

THIS PAGE IS SECURE

Home / Advanced Science Letters, Volume 24, Number 7



# Do Consumer Health Spending and Income per Capita Influence Mortality Rate? Study in Five ASEAN Countries

Buy Article:  
**\$106.23 + tax**  
(Refund Policy)  
[ADD TO CART](#)  
[BUY NOW](#)

**Authors:** Mustolih, Arif<sup>1</sup>; Naomi, Prima<sup>2</sup>  
**Source:** Advanced Science Letters, Volume 24, Number 7, July 2018, pp. 5022-5026(5)  
**Publisher:** American Scientific Publishers  
**DOI:** <https://doi.org/10.1166/asl.2018.11259>

< previous article | view table of contents | next article > [ADD TO FAVOURITES](#)

Abstract | References | Citations | Supplementary Data | Article Media | Metrics | Suggestions

This research aims to investigate the influence of consumer health spending and income per capita on mortality rate in five ASEAN countries. It also aims to observe more detail which type of consumer health actually influences mortality rate. We used annual data from 2002 to 2016. Estimation using fixed effect model with five years time-lag leads is the best model. The result shows that consumer health spending has negative influence on mortality, while income per capita provides positive influence. Furthermore, types of consumer health products that influence mortality rate include allergy care, weight management and wellbeing, vitamins and dietary supplements.

**Keywords:** Asean Country; Consumer Health Spending; Income per Capita; Mortality Rate  
**Document Type:** Research Article  
**Affiliations:** 1: PGSB Universitas Paramadina, Tempo Building 7th Floor, Jl.Palmerah Barat No. 8, 12240, Jakarta, Indonesia 2: FEB Universitas Paramadina, Jl. Gatot Subroto, Kav. 97 Mampang, 12790, Jakarta, Indonesia  
Publication date: July 1, 2018  
[More about this publication?](#)

Sign-in - [Register](#)

Username:

Password:

[SIGN IN NOW](#)

Remember Login | [Login reminder](#)

[OpenAthens](#) | [Shibboleth](#)

Tools

- [Reference exports +](#)
- [Linking options +](#)
- [Receive new issue alert](#)
- [Latest TOC RSS Feed](#)
- [Recent Issues RSS Feed](#)
- [Get Permissions](#)
- [Favourites](#)
- [Accessibility](#)

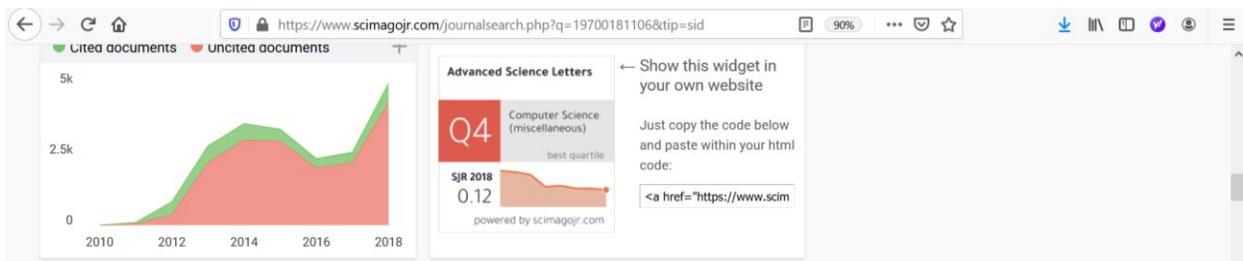
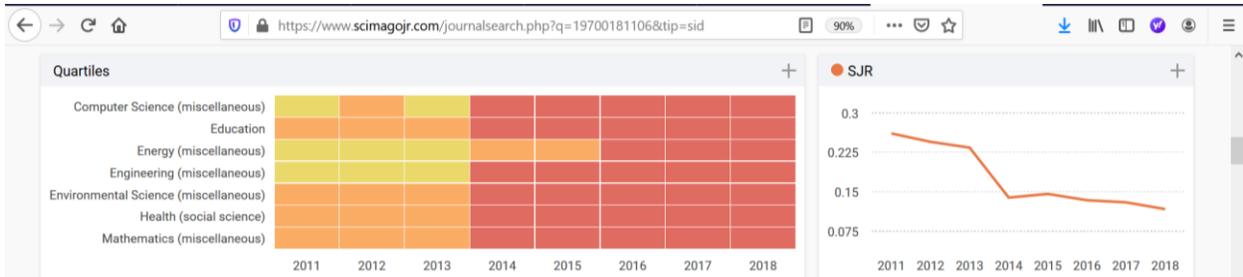
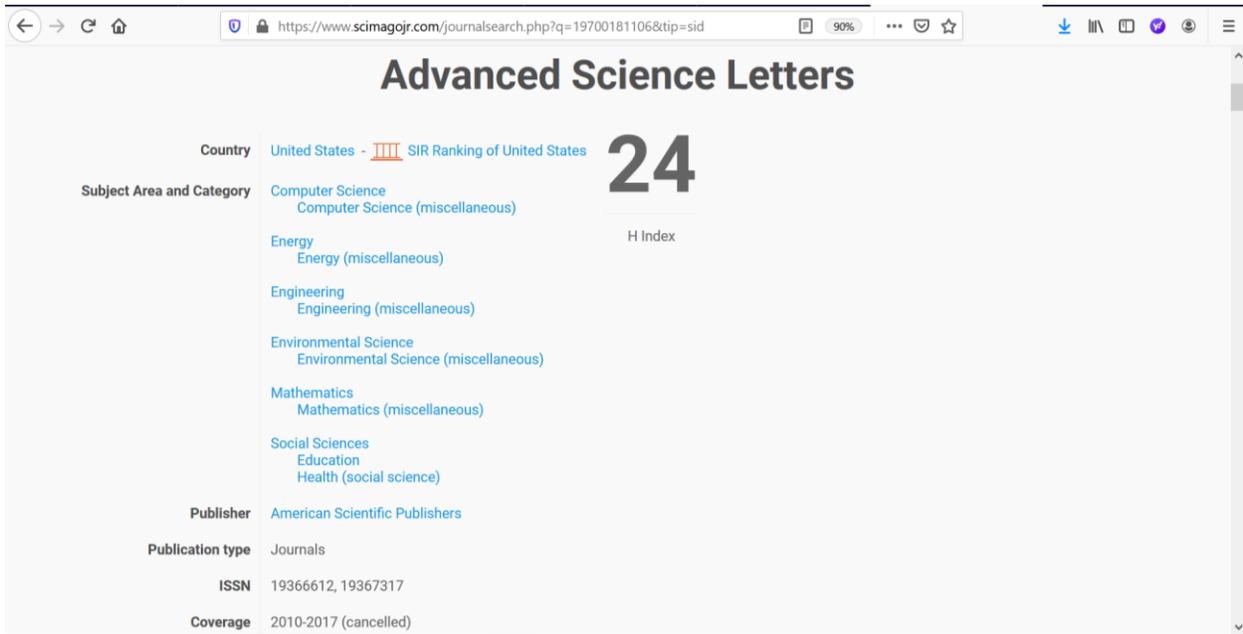
Pilih Bahasa

Diberdayakan oleh [Google](#) [Terjemahan](#)

Share Content

Advance Science Letter adalah jurnal international bereputasi hingga 2017. Tahun terbitan tulisan ini adalah tahun 2018. Oleh karena itu masuk kategori Jurnal Internasional. → nilai tertinggi : 20

Prima naomi adalah penulis ke-2, dengan demikian nilai tertinggi =  $20 \times 0,4 = 8$



<https://www.ingentaconnect.com/content/asp/asl/2018/00000024/00000007/art00066>



# Do consumer health spending and income per capita influence mortality rate? Study in Five ASEAN Countries

Arif Mustolih<sup>1</sup>, Prima Naomi<sup>2\*</sup>

<sup>1</sup>PGSBUniversitas Paramadina, Tempo Building 7<sup>th</sup> Floor, Jl. Palmerah Barat No.8, 12240, Jakarta, Indonesia

<sup>2</sup>FEBUniversitas Paramadina, Jl. Gatot Subroto, Kav. 97 Mampang, 12790, Jakarta, Indonesia

This research aims to investigate the influence of consumer health spending and income per capita on mortality rate in five ASEAN countries. It also aims to observe more detail which type of consumer health actually influences mortality rate. We used annual data from 2002 to 2016. Estimation using fixed effect model with five years time-lag leads is the best model. The result shows that consumer health spending has negative influence on mortality, while income per capita provides positive influence. Furthermore, types of consumer health products that influence mortality rate include allergy care, weight management and wellbeing, vitamins and dietary supplements

**Keywords:** consumer health spending, income per capita, mortality rate, asean country

## 1. INTRODUCTION

It is interesting to witness that consumer groups are increasingly mindful to stay healthy. They are now aware of the benefits of taking vitamins and dietary supplements as well as other nutrition in order to boost and to maintain their healthiness. Feldman<sup>1</sup> state that world's consumer health industry is rapidly growing. Asia Pacific, the Middle East and Africa will be the regions where consumers will generate the fastest growth on expenditure in the next five years as local populations gain wider access to pharmaceutical and medical services. According to Feldman, internet retailing has captured a significant growth since 2010 when it generated US\$7 billion in retail value to become more than double to US\$14 billion in 2015. Vitamins and dietary supplements, out the counter (OTC) drugs and weight management products contributed the biggest margin from the internet sales. It is, somehow, an interesting phenomenon.

According to Schmidt<sup>2</sup>, the consumer health industry is poised another exciting growth in 2016. With global sales expected to grow by over 3%, the consumer health industry is expected to reach US\$217 billion by year end of 2016. Five of the emerging markets are offering a consolidated industry and are looking beyond the traditional growth divers to the markets. The two of the emerging markets on consumer health industry, Indonesia and Thailand, both are members of ASEAN countries, are the object countries of this research. The other three countries include Pakistan, Algeria and China.

For Asia Pacific Region minus China, the Association of Southeast Asian Nations (ASEAN) offers comparative

demographic advantages. One of the comparative advantages is huge number of population that offers good opportunity for fast growing market place for all industries. In April 2016, ASEAN Secretariat and IMF World Economic Outlook recorded that total population in ASEAN was 629 million people. It is the third largest in the world, after China and India. In particular, Indonesia's population is accounted for about 40% of the region's total population<sup>3</sup>. Market-wise, the size of consumer health market in five ASEAN member states recorded at US\$8.79 billion in 2016, which is 11.8% of Asia Pacific market (US\$74.6 billion) and 4.05% of global market (US\$217.2 billion).

Supinus<sup>4</sup> on his research conducted in Indonesia using data from 2005 to 2010 provided empirical evidence that the government health spending provided significant positive influence on infant mortality decline. This means that if the government budget on health spending increases, the life expectancy increases and mortality rate decreases as long as income per capita increases as well. Gottret & Schiber<sup>5</sup> stated that a 10% increase in government spending on health care, on education, on road or infrastructure and on sanitation will significantly impact infant and mother mortality decline.

Nolte & McKee<sup>6</sup> examined trends and patterns of amenable mortality, deaths that should not occur in the presence of assurance and effective health care. Their study about the amenable mortality was conducted in the United States, France, Germany and United Kingdom. The result shows that overall, amenable mortality rates fell by 18.5% among men under seventy five years of age and among women with the same range of age it fell 30%. The above will

not happen in countries where health care and other health programs are poor. Meanwhile, Suhri<sup>7</sup> who studied Infant Mortality Rate and Life Expectancy in Indonesia determined that there was significant positive influence between lack of daily value index and population who has access to sanitation on infant mortality rate. When the index increases, the mortality rate also increases. Based on above

studies and resarches, we propose the first hypotesis that consumer health spending influences mortality rate.

Another concern that influences the mortality rate is income per capita. The influence of income on life expectancy has been examined many times through scientific and statistical studies. A Study conducted by Brenner<sup>8</sup> determined that economic growth, cumulatively over at least a decade, is the central factor of mortality rate decline in the United States over the 20<sup>th</sup> century. In the short term, within the first months of that decade, rapid economic growth is associated with increased mortality, simply because it was owing to the initial stresses of adaptation to new technology in combination with greater work volume, speed, and duration. However, this short term effect disappears and long term effect of economic growth is entirely related to mortality decline.

The so-called Preston curve<sup>9</sup>, for example, indicates that individuals born in wealthier countries, on average, expect to live longer than those born in poor countries. However, it is not always the case. Higher income also correlates with a number of unhealthy behaviors, such as smoking and consuming alcohol and less healthy diets, which in turn leads to weakening health. Physical fatigue, increased consumption of automobiles, alcohol, tobacco, sugar and animal fats are all features of western society today, mainly because high income per capita has made such consumption possible. In particular, smoking, consuming alcohol and obesity are the major risk factors with biological effects on health and demographic patterns. Looking at the latest development, not only GDP or life expectancy correlation is a lot stronger in emerging countries, but also certain other indicators are a lot more important for developing nations. For example, the correlation coefficient between life expectancy and access to improved sanitary facilities. Expenditure on health was also a lot more important in emerging economies, where existing healthcare facilities are so basic that every extra dollar poured into the sector can have a tremendous effect. It leads towards healthy and wealthy communities that could provide longest life expectancy and at the end of the day, declining mortality rate.

Chetty, et al.<sup>10</sup> conducted research about the association between income and life expectancy in the United States from 2001 to 2014 and concluded that higher incomes in the United States are associated with greater longevity, and differences in life expectancy across income groups increased over time. However, the association between life expectancy and income varied substantially across areas; differences in longevity across income groups decreased in some areas and increased in others. The differences in life expectance were correlated with health behaviours and local characteristics in that area. Based on the above arguments we proposed second hypothesis that income per capita influences mortality rate.

Biggs, et al.<sup>11</sup> found that income is not the only factors to lower mortality rate but most importantly is how to create distribution of income (equality). Meanwhile, according to Bhalotra<sup>12</sup> (2005), the economic growth is related to mortality decline as long as it is followed by other factors, such as education and health. In this research, consumer health is meant to be a spending on consumer health products, those that are

manufactured to help boost and maintain someone's health. Consuming the consumer health products is aimed at reducing unnecessary health expenses related to sickness and other health issues.

The consumer health products in this research include: 1) Out The Counter (OTC); 2) Sports Nutrition; 3) Vitamins and Dietary Supplements; 4) Weight Management and Wellbeing; 5) Herbal and Traditional Products; and 6) Allergy Care. We would also like to take this opportunity to further examine which types of consumer health products actually influence mortality rate.

## 2. RESEARCH METHODOLOGY

This research uses data sample from five ASEAN countries that have the biggest spending in consumer health products, include Indonesia, Malaysia, Philippines, Thailand, and Vietnam. The compiled data is framed from 2002 to 2016 obtained from Euromonitor International at [www.euromonitor.com](http://www.euromonitor.com)

The variables for this research consist of two independent variables (consumer health spending and income per capita) and another dependent variable (mortality rate). Each of the variables is defined as follows:

1. Consumer Health Spending: refers to spending on consumer health products that are manufactured to help boost and maintain someone's health. In this study, the data of the consumer health spending is available in U.S. Dollar (constant).
2. Income per capita: applies to the average income earned per person in a country in a specified year. In this study, the data of the income per capita is available in U.S. Dollar (constant).
3. Mortality Rate: is number of deaths occurs in a population in certain period of time, divided by number of population in that area. In this study, the data of the mortality rate is available in percentage.

The research framework is described in figure 1. and figure 2.

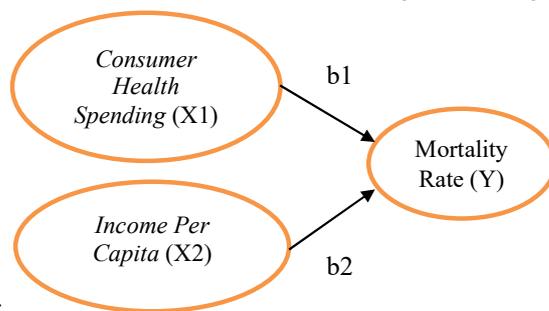


Figure 1. framework for the question 1 and 2

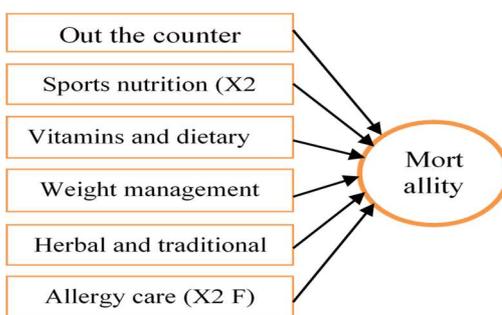


Figure 2. framework for the question 3

Data processing is performed by using panel data regression. Several tests are also performed to select the best model to further analysing the results.

### 3. RESULTS AND DISCUSSION

The descriptive statistics results are shown in Table 1. From the table it can be seen that the mean of income per capita and consumer health spending in five ASEAN member countries are respectively 2647.497 US D, 17.42667 USD. While, the mortality rate in five ASEAN member states is 6.25 %.

The estimated result using fixed effect model concluded the best result with independent variables 5 year period prior to t (t-5), which can be seen in Table 2. The value of R<sup>2</sup>(coefficient of determination) shows that the variant of mortality rate can be explained by 98.71% from consumer health spending and

income per capita variables. The F Test results indicate that consumer health spending along with income per capita is jointly significant in influencing mortality rate. Consumer health spending provides negative influence on mortality rate, while income per capita provides positive influence.

Tabel 1. Descriptive Statistic

	Income Per capita	Consumer Health	Mortality Rate
Mean	2647.497	17.42667	6.25
Median	2285.100	14.50000	6.30
Maximum	6852.700	39.50000	8.20
Minimum	712.6000	4.400000	4.30
Std. Dev.	1431.601	10.40781	1.08
Observatio	75	75	75
Cross	5	5	5

Tabel 2. The Test Result of Fixed Effect Model

Dependent Variable: Y  
 Method: Pooled Least Squares  
 Date: 02/20/17 Time: 10:22  
 Sample: 2007 2016  
 Included observations: 10  
 Cross-sections included: 5  
 Total pool (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2408.950	378.9012	6.357726	0.0000
X1	166.1701	5.466015	30.40059	0.0000
X2	-344.2884	62.55667	-5.503625	0.0000
Fixed Effects (Cross)				
_INDONESIA—C	746.5178			
_MALAYSIA—C	-399.3755			
_PHILIPPINES--C	-350.4539			
_THAILAND—C	283.5153			
_VIETNAM—C	-280.2038			

#### Effects Specification

#### Cross-section fixed (dummy variables)

R-squared	0.987068	Mean dependent var	2903.118
Adjusted R-squared	0.985264	S.D. dependent var	1590.419
S.E. of regression	193.0644	Akaike info criterion	13.49310

Sum squared resid	1602775.	Schwarz criterion	13.76078
Log likelihood	-330.3275	Hannan-Quinn criter.	13.59504
F-statistic	547.0294	Durbin-Watson stat	1.114110
Prob(F-statistic)	0.000000		

With regard to the finding about the negative influence of consumer health spending on mortality rate, it is in line with the studies conducted by Supinus<sup>4</sup> and Nolte and McKee<sup>5</sup>. Supinus<sup>4</sup> stated that any percentage increase of the state health spending will decrease mortality rate as long as income per capita also increases. Nolte and McKee<sup>5</sup> examined that amenable mortality should not occur in the presence of timely and effective health care. This can also be observed in how the health spending escalates, particularly in how big the consumption of consumer health product is.

Meanwhile, the positive influence of income per capita on mortality rate is in accordance with the Preston curve theory, which indicates that the more higher income the more correlate with unhealthy behaviours, such as smoking, consuming alcohol, and less healthy diets, which in turn lead to weakening health. This result is also in line with the research conducted by Biggs et

Al.<sup>11</sup>, which found that income is not the only factor to decrease mortality rate, but most importantly is how to create distribution of income (equality). Furthermore, the result of this study is also supported by Bhalotra<sup>12</sup> who stated that the economic growth could decrease mortality rate as long as it is followed by other factors, such as education and health.

In addition, Kaplan<sup>13</sup> also provided strong correlation to this study, where he believed that national income of a country is not the only underlined factors. Equal income distribution is also important. According to Kaplan, the variant of imbalance distribution of income across countries has significant connection with the variant of health outcome. Economic policy that leads to income and wealth imbalance is very crucial to the health issue in a country.

Consumer health spending in this study is divided into six product categories including out the counter (OTC), sports nutrition, vitamins and dietary supplements, weight management and wellbeing, herbal and traditional products, and allergy care. In this study, we also had the opportunity to perform additional test aimed at finding more detailed results on which of the above consumer health product categories actually influences mortality rate. The result can be found in Table 3.

Tabel 3. Consumer Health Spending Dimension

Dependent Variable: Mortality Rate  
 Method: Pooled Least Squares  
 Date: 02/20/17 Time: 16:01  
 Sample: 2007 2016  
 Included observations: 10  
 Cross-sections included: 5  
 Total pool (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.59677	1.350702	10.06645	0.0000
OTC	-2.380228	1.754206	-1.356869	0.1826
SPORTS NUTRITION	1.006863	0.122173	8.241274	0.0000
VITMIN_DIETARY_SUPPLE	-0.344316	0.045077	-7.638339	0.0000
WEIGHT_MANAGEMENT_W	-0.860955	0.177387	-4.853530	0.0000
HERBAL_TRADITIONAL_PR				
O	-0.254887	0.995850	-0.255949	0.7993
ALLERGY_CARE	-1.685880	0.240152	-7.020070	0.0000

Fixed Effects (Cross)	
_INDONESIA—C	1.040672
_MALAYSIA—C	-3.711159
_PHILIPPINES—C	2.503430
_THAILAND—C	2.829416
_VIETNAM—C	-2.662358

---

Effects Specification	
Cross-section fixed (dummy variables)	
R-squared	0.995522
Adjusted R-squared	0.994373
S.E. of regression	0.155784
Sum squared resid	0.946484
Log likelihood	28.22869
F-statistic	866.9306
Prob(F-statistic)	0.000000

The result shows that there are only four products out of six consumer health products that are significantly influencing mortality rate. Three of those products are allergy care, weight

management and wellbeing, and vitamins and dietary supplements. It explains that those three products could help to boost and maintain someone's health and at the end of the day they are related to mortality decline.

Allergy care appears to be the consumer health product that most significantly influences mortality rate decline. The common example of allergy care is that which is associated with asthma handling. Rebuck<sup>14</sup> described that beyond doubt, childhood asthma has become more common. Rebuck<sup>14</sup> noted that according to the American Academy of Allergy, Asthma and Immunology, the overall number of people with asthma continues to grow with approximately 8% of the population are now having asthma. One in ten children in the US suffers from asthma. The rate is rising more rapidly in preschool aged children than in any other groups. Over the past twelve years, 5-7 years old have had the highest asthma attack prevalence rates, while those over 65 have had the lowest rates.

The American Lung Association<sup>15</sup> (2004) recently issued a report from its Epidemiology and Statistics Unit on trends in Asthma mortality and morbidity. Rebuck<sup>14</sup> also stated that in 2009, the 3,388 people who tragically died from asthma represented a 26% decrease over a 10-year period. At last, after a long period of steady increase, asthma mortality seems to be decreasing. Rebuck also mention that in New York City, for example, the number of deaths from asthma fell from 213 to 149 over an eight-year period. The age-adjusted rate fell from 2.7 to 1.7 per 100,000 over the same time. The overall decrease in asthma mortality seemed to be driven by the older population and coincided with an increase in use of inhaled corticosteroids. While it is not possible to prove that inhaled corticosteroids is the sole explanation responsible for the decreased mortality rate, the fact remains that there is a correlation between a significant reduction in asthma mortality and a significant change in asthma management. It is reported that the Royal College of Physicians, in partnership with Asthma UK, state categorically that 90% of asthma deaths in the UK, currently at a rate of three every day, are preventable. In addition, Rebuck also noted that while comparisons between regions and across time are complex, it is clear that over the last two decades, mortality and hospitalizations from asthma have decreased<sup>16</sup>. Simply put, if we

are able to handle allergic disease with appropriate medical treatment, it could lead to mortality decline.

There is no surprise that weight management and wellbeing and vitamins and dietary supplement also provide a significant influence on the decline of mortality rate. It is certainly an interesting phenomenon. As described at the beginning of this study, there is indication that consumer groups are increasingly aware in implementing a healthy active lifestyle as an effort to maintaining their health. Consumer groups who are consuming weight management and wellbeing and vitamins and dietary supplements are those who are strongly aware of the benefit to stay healthy and are encouraged for a healthy lifestyle including but not limited to performing physical exercise and consuming balance nutrition intake.

The result also indicates that sports nutrition provides positive significant influence on mortality rate. Sports nutrition products are basically produced to increase certain hormonal production, to increase stamina and power, to kill pain and to reduce fatigue, to increase muscle mass and other function related to enhancing performances. In the event of consuming these products excessively in the long period of time, especially those with doping contaminant, it could lead to severe health risk. According to Pipe & Ayotte<sup>17</sup>, many sports supplement products contain substances that are prohibited in sports-typically stimulants or anabolic steroid precursors. Many sports supplements contain substances (e.g., ephedrine) that have been associated with significant morbidity and mortality. Pipe and

Ayotte also stated that sport practitioners have particular responsibilities in addressing this issue. Athletes also need to be aware of the problem that can follow sports nutrition/supplement use and sport authorities need to ensure that nutritional education and guidance of athletes is of the highest standard.

#### 4. CONCLUSIONS

There are three conclusions that we made from this study:

1. Consumer health spending significantly influences mortality rate decline. It explains that if consumer health spending increases, it will decrease mortality rate.
2. Income per capita is also proven to influence mortality rate.
3. Additional test on types of consumer health products resulted that only spending on allergy care, weight management and wellbeing and vitamins and health supplements products can provide significant influence on mortality decline.

#### References and Notes

1. Feldman, Performance to Advance Market Strategy in 2016 and Beyond. London: Passport Euromonitor International (2015).
2. Schmidt, C.. A Look Ahead: Consumer Health's Fastest-Growing Market in 2016. London: Passport Euromonitor International. (2016).
3. ASEAN. ASEAN Economic Community Chartbook 2016. Jakarta: ASEAN Secretariat. (2016).
4. Supinus, Pengaruh belanja sektor kesehatan bayi di Indonesia tahun 2005-2010. Jakarta: Universitas Indonesia. . (2013).

