Poisoning Mortality and Hospitalization Trends in Taiwan, 1999-2008

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Abstract

Background

Poisoning with non-fatal outcomes may still be left with permanent, disabling sequelae, and the resultant long-term usage of medical services would burden the public health care system. The objective of this study was to analyze the changes in types of poisoning in Taiwan from 1999 to 2008.

Methods

We analyzed mortality rate data sourced from official publications in the National Health Insurance Research Database, which contain vital statistics and hospitalization data from 1999 to 2008. The data was then age-adjusted to the Year 2000 Standard Population in order to determine a decade of hospitalization and mortality rate trends, which we classify according to gender, age, and type (of poisoning). Linear regression was used to test the trends.

Results

There were 20,260 deaths and 210,021 poisoning hospitalizations recorded due to poisoning, and the mortality and hospitalization rates caused by poisoning were 8.211 per 100,000 and 86.302 per 100,000 respectively. Males exhibited higher rates of mortality and hospitalization as a result of poisoning, and the high-risk group consisted of aged 65 and over. Unintentional poisoning was the leading cause of death; however, intentional poisoning was the primary cause of hospitalization cases. There was an increasing trend of both mortality and
hospitalization rates due to poisoning during the study period, with a greater increase occurring in the hospitalization rate over the mortality rate. In addition, the mortality rate trend of intentional poisoning was similar to that of the total poisoning mortality rate, while the trend in unintentional poisoning hospitalization rate was similar to the total poisoning hospitalization rate.

**Conclusions**

There was a decreasing trend in most unintentional poisoning mortality rates in Taiwan from 1999 to 2008, but unintentional drug poisoning mortality increased. During the research period, the rate of hospitalization as a result of adverse effects poisoning from consuming alcohol and other drugs increased, but rates of hospitalization due to poisoning from pesticides, other solids and liquids, and gas distributed by pipelines decreased. Meanwhile, other types of poisoning hospitalization didn’t change. In the future, the government should develop different types of appropriate prevention programs to reduce poisoning mortality and hospitalization rates.

**Keywords:** poisoning, mortality, hospitalization, trends
Research article

Background

Poisoning is a public health matter of concern for the whole world. The World Health Organization (WHO) indicated that in 2000, unintentional poisoning resulted in 315,000 deaths worldwide. This represents 6% of all deaths due to unintentional injuries, a proportion that is comparable with unintentional falls [1]. According to statistics from the American Association of Poison Control Centers in 2004, one poisoning case occurred every 13 seconds in the United States, with an incidence of 5.5 to 18.1 per thousand people. Altogether there were a yearly total of 200,000 cases of suicide poisoning along with two million cases of unintentional poisoning [2].

Among all unintentional injuries in the US, unintentional poisoning ranks as the second leading cause of death, next only to automobile injuries [3]. According to the US Centers for Disease Control and Prevention, poisoning showed the largest increase in mortality rate among all unintentional injuries during 1999-2004, with a 55.7% overall hike, of which there was a 62.5% increase in unintentional poisoning, 10.8% increase in suicide poisoning, and 26.6% increase in unspecified poisoning [4]. In addition, according to health statistics in the United Kingdom, poisoning was the second leading cause of death among all unintentional injuries in England and Wales in 2004, ranking behind only fall injuries. As mortality from suicide poisoning declined between 1979 and 2004, mortality from unintentional and drug
abuse poisoning rose to become the primary type of poisoning [5].

According to the Taiwan National Poison Center, the incidence of poisoning in Taiwan is about 0.16-0.22 per thousand people [6]. Statistics from the Department of Health show that a total of 324 Taiwanese people died of unintentional poisoning in 2007, a rate of almost one person per day. The poisoning mortality rate ranks fourth among unintentional injuries, of which the top three causes are automobile injuries, unintentional falls, and drowning [7]. In Taiwan, there was a descending trend in poisoning mortality from 1975-1998, with a drop of 41.2%. While unintentional and intentional poisoning mortality fell by 40.1% and 55.6%, respectively, there was a 32.5 times increase in the mortality from unspecified poisoning [8]. In addition, a study showed that between 1986 and 2005, mortality from poisoning-related suicides, including suicides using solid or liquid substances and suicides using other gas and vapor, was the second and third leading types of suicide deaths [9].

Most previous studies conducted in Taiwan that focus on poisoning are cross-sectional and fail to present overall epidemiological characteristics and long-term trends of poisoning. Therefore, this study aimed to explore these particular characteristics and trends in Taiwan using the combination of “cause of death statistics” and the “National Health Insurance Research Database.” We hope that a better understanding of the evolution of poisoning types from 1999 to 2008 may serve as a reference for the design of future prevention programs.
Methods

Data source

The mortality data in Taiwan from 1999-2008 were obtained from the cause of death statistics provided by the Department of Health, Executive Yuan [7]. Hospitalization data were adapted from the inpatient expenditures by admissions (DD) and registry for contracted medical facilities (HOSB) data provided by the NHI Research Database [10]. Since its launch on March 1, 1995, the NHI has reached a coverage rate of 99% in Taiwan. The NHI Research Database consists of data on both outpatient (including emergency treatment) and inpatient care. Medical institutions are required by law to make outpatient claims (including emergency treatment) and inpatient fees to the NHI Bureau. Hence, the NHI Research Database holds the promise of being a quintessential resource of representative and evidence-based data for studies in medical and health research which may in turn shed light on future health policy [10].

Data analysis

We calculated mortality and hospitalization rate using the mid-year population in the “population by age report” provided by the Ministry of the Interior as the denominator. Data were age-adjusted by the direct method to the 2000 world standard population from the WHO. Afterwards, we calculated ten-year trends in unintentional poisoning mortality and
hospitalization rates and categorized them by gender, age, and type.

With regards to age, the Department of Health's classification, which uses six groupings, was adapted: children aged 0-4, infant aged 5-14, young adults aged 15-24, maturity adults aged 25-44, middle-aged adults aged 45-64, and elderly aged 65 or more. With regards to poisoning types, we used ICD-9-CM external causes of injury codes (E-Codes), which include “unintentional poisoning, such as by medicinal drugs E850-E858, alcohol E860, cleaning solutions E861, petroleum products E862, pesticides E863, corrosives E864, foodstuffs E865, other solid and liquid substances E866, gas distributed by pipeline E867, carbon monoxide E868, other gases and vapors E869, venomous animals and plants E905, and medicinal drugs causing adverse effects E930-E948”; “intentional poisoning, such as suicide using solid or liquid substances E950, suicide using gases in domestic use E951, suicide using other gases and vapors E952, and assault using poisoning E962”; and “unspecified poisoning, including by unspecified solid and liquid E980, by unspecified gases in domestic use E981, and by other unspecified gases E982.” With regards to NHI hospitalization data, since medical facilities are required to file NHI claims on a monthly basis, the same case may be separated into several data entries if a patient’s stay extends into the following month. Therefore, all entries with the same ID and hospitalization date were regarded as the same hospital stay.

Regarding statistical methods, Independent-Samples $T$-Test, One-Way ANOVA, and
Scheffe’s post hoc comparisons were conducted using the SPSS 18.0 software to examine the
difference in poisoning mortality and hospitalization by gender, age, and poisoning types.
Linear regression was used to identify ten-year tends.

**Results**

**Epidemiological characteristics**

Between 1999 and 2008, there were a total of 20,620 poisoning deaths in Taiwan,
representing a mortality rate of 8.211 per 100,000 people. When considering intention, the
number of deaths caused by intentional poisoning was the greatest, with 14,440 deaths
(70.03% of all poisoning deaths), and demonstrated the highest mortality rate (5.734 per
100,000). The second and third greatest causes of poisoning deaths were unintentional
poisoning (3,589 deaths or 17.41% of all, mortality rate: 1.449 per 100,000) and unspecified
poisoning (2,591 deaths or 12.56% of all, mortality rate: 1.030 per 100,000). Cross analysis
on gender and intention showed that men had a higher proportion of unintentional poisoning
among all poisoning deaths than women (18.71% versus 14.29%), whereas women had higher
proportions of intentional and unspecified poisoning among all poisoning deaths than men
(72.77% versus 68.88% and 12.94% versus 12.41%, respectively). Men demonstrated a
mortality rate 2.3 times higher than women (11.460 versus 4.923 per 100,000). Mortality rates
from unintentional, intentional, and unspecified poisoning were all higher in men than in
women (2.160 versus 0.727, 7.883 versus 3.56, and 1.417 versus 0.637 per 100,000, respectively, \( p<0.001 \)). Cross analysis on age and intention showed that death from unintentional poisoning was significantly higher in age groups of 25-44 and 65 or more, compared to the 45-64, 15-24, 0-4, and 5-14 age groups (2.590 and 2.185 versus 1.556, 0.888, 0.291, and 0.177 per 100,000, respectively, \( p<0.001 \)); on the other hand, mortality rates from intentional poisoning were significantly higher in age groups of 65 or more, 45-64, and 25-44, compared to those in the 15-24, 0-4, and 5-14 age groups (10.635, 9.438, and 8.859 versus 2.242, 0.189, and 0.093 per 100,000, respectively, \( p<0.001 \)) (Table 1).

From 1999 to 2008, among a total of 254,993 hospitalized patients from poisoning in Taiwan, 97,888 people had both poisoning-related nature of injury codes (N-Codes) and E-Codes, 44,338 people who had only poisoning-related N-Codes, and 112,767 people who had only poisoning-related E-Codes, (38.4%, 17.4%, and 44.2%, respectively). In order to compare hospitalization data with mortality data, we calculated those with poisoning-related E-Codes, totaling 210,655, less 634 people who failed to provide gender information, hence equaling 210,021 or 82.4% of all hospitalized patients from poisoning. They were then categorized as unintentional, intentional, and specified poisoning.

Using the abovementioned method, a total of 210,021 hospitalized patients in Taiwan in 1999-2008, which represented a hospitalization rate of 86.362 per 100,000, were included in our analysis. Based on intention, unintentional poisoning contributed to the largest number of
hospitalized patients and the highest hospitalization rate, followed by intentional poisoning and unspecified poisoning (Number of cases: 153,045 or 72.87% of all versus 38,084 and 18,892 or 18.13% and 9.00% of all; hospitalization rate: 63.308 versus 15.392 and 7.661 per 100,000, respectively). Cross analysis of gender and intention revealed that the proportion of unintentional poisoning in hospitalized male patients was higher than in their female counterparts (76.42% versus 69.11%), while the proportions of intentional and unspecified poisoning were higher in hospitalized female patients than in their male counterparts (21.24% versus 15.19% and 9.65% versus 8.39%, respectively). With regards to hospitalization rate, men demonstrated a 1.04 times higher rate of poisoning hospitalization than women (88.032 versus 84.777 per 100,000 people). Men had a higher rate of unintentional poisoning hospitalization than women (67.610 versus 58.980 per 100,000 people); whereas women showed higher rates of intentional and unspecified poisoning hospitalization than men (17.739 versus 13.139 per 100,000 and 8.059 versus 7.284 per 100,000, respectively). Cross analysis on age and intention showed that the age groups of 65 or more and 45-64 had significantly higher rates of unintentional poisoning hospitalization, compared to the 0-4, 25-44, 15-24, and 5-14 age groups (291.580 and 90.869 versus 42.500, 39.517, 24.667, and 11.905 per 100,000, respectively, p<0.001), and people aged 65 or more demonstrated the highest rate of intentional poisoning hospitalization, compared to the 25-44, 45-64, 15-24, 5-14, and 0-4 age groups (27.264 versus 22.783, 17.791, 16.891, 0.636, and 0.515 per 100,000, respectively,
Long-term trends

Between 1999 and 2008, there was an increasing trend in overall poisoning mortality, with a 47.2% increase, \( p=0.003 \). Men demonstrated a larger increase in mortality rate than women (57.6% versus 26.2%, \( p=0.002 \) and 0.011, respectively) (Figure 1a). Regarding hospitalization, there was also a rising trend in overall poisoning hospitalization rate, with a 79.1% increase, \( p<0.001 \). Men had a larger increase in hospitalization rate than women (98.1% versus 61.4%, \( p<0.001 \) and \( p=0.001 \), respectively) (Figure 1b).

With regards to age, the population aged 65 or more demonstrated a declining trend in mortality, with a drop of 19.9%, \( p=0.011 \). However, the 25-44 age group showed a rising trend in mortality rate, with a 120.7% hike, \( p<0.001 \), and in 2005 this group surpassed those aged 65 or more to become the primary high-risk group for poisoning (Figure 2a). Considering hospitalization, the age group of 65 or more demonstrated the largest rise of 165.7% in hospitalization rate, \( p<0.001 \), followed by the 45-64 and 25-44 age groups with increases of 96.1% and 30.8%, respectively (\( p=0.001 \) and 0.047, respectively) (Figure 2b).

With regards to intention, mortality from unintentional poisoning declined by 35.8%, \( p<0.001 \). While mortality from intentional poisoning showed an increase of 120.0%, \( p<0.001 \), mortality from unspecified poisoning had decreased by 42.7%, but it failed to reach statistical
significance ($p=0.263$) (Figure 3a). In consideration of hospitalization, there was a 123.1% rise in the unintentional poisoning hospitalization rate, $p<0.001$, which was in line with the overall hospitalization rate. While the intentional poisoning hospitalization rate decreased by 23.3%, $p=0.047$, the unspecified poisoning hospitalization rate grew by 54.1%, $p=0.001$ (Figure 3b).

After analyzing the causes of unintentional poisoning, we found that unintentional poisoning from medicinal drugs was the primary type, followed by carbon monoxide, agricultural chemicals other than plant foods and fertilizers, and alcohol. With regards to trends in mortality, while most methods of unintentional poisoning demonstrated a decreasing trend, unintentional poisoning by medicinal drugs showed a 51.9% increase, $p=0.004$ (Figure 4a). With regards to trends in hospitalization rates, unintentional poisoning by medicinal drugs constituted the leading cause of unintentional poisoning hospitalization, followed by (2) venomous animals and plants, (3) pesticides, and (4) carbon monoxide. In consideration of trends in hospitalization rates, different methods of unintentional poisoning showed varying ten-year trends. The hospitalization rates from alcohol poisoning and adverse drug effects rose, while poisoning by other solid and liquid substance and by domestic gas fell. On the contrary, other methods showed no significant change (Figure 4b).
Discussion

Poisoning mortality and hospitalization by gender

Our analysis on overall poisoning mortality revealed that men had higher poisoning mortality than women, regardless of intention; this finding corresponded to the 2000 WHO report that indicated a higher global mortality from unintentional poisoning in men [1]. As for hospitalization, we found that men had a higher hospitalization rate from unintentional poisoning, and women had a higher hospitalization rate from intentional poisoning; our finding somewhat differed from previous literature. In the US, both the 2001-2003 health statistics from Colorado [11] and a study on emergency care data from 2001-2004 [12] indicated a higher poisoning hospitalization rate in women than that in men, regardless of intention.

In Taiwan, the reason for such a discrepancy between genders may result from personality and choice of occupation. In general, men are more adventurous than women and therefore are more prone to ingesting medicinal drugs or chemicals by mistake. Besides, men have less “insight of illness,” and hence tend to neglect the presence of a physical problem, or procrastinate to seek medical help, resulting in advanced disease progression at point of care. With regard to choice of occupation, a majority of agricultural and chemical industrial workers are men, who are at higher risks of exposure to harmful substances. Consequently, the risks of poisoning deaths are much higher in men than in women.
Poisoning mortality and hospitalization by age

We discovered that older adults aged 65 or more showed the highest poisoning mortality among all age groups, regardless of intention. Corresponding to our finding, the 2000 WHO report also pointed out that people aged 80 or more worldwide have the highest mortality rate from unintentional poisoning, followed by the 45-59 and 60-69 age groups (mortality: 8.3, 7.8, and 7.6 cases per 100,000 people, respectively) [1]. In consideration of hospitalization, older adults aged 65 or more demonstrated the highest poisoning hospitalization rate among all age groups, regardless of intention; this finding was different from previous literature. The 2001-2003 health statistics in Colorado US suggest that adolescents aged 15-19 are at the highest risk for intentional poisoning hospitalization, with 98.1 cases per 100,000 [11]. On the other hand, the epidemiological study using emergency care data from between 2001 and 2004 revealed that adolescents aged 15-19 demonstrate the highest incidence of non-lethal intentional poisoning (248 per 100,000), a rate which decreases with age [13].

In Taiwan, older adults constituted the high-risk group for mortality and hospitalization from poisoning. The phenomenon may be associated with the fact that this population is of a lower education level and literacy rate, resulting in a lack of knowledge and skills related to handling items safely. In addition, the existence of multiple illnesses and poor physical conditions may increase the risks for poisoning hospitalization or mortality as well.
Poisoning mortality and hospitalization by intention

Regarding intention, a majority of unintentional poisoning deaths were caused by medicinal drugs, followed by (2) carbon monoxide, (3) pesticides, and (4) alcohol, whereas most intentional poisoning deaths were caused by suicide using solid or liquid substances and suicide using other gases and vapors. Regarding hospitalization, a majority of unintentional poisoning hospitalization was caused by unintentional poisoning by medicinal drugs, followed by (2) venomous animals and plants, (3) pesticides, and (4) carbon monoxide; on the other hand, most intentional poisoning hospitalization was caused by suicide using other gases and vapors and suicide using solid or liquid substances. A number of previous studies correspond to our discovery that poisoning by medicinal drugs and pesticides was the primary cause of poisoning mortality and hospitalization [11, 14-19]. This phenomenon may result from the wide prevalence and easy availability of medicinal drugs and pesticides compared to other poisoning methods. Therefore, the following discussion will focus on the long-term trends in poisoning by medicinal drugs and pesticides.

Trends in mortality and hospitalization from poisoning by medicinal drugs

This study revealed a rising trend in mortality rates from unintentional poisoning caused by medicinal drugs. Previous studies from other countries are as follows: in England and
Wales, mortality rates from unintentional poisoning by medicinal drugs were on the rise in 1993-1998 [20]. According to the 2004-2007 statistics in England and Wales, the mortality rate from using paracetamol had dropped the most, followed next by antidepressants, whereas mortality rates from methadone demonstrated the greatest increase, along with the continuous rise in mortality rates from heroin/morphine poisoning [21]. There was also an increasing trend in drug poisoning mortality in the US between 1979 and 2002 primarily stemming from the increase in deaths from unintentional poisoning by medicinal drugs, particularly opioids [22]. It has been indicated that most drug poisoning cases in the US were caused by prescription drugs [23], whereas poisoning by controlled substances such as heroin became the primary cause during the 1970s [24]. In recent years, the misuse and abuse of prescription drugs has risen again and become the primary cause of drug poisoning in the US [25]. In Sweden, there was a decline in suicide by drug poisoning between 1969 and 1996 in older populations, mainly resulting from a decrease in suicides using antidepressants [26]. However, in 1993-2004, despite the decline in poisoning by tricyclic antidepressants, there was an increasing trend in poisoning by selective serotonin reuptake inhibitors [27].

Since the launch of the NHI in Taiwan in 1995, the general public has had better access to prescription drugs such as sleeping pills, sedatives, and analgesics, which may increase the chances of drug misuse and hence elevate mortality from unintentional drug poisoning [16]. The promulgation of the Drug Harvard Relief Act in Taiwan in 2000 allows timely relief
without resorting to lawsuits or pleads provided to victims of unforeseeable adverse reactions from the proper usage of legal drugs that results in death, disability, or serious illness [28]. Therefore, the Act’s launch may encourage the report of drug poisoning deaths and hence increase death counts from unintentional drug poisoning. Furthermore, the leading types of drug poisoning in this study differed from those in other studies; this may be a result of the varying availability of marketed medicinal drugs along with different prescription patterns of physicians in other countries.

**Trends in mortality and hospitalization rates from poisoning by pesticides**

This study revealed decreasing trends in mortality and hospitalization rates from unintentional poisoning by pesticides, in mortality rates from suicide poisoning by solid and liquid substances (including pesticides), and in hospitalization rates from suicide poisoning by pesticides between 1999 and 2008. Studies from other countries are as follows: in Korea from 1996-2005, mortality from pesticides rose for both genders [29]. In Central America, there was also an increase in both incidence and mortality rate from pesticide poisoning from 1992-2000, which might be related to increased pesticide imports during the same period of time [30]. In Thailand from 1987-1996, both injuries and deaths from pesticide poisoning decreased; however, there the numbers might be an underestimation since most locals failed to seek medical help in the event of poisoning [31]. In Japan from 1991-1996, poisoning by
pesticides was on the decline, which could result from the decrease in paraquat poisoning [32].

As a result of social transformations in Taiwan in recent years, the area of farmland has been decreasing. As the traditional agriculture-centered Taiwanese society continues to thrive more and more on business, traditional industry, and high-technology industry, organic farming has also gradually replaced traditional farming, resulting in a large decrease in pesticide use. Between 1951 and 1992, the proportion of agricultural workers in Taiwanese population decreased from 56% to 12%, while that of industrial workers rose from 16% to 40% [33]. According to the 2009 statistics from the Council of Agriculture, Executive Yuan, there has been a decreasing trend in the amount of people employed in the agricultural industry, from approximately 710,000 people in 2002 to about 540,000 people as of June, 2009 [34]; this trajectory has coincided with the increasing amount of importance attached to environmental protection and food safety issues by the public. Since 1972, a total of 119 agricultural chemicals have been banned due to high toxicity, teratogenicity after long-term exposure, tumorigenicity, and/or environmental pollution [35]. The abovementioned reasons may well account for the decline in the pesticide poisoning mortality rate.

**Limitations**

The variables analyzed in this study were limited by the cause of death statistics in
Taiwan and the hospitalization data retrieved from the NHI Research Database. Certain information was not available, such as the severity of poisoning, education level of patients, smoking habits, and use of alcohol.

Our study was limited with regards to cause of death statistics; when registering cause of death, the Department of Health only records the first three digits of E-Codes. Therefore, the absence of the fourth digit hindered us from extracting additional detailed information. For example, we were unsuccessful in differentiating between organic phosphorus pesticides and organic chlorine pesticides in agricultural chemical poisoning cases, and hence were unable to compare the mortality data against the hospitalization data.

After an injury, posttraumatic care can be categorized into no medical care or self-care, outpatient care, emergency care, inpatient care, and death. However, because the outpatient and emergency treatment data provided by the NHI Research Database failed to include E-Codes, we were unable to classify those patients receiving such care by the poisoning method based on the ICD-9-CM system. As a result, only deaths and hospitalized patients for severe poisoning injuries were analyzed in this study, while those receiving other types of care were excluded.

**Conclusions**

In Taiwan, there were 20,620 deaths from poisoning (mortality: 8.211 per 100,000) and
210,021 hospitalized patients from poisoning (hospitalization rate: 86.362 per 100,000) between 1999 and 2008. Men demonstrated higher poisoning mortality and hospitalization rates than women. Older adults aged 65 or more had the highest rates of poisoning mortality and hospitalization rates among all age groups. Intentional poisoning was the primary cause of poisoning deaths, with a mortality rate of 5.734 per 100,000, whereas unintentional poisoning was the primary cause of poisoning hospitalization, with a hospitalization rate of 63.308 per 100,000. Trend analysis showed a rise in both poisoning mortality and hospitalization rates in Taiwan from 1999 to 2008, which resulted from increases in intentional poisoning mortality and in unintentional poisoning hospitalization, respectively. Furthermore, the main causes of poisoning were medicinal drugs, carbon monoxide, and pesticides.

We analyzed the trends between 1999 and 2008 in poisoning mortality and hospitalization rates by various poisoning types using cause of deaths statistics and hospitalization data from the NHI Research Database. However, the risks factors for such mortality and hospitalization rates were not discussed in this study. Future studies are required to further explain the different risk factors for mortality and hospitalization rates caused by various types of poisoning.

**Competing interests**

The author(s) declare that they have no competing interests.
Authors' contributions

CHC contributed to interpretation of the data and drafted the paper. YCH contributed to interpretation of the data. WCC contributed to the study design, obtained the data and commented on the interpretation. All authors have read and approved the final manuscript.

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Number of deaths classified according to the basic tabulation list by gender and age.


Figures

Figure 1 - Long-term trends in mortality and hospitalization rates in Taiwan, categorized by gender, 1999-2008

a) Unintentional poisoning mortality rates

Mortality Rate (per 100,000)

b) Unintentional poisoning hospitalization rates

Inpatient Rate (per 100,000)
Figure 2 - Long-term trends in mortality and hospitalization rates in Taiwan, categorized by age group, 1999-2008

a) Unintentional poisoning mortality rates
Mortality Rate (per 100,000)

b) Unintentional poisoning hospitalization rates
Inpatient Rate (per 100,000)
Figure 3 - Long-term trends in poisoning mortality and hospitalization rates in Taiwan, categorized by cause, 1999-2008

a) Unintentional poisoning mortality rates

b) Unintentional poisoning hospitalization rates
Figure 4 - Long-term trends in unintentional poisoning mortality and hospitalization rates in Taiwan, categorized by poisoning type, 1999-2008

a) Unintentional poisoning mortality rates

Mortality Rate (per 100,000)

1.0000
0.9000
0.8000
0.7000
0.6000
0.5000
0.4000
0.3000
0.2000
0.1000
0.0000

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 Year

- Drugs
- Alcohol
- Cleansing
- Petroleum products
- Pesticide
- Corrosives
- Food stuffs
- Other solid and liquid
- Gas distributed by pipeline
- Other utility gas and CO
- Other gases and vapors
- Animals and plants

b) Unintentional poisoning hospitalization rates

Inpatient Rate (per 100,000)

12.0000
10.0000
8.0000
6.0000
4.0000
2.0000
0.0000

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 Year

- Drugs
- Alcohol
- Cleansing
- Petroleum products
- Pesticide
- Corrosives
- Food stuffs
- Other solid and liquid
- Gas distributed by pipeline
- Other utility gas and CO
- Other gas and vapors
- Animals and plants
Additional files provided with this submission:

Additional file 1: Table1.pdf, 34K
Additional file 2: Table2.pdf, 32K
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