. Thus, it is difficult to compare different diseases based only on incidence and mortality. Therefore, in 1993, the Harvard School of Public Health, the World Bank, and the World Health Organization (WHO) collaborated to study the global burden of disease (GBD) using the principles and methods of economics to quantify the economic pressures on societies caused by illness, disability, and premature death. An important indicator is the disability-adjusted life year (DALY). A DALY can be considered one year of healthy life lost. The sum of DALYs of an entire population can be used to

measure the gap between the current health status of that population and the ideal health status (assuming that the entire population could live to an advanced age without disease and disability)(3).

Both Traebert et al.(4) and van Lier et al.(2) have estimated infectious diseases. Their studies collected reports of diseases that caused deaths in Santa Catarina, Brazil in 2011, and the notifiable infectious diseases in the Netherlands from 2007 to 2011, respectively. Traebert et al.(4) divided the DALY results into years of life lost (YLL) and years lost due to disability (YLD) and stratified the results by age group and gender, expressing the results as odds ratio (OR) values. In addition, they compared the differences in various regions across the state of Santa Catarina. In total, infectious diseases caused 45,237.33 DALYs statewide. The burden of disease was 685.46 DALYs per million population. AIDS was the major contributing infectious disease among all infectious diseases, and the risk for males was 1.53 times higher than for females (OR = 1.53), with cases mainly distributed in coastal areas. It was speculated that this result might be related to the local tourism industry. van Lier et al.(2) divided infectious diseases into sexually transmitted diseases, vaccine-preventable diseases, food-borne diseases, and respiratory diseases. Streptococcus pneumonia (9,444 DALYs/year) and influenza (8,670 DALYs/year) were the two diseases that cause the most DALYs. The burden of most sexually transmitted diseases was high, while the burden of food-borne diseases was relatively low, as the YLL was relatively small compared to other diseases; influenza was the most severe respiratory disease, and was mainly distributed in older adults (over 75 years old).

Lai et al.(5) estimated the burden of food-borne diseases in Taiwan from 2012 to 2015. The cases were collected from the National Health Insurance Research Database (NHIRD) and the reported diseases cases from the Centre of Disease Control in Taiwan (TCDC). Food-borne diseases were further divided into bacterial, viral, and parasitic infections. The study found that food-borne diseases caused 4,947 DALYs/year, with the highest incidence in children younger than five years old. Mora-Salamanca et al.(6) studied the burden of parasitic infections and complications in Colombia from 2013 to 2016. Their results showed that the DALYs of parasitic infections exceeded those caused by other infectious diseases.

Therefore, this study used the statistics on infectious diseases from the Ministry of Health and Welfare to collect the number of cases and deaths. This study used DALYs to estimate the burden of disease. The notifiable infectious diseases that contributed to the disease burden in 2007 and 2017 were explored. The differences between the two years were analyzed by the percentage of change in diseases. This study then classified infectious diseases according to exposure routes and explored the differences in age and gender groups in consideration of the different exposure routes.

2. Materials and methods

2.1 Screening for infectious diseases

This study collected the epidemiological data on notifiable infectious diseases in 2007 and 2017 from the Ministry of Health and Welfare, and the parameters and data from the WHO and other literature. The notifiable infectious diseases were

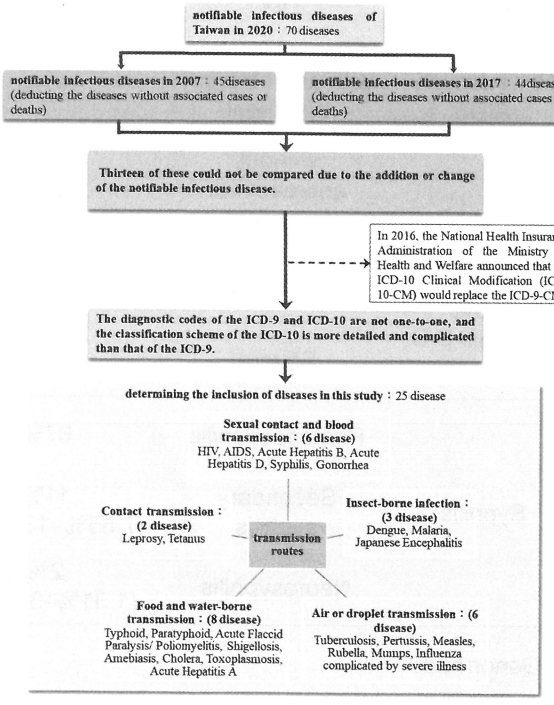


Figure 1. Diagram showing the determining the inclusion of diseases in this study.

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then classified according to the route of infection. DALYs were used to estimate the burden of notifiable infectious diseases. The changes in DALYs of different diseases were further explored between the years, age groups, and genders.

Currently, in 2020, there are a total of 70 notifiable infectious diseases in Taiwan. After deducting the diseases without associated cases or deaths, there were 45 and 44 notifiable infectious diseases in 2007 and 2017, respectively. Thirteen of these could not be compared due to the addition or change of the notifiable infectious disease. In 2016, the National Health Insurance Administration of the Ministry of Health and Welfare announced that the ICD-10 Clinical Modification (ICD-10-CM) would replace the ICD-9-CM. The diagnostic codes of the ICD-9 and ICD-10 are not one-to-one, and the classification scheme of the ICD-10 is more detailed and complicated than that of the ICD-9. Therefore, diseases may be affected by code conversion. For example, although it is a single disease, infection of invasive streptococcus pneumonia may cause sepsis. The code A40.3 of the ICD-10 indicates sepsis caused by streptococcus pneumonia, while the ICD-9 code did not have a subdivision for sepsis (038). Therefore, it was impossible to categorize a single disease in some cases, which resulted in eight diseases that could not be counted. Ultimately, there were 25 diseases included in the calculation. The process of determining the inclusion of diseases in this study is shown in Figure 1. The two transmission routes contributing to the highest incidence of notifiable infectious diseases (sexual contact and blood transmission and air or droplet transmission) can be identified from Table 1.

2.2 Epidemiological data collection

The number of cases and deaths of notifiable

Table 2. The disease weights and the time of disability resulting from sexual contact and blood transmission diseases

Disease	Severity rating	Severity distribution	Weights	The time of disability	References
HIV infection /AIDS	HIV	60% (45%–75%)	0.274 (0.184–0.377)[a]	0.03 yr	GBD, 2018[8] van Lier et al., 2016[2]
	with antiretroviral treatment	73.3%	0.078 (0.052–0.111)[a]	9 yr	TCDC, 2016[9] GBD, 2018[8] van Lier et al., 2016[2]
	without antiretroviral treatment	26.7%	0.582 (0.406–0.743)[a]		
Acute Hepatitis B/D	Moderate	73%	0.051 (0.032–0.074)[a]	42 d	GBD, 2018[8] GBD, 2015[10]
	Severe	27%	0.133 (0.088–0.190)[a]		
Syphilis	Primary syphilis	87%	0.006 (0.002–0.012)[a]	5 yr	van Lier et al., 2016[2] GBD, 2018[8] GBD, 2015[10]
	Secondary syphilis	11% (7.85%–13.09%)[b]	0.051 (0.032–0.074)[a]		
	Neurosyphilis	2% (1.31%–3.28%)[b]	0.203 (0.134–0.290)[a]		
Gonorrhea	-	-	0.006 (0.002–0.012)[a]	21 d	GBD, 2018[8]

[a] Mean (range)
[b] Triangular distribution (min–max)

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infectious diseases were collected in the annual report on public service statistics and the annual report on causes of death statistics from the Ministry of Health and Welfare by using the code reference tables from the ninth and tenth editions of the international classification of diseases (ICD-9-CM, ICD-10-CM) published by the Centre for Disease Control. The codes for each of the notifiable infectious diseases in the ICD-9 and ICD-10 were: human immunodeficiency virus (HIV) (ICD-9: 042; ICD-10: B20-, O98.7-, Z21), acquired immunodeficiency syndrome (AIDS) (ICD-9: 042; ICD-10: B20-, O98.7-), acute hepatitis B (ICD-9: 070.20, 070.21, 070.30, 070.31; ICD-10: B16-), acute hepatitis D (ICD-9: 070.42, 070.52; ICD-10: B17.0, B16.0, B16.1), syphilis (ICD-9: 090-097; ICD-10: A50-, A51-, A52-, A53-, O98.1), gonorrhea (ICD-9: 098; ICD-10: A54-, O98.2), tuberculosis (ICD-9: 010-018; ICD-10: A15-, A17-, A18-, A19-, J65, P37.0, O98.0), pertussis (ICD-9: 033.0; ICD-10: A37-), measles (ICD-9: 055; ICD-10: B05-), rubella (ICD-9: 056; ICD-10: B06-), mumps (ICD-9: 072; ICD-10: B26-), and influenza (ICD-9: 487; ICD-10: J10-, J11-).

2.3 Estimation of DALYs

DALYs combine mortality and morbidity to quantify the burden of disease. DALYs are the sum of YLL and YLD (Eq.(1)). YLL is a measure of the loss of person-years caused by death (Eq. (2)). N is the number of deaths, and L is the remaining life expectancy at the age of death in the equation. This study used the average life expectancy in the abridged life table provided by the Ministry of the Interior (7). YLD is a measure of the loss of person-years caused by disability (Eq. (3)). The number of cases (I) during a specific period was multiplied by the time of disability (L) and the disability weights (DW) to estimate the YLD of a particular disease within a specific period. The DW reflected the severity of the disease as a decimal between 0 (good health) and 1 (death). The unit of DALY calculation is the person-year. Since the annual populations

Table 3. The disease weights and the time of disability resulting from air or droplet transmission diseases

Disease	Severity rating	Severity distribution	Weights	The time of disability	References
Tuberculosis	-	-	0.333 (0.224–0.454)[a]	91.25 d	GBD, 2018[8] Murray & Lopez, 1996[11,12]
Pertussis	-	-	0.051 (0.032–0.074)[a]	50 d	GBD, 2018[8] GBD, 2015[10]
Measles Rubella	Moderate	50%	0.051 (0.032–0.074)[a]	10 d	GBD, 2018[8] GBD, 2015[10]
	Severe	50%	0.133 (0.088–0.190)[a]		
Mumps	-	-	0.152	3 d	Murray & Lopez, 1996[11,12] van Lier et al., 2016[2]
Influenza complicated by severe illness	-	-	0.13	14 d	Murray & Lopez, 1996[11,12]
Tuberculosis	-	-	0.133 (0.088–0.190)[a]	7.79 d (6.2–9.64)[b]	GBD, 2018[8]

[a] Mean (range)
[b] Triangular distribution (min–max)

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Table 4. The disease weights and the time of disability resulting from food and water-borne diseases

Disease	Severity rating	Severity distribution	Weights	The time of disability	References
Typhoid	Moderate	35.0% (26.0–44.3)[b]	0.051 (0.032–0.074)[a]	14 d	GBD, 2018[8] GBD, 2015[10]
	Severe	47.75% (38.0–57.4)[b]	0.133 (0.088–0.190)[a]		
	severe abdominal pain and distention	17.0% (10.0–25.7)[b]	0.325 (0.20–0.462)[a]		
	intestinal bleeding	0.25% (0–2.0)[b]	0.324 (0.22–0.442)[a]		
Paratyphoid	Mild	28.5% (15.6–44.2)[b]	0.006 (0.002–0.012)[a]	14 d	GBD, 2018[8] GBD, 2015[10]
	Moderate	52.25% (27.2–77.7)[b]	0.051 (0.032–0.074)[a]		
	Severe	14.25% (8.2–21.8)[b]	0.133 (0.088–0.19)[a]		
	Abdominal pain & distention	5.0% (2.8–7.6)[b]	0.114 (0.078–0.159)[a]		
Acute Flaccid Paralysis[c]	-	-	0.296 (0.198–0.414)[a]	201 d	GBD, 2018[8]
Diarrhea[d]	Mild	64.8%	0.074 (0.049–0.104)[a]	4.3 d (4.2–4.4)[a]	GBD, 2018[8]
	Moderate	28.9%	0.188 (0.125–0.264)[a]		
	Severe	6.9%	0.247 (0.164–0.348)[a]		
Toxoplasmosis	-	-	0.051 (0.032–0.074)[a]	28 d	Lai et al., 2019[5]
Acute Hepatitis A	Moderate	50%	0.051 (0.032–0.074)[a]	21 d	GBD, 2018[8] Lai et al., 2019[5]
	Severe	50%	0.133 (0.088–0.190)[a]		

[a] Mean (range)
[b] Triangular distribution (min–max)
[c] The disability weight for 'Guillain-Barre Syndrome (GBS)' was used as a proxy
[d] Including shigellosis, amebiasis and cholera

were different and could not be compared, this study standardized the calculated DALYs (Eq. (4)). The population at the end of the year was taken from the statistical data from the Ministry of the Interior.

$$DALYs = YLL + YLD \quad \text{(Eq. 1)}$$

$$YLL = N \times L \quad \text{(Eq. 2)}$$

$$YLD = I \times DW \times L \quad \text{(Eq. 3)}$$

$$\text{DALYs (million person-years)} = \text{DALYs (person-years)} / \text{population at the end of the year} \times 100{,}000 \quad \text{(Eq. 4)}$$

2.4 Estimation of the disease weights and the time of disability

To estimate the GBD, 22 indicators were used

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Table 5. The disease weights and the time of disability resulting from diseases that are transmitted through contact

Disease	Severity rating	Severity distribution	Weights	The time of disability	References
Leprosy	Grade 1	21.25%	0.011 (0.005–0.021)[a]	6 m	Rathod et al., 2020[13]
	Grade 2	6.31%	0.067 (0.044–0.096)[a]	2 y	GBD, 2018[8]
Tetanus	-	-	0.133 (0.088–0.190)[a]	14.6 d	GBD, 2018[8]

[a] Mean (range)

Table 6. The disease weights and the time of disability resulting from insect-borne diseases

Disease	Severity rating	Severity distribution	Weights	The time of disability	References
Dengue	Dengue fever	-	0.197 (0.172–0.211)[a]	7 d (4–10)[b]	Murray & Lopez, 1996[11,12]
	Dengue hemorrhagic fever	-	0.542 (0.475–0.583)[a]	15 d (10–20)[b]	WHO, 2008[14]
Malaria	Mild	-	0.006 (0.002–0.012)[a]	14-28 d[c]	GBD, 2018[8]
	Moderate	-	0.051 (0.032–0.074)[a]		
	Severe	-	0.133 (0.088–0.190)[a]		
Japanese Encephalitis	Mild	48% (1-Mod+Severe)	0.031 (0.018–0.050)[a]	20 d (15.6–23.4)[b]	Vodicka, 2020[15]
	Moderate	24% (19%–29%)	0.203 (0.134–0.290)[a]		
	Severe	28% (22%–34%)	0.542 (0.374–0.702)[a]		

[a] Mean (range)
[b] Triangular distribution (min–max)
[c] Uniform distribution (min–max)

as criteria to evaluate disease weights in 1990. In 2017, GBD was assessed using the disability weights of 234 health states. Some disability weights were divided into different weights under different conditions, such as mild, moderate, and severe. The time of disability was measured from disease onset to recovery (8). Tables 2 to 6 in this study show the disease weights and the time of disability for different notifiable infectious diseases classified according to the route of transmission. Parameters from the WHO and other literature were used as primary references. This study used the average value for calculation if there was a distribution or the range of the distribution for severity, disease weights, and time of disability.

3. Results and Discussion

3.1 The comparison of overall disease

The notifiable infectious diseases caused 20,205.29

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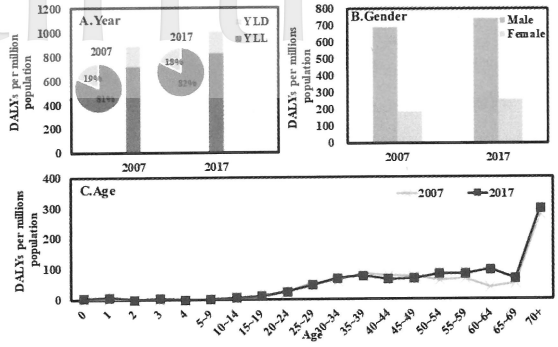


Figure 2. Disability-adjusted life years (DALYs) in 2007 and 2017 for (A) YLD and YLL, (B) Gender and (C) Age.

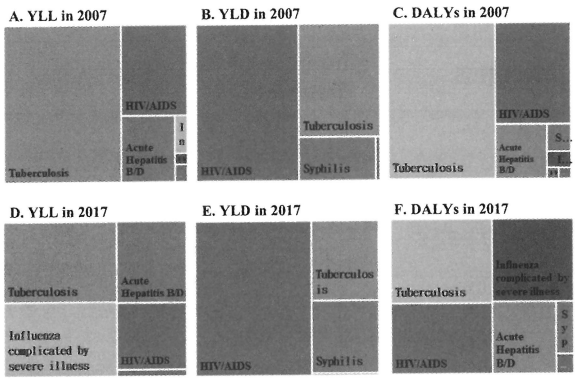


Figure 3. Tree diagrams showing years of life lost (YLL), years lost due to disability (YLD), and disability-adjusted life years (DALYs) in 2007 and 2017.

A: Gray: Tuberculosis. Blue: HIV infection/AIDS. Orange: Acute hepatitis B/D. Yellow: Influenza.
B: Gray: Tuberculosis. Blue: HIV infection/AIDS. Orange: Syphilis.
C: Yellow: Tuberculosis. Blue: HIV infection/AIDS. Gray: Acute hepatitis B/D. Orange: Syphilis. Dark blue: Influenza.
D: Gray: Tuberculosis. Blue: HIV infection/AIDS. Orange: Acute hepatitis B/D. Yellow: Influenza.
E: Gray: Tuberculosis. Blue: HIV infection/AIDS. Orange: Syphilis.
F: Yellow: Tuberculosis. Blue: HIV infection/AIDS. Gray: Acute hepatitis B/D. Orange: Syphilis. Dark blue: Influenza.

DALYs in 2007, and the burden of disease per million population was 880.93 DALYs. In 2017, the notifiable infectious diseases caused 23,622.5 DALYs, and the burden of disease per million population was 1002.18 DALYs. Compared with 2007, the burden of disease increased by 3,147.21 DALYs or 121.27 DALYs per million people. YLL respectively accounted for 81% and 82% of DALYs in the two years analyzed (Figure 2A). In terms of gender, males had significantly higher DALYs than females (Figure 2B). The trend chart for different age groups is shown in Figure 2C.

In 2007, in terms of YLL, the main contributors were tuberculosis, HIV infection/AIDS, and acute hepatitis B/D, which respectively accounted for 63.89%, 20.86%, and 12.33% of YLL (Figure 3A). The main contributors to YLD were HIV infection/AIDS, tuberculosis, and syphilis, which respectively accounted for 55.48%, 32.33%, and 11.55% of YLD (Figure 3B). The primary diseases that caused DALYs were tuberculosis, HIV infection/AIDS, and acute hepatitis B/D, which respectively accounted for 58.03%, 27.27%, and 10.05% of DALYs (Figure 3C).

In 2017, the primary diseases contributing to YLL were tuberculosis, influenza complicated by severe illness, acute hepatitis B/D, and HIV infection/AIDS, which respectively accounted for 32.24%, 29.50%, 20.08%, and 16.63% of YLL (Figure 3D). The main contributors to YLD were HIV infection/AIDS, tuberculosis, and syphilis, which respectively accounted for 63%, 19.16%, and 17.26% of YLD in 2017 (Figure 3E). The primary diseases that caused DALYs were tuberculosis, HIV infection/AIDS, influenza complicated by severe illness, acute hepatitis B/D, and syphilis, which respectively accounted for 29.89%, 24.95%, 24.22%, 16.48%, and 3% of DALYs (Figure 3F). Figure 3 shows that, aside from the addition of influenza complicated by severe illness, the diseases that contributed to YLL, YLD, and DALYs did not differ much between the years. The main contributions were tuberculosis, HIV infection/AIDS, acute hepatitis B/D, and syphilis.

Figure 4 shows the number of deaths, the number of cases, and DALYs of the notifiable infectious diseases classified according to exposure routes. For air or droplet transmission, the number of cases in 2007 was higher than in 2017 (Figure 4A). However, after standardization (Figure 4B), the number of DALYs in 2017 was higher than in 2007. There were only eight deaths caused by influenza in 2007, and that number increased to 389 in 2017. Due to this increase, the DALYs in 2017 were higher than in 2007 after weighting.

3.2 Sexual contact and blood transmission

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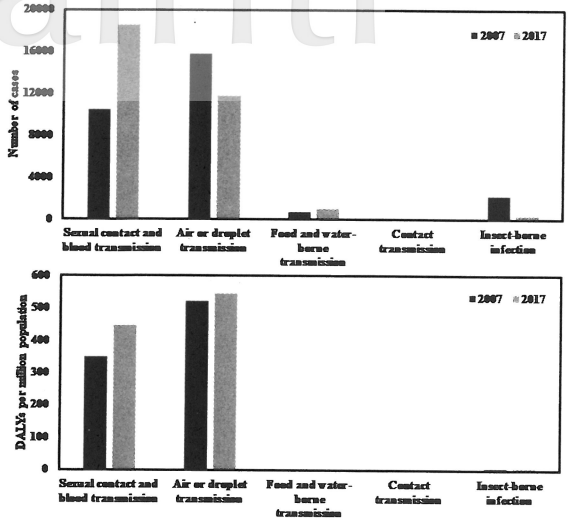


Figure 4. The number of cases of notifiable infectious diseases and their associated disability-adjusted life years (DALYs).

A: Number of cases
From left to right: Sexual contact and blood transmission, air or droplet transmission, food and water-borne transmission, contact transmission, and insect-borne infection.

The relatively higher burden of disease in the sexual contact and blood transmission exposure route may be related to the severity of the disease course (such as HIV infection/AIDS, and acute hepatitis B/D, etc.) and high incidence (such as gonorrhea)(2). Figure 5A shows the DALYs of different diseases. In addition to death, disability was also a leading cause of DALYs for diseases such as HIV infection/AIDS and syphilis. All diseases increased in 2017 compared to 2007. Among them, gonorrhea showed the greatest change (Figure 5B). When grouped by age, 2007 and 2017 reached peaks at 35 to 37, with young people forming the majority that were affected. According to the AIDS prevention and control program of the TCDC the Ministry of Health and Welfare (9), this situation is related to the prevalence of online dating and the increasing abuse of addictive drugs, both accompanied with unsafe sex. In terms of gender, the male DALYs were higher than female DALYs in both years (Figure 5D). The most significant gender difference was in HIV infection/AIDS, as unsafe sex was the main transmission route of HIV infection and men who have sex with men were the major population affected.

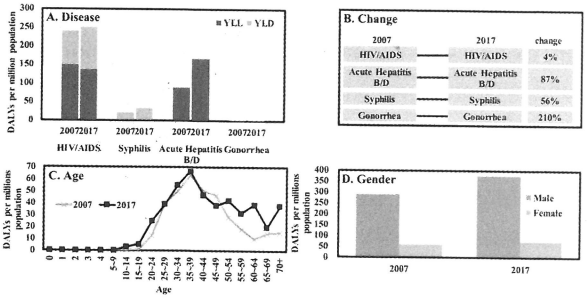


Figure 5. The disability-adjusted life years (DALYs) resulting from sexual contact and blood transmission diseases.

Top left: From left to right: HIV infection/AIDS, syphilis, acute hepatitis B/D, and gonorrhea

Top right: From top to bottom: HIV infection/AIDS, acute hepatitis B/D, syphilis, and gonorrhea

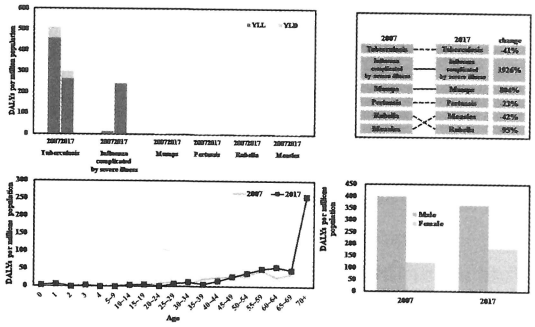


Figure 6. The disability-adjusted life years (DALYs) resulting from air or droplet transmission diseases.

Top left: From left to right: Tuberculosis, influenza complicated by severe illness, mumps, pertussis, rubella, and measles

Top right: From top to bottom: Tuberculosis, influenza complicated by severe illness, mumps, pertussis, rubella, and measles

3.3 Air or droplet transmission

In terms of the air or droplet transmission route, the primary diseases that caused the burden of disease were tuberculosis and influenza complicated by severe illness (Figure 6A). The burden of almost all the diseases in this exposure route decreased in 2017 compared to 2007 (Figure 6B). However, the occurrence of influenza complicated by severe illness substantially increased, due to the 2009 H1N1 influenza pandemic, the H1N1 influenza epidemic periods in 2015 and 2016, the influenza epidemic caused by H3N2 and influenza B viruses from 2016 to 2018(16). Despite the development of

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vaccines, anti-viral drugs, and medical facilities, influenza still accounts for considerable morbidity and economic costs each year. Although vaccination is still the most effective way to prevent and control influenza, the practitioners of public health should still implement influenza prevention and control strategies to reduce the spread of diseases and reduce the mortality and the morbidity (17). In terms of the age difference, a trend for a gradual increase with age was found (Figure 6C). The trend may be related to the fact that the high-risk group for influenza complicated by severe illness is older adults, and the fact that the majority of people (~55%) in the epidemiological distribution of tuberculosis were over 65 years old(18). The epidemiological distribution of tuberculosis also showed that the sex ratio of males to females was 2.3:1.0 (18), which may be related to the male DALYs were higher than female DALYs (Figure 6D).

3.4 The limitations of research and discussion

This study proposes three limitations of research: (1) The severity and the time of disability will be different according to the medical conditions in each country. However, the only parameter available was from international data, and was not specific for Taiwan. (2) The parameters will also change with medical progress. Since there were no data for 2007 and 2017 specifically, the same parameters were used for estimation in both years. (3) Due to the changes in the announcements and ICD codes between 2007 and 2017, not all notifiable infectious diseases could be estimated.

Conclusion

Our results show that about 80% of the burden of disease is caused by death. The most important contributors to the burden of disease were tuberculosis, HIV infection/AIDS, influenza complicated by severe illness, acute hepatitis B/D, and syphilis. Therefore, prevention and treatment plans should focus on these diseases. In addition, gender and age differences were found for diseases spread by sexual contact and blood transmission, and air or droplet transmission. Therefore, interventions, such as those focused on health and education, should be implemented for these groups to reduce the incidence. An accurate estimation of the burden of infectious diseases can be used as a basis for public health policy formulation and to determine health planning priorities. The calculation of the burden of disease in this study can be used as a reference.

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