1. INTRODUCTION

- Annually there are estimated 25 million pneumonia cases worldwide and 6.5 million deaths. According to the World Health Organization (WHO), pneumonia is also the leading cause of death in children.
- The Department of Statistics Malaysia (DOSM), pneumonia is one of the top five causes of death in Malaysia. In 2009, pneumonia was the 4th leading cause of death in Ministry of Health (MOH) Hospitals in Malaysia (10.4% of hospital mortality).

2. METHODOLOGY

- Data on all cause pneumonia deaths in Malaysia from 2004 to 2008 were obtained from the DOSM. For death attributed to pneumonia, the data obtained included the age, year and cause of death. Data on all cause death was given for each year, though the age and cause of death were not provided.
- The DOSM data on pneumonia deaths was based on death records obtained from the Malaysian National Registration Department. These were categorised using the International Statistical Classification of Diseases and related Health Problems, Tenth Revision (ICD-10).
- Deaths caused by pneumonia were identified using ICD-10 codes (I81 and I82) in the data provided by DOSM.
- Death rate was reported in deaths per 100,000 population.
- Analysis was conducted using Microsoft Office Excel 2007 and Stata SE version 11.2.

3. RESULTS

- As shown in Table 1, the all cause death rate in Malaysia ranged from 406.41 to 455.99 per 100,000 population from 2004 to 2008.
- Deaths attributed to pneumonia showed an increasing trend (Figure 1).
- Deaths attributed to pneumonia showed an increasing trend from 2004 to 2008 (Figure 1).
- The all cause death rate attributed to pneumonia showed an increasing trend (Figure 1).
- Deaths due to pneumonia appeared to show an increasing trend over the period from 2004 to 2008 relative to the all cause death rate during that time.
- The result is consistent with other studies that reported age group 65 and above contributes to a significant proportion of pneumonia deaths. Different from previous studies, our study shows age groups 31-45 and 46-64 are also contributing to the increased pneumonia deaths.
- The trend of increasing pneumonia deaths could be related to factors such as:
  - Over-prescription of antibiotics which lead to higher pathogen resistance
  - Increasing number of migrants from less developed countries
  - Improvements in cause of death reporting and identification of pneumonia as a cause of death
- Our study is reliant on the presumed accuracy of the ICD-10 coding provided within the dataset. Related to this, we believe that cases of tuberculosis related to pneumonia may explain part of the increasing trend.
- Authors recognize limitations of this study as the data that was used was limited in its depth. In particular, the data provided did not have date or location of death. Hence, our analysis was unable to assess monthly or seasonal variations. Also unknown is whether the pneumonia deaths were hospital acquired or community acquired pneumonia.

4. DISCUSSION

- Deaths due to pneumonia appear to show an increasing trend over the period from 2004 to 2008 relative to the all cause death rate during that time.
- The result is consistent with other studies that reported age group 65 and above contributes to a significant proportion of pneumonia deaths. Different from previous studies, our study shows age groups 31-45 and 46-64 are also contributing to the increased pneumonia deaths.
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5. CONCLUSION

- Our study shows an increasing number of deaths in Malaysia caused by pneumonia between 2004-2008. The rate of pneumonia deaths has increased significantly when compared against all cause mortality.
- We would aim to collaborate further with the DOSM to obtain greater details in the dataset to gain better clarity of these findings.
- For future study, further examination of pathogenic causes as well as wide scale surveillance of pneumonia in Malaysia is needed.
- The additional study would help to determine the validity of these findings and understand the reasons for this possible increasing trend.

6. ACKNOWLEDGEMENT

- The authors wish to thank the Department of Statistics Malaysia for providing the data used in this study.

References:

1. World Health Organization. Pneumonia Factsheet N0331, August 2012;
2.-methodology
3. Methodology
4. Discussion
5. Conclusion
6. Acknowledgement

Table 1: All cause death and pneumonia death rate by year (2004-08)

<table>
<thead>
<tr>
<th>Year</th>
<th>All cause death</th>
<th>Pneumonia death</th>
<th>Population</th>
<th>All cause death rate</th>
<th>Pneumonia death rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>113,748</td>
<td>5,723</td>
<td>27,000</td>
<td>416.41</td>
<td>19.79</td>
</tr>
<tr>
<td>2005</td>
<td>116,055</td>
<td>6,955</td>
<td>27,000</td>
<td>427.61</td>
<td>19.95</td>
</tr>
<tr>
<td>2006</td>
<td>118,481</td>
<td>7,946</td>
<td>27,000</td>
<td>437.88</td>
<td>19.51</td>
</tr>
<tr>
<td>2007</td>
<td>120,157</td>
<td>8,407</td>
<td>27,000</td>
<td>452.97</td>
<td>19.99</td>
</tr>
<tr>
<td>2008</td>
<td>124,932</td>
<td>19,082</td>
<td>27,000</td>
<td>465.96</td>
<td>17.70</td>
</tr>
</tbody>
</table>

Figure 1: Pneumonia death rate (per 100,000 population) from 2004 to 2008

Figure 2: Distribution of pneumonia death by age group (%), 2004-2008

Figure 3: Percentage of deaths caused by pneumonia compared to all cause death

Abbreviations:

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