Is there a relationship between Countries' Human Development Index (HDI) level and the incidence of tuberculosis?

Introduction

Tuberculosis is a very deadly disease caused by the bacteria, *Mycobacterium tuberculosis,* and if left untreated it might causes the death of its victims or serious lung damage. As well as being one of the most common disease in the planet, the vast majority of the cases occurs in under developed countries The symptoms, according to the World Health Organization (WHO, 2011) are a chronic cough with blood-tinged sputum, fever, night sweats, and weight loss. If the person infected receives proper healthcare, the chances of recovery without any traces increases, that is one of the reasons why a well structured health system helps to control the number of cases and the number of deaths caused by tuberculosis.

PE: There is purpose to the investigation but there is no sign of personal engagement.

Ex: Relevant scientific context is used

In order to check whether or not Human Development Index (HDI) had a significant influence in the number of tuberculosis cases this research was conducted. The living conditions can be measured by HDI , Human Development Index, a statistical analyses made by the United Nation (UN) to check human conditions throughout the world. A HDI closer to one, means good human development. A high HDI level may contribute to reduce the number of Tuberculosis cases, as the disease incidence increases with factors such as bad nutrition and unsanitary environments, according to the National Center of Biotechnology Information (NCBI, 2010).

Ex: It is not clear how the HDI is established.

Ex: Prediction made

In order to make this research three countries were chosen, Germany, Hungary, Poland, Portugal and Switzerland, as they are from the same Continent, but have very different HDI values. The number of tuberculosis incidence were obtained with the World Health Organization database (WHO, 2010) available online. So the research question was: Is there a relationship between Countries' Human Development Index (HDI) level and the incidence of tuberculosis? If the hypothesis is correct, then we should find a negative correlation between tuberculosis and HDI.

Ex : Research question could be more focussed. E.g. which countries are used in the study?

Material and Methods:

- WHO (available on line)
- UN Database (available on line)
- Excel Program

Ex: The description of the method lacks detail.

Using the World Health Organization Database we have been able to research the number of tuberculosis cases, between the years of 2007 up to 2009 in five different European countries: Germany, Poland, Hungary, Switzerland and Portugal. Using the United Nations Database, we have also been able the check the HDI of each country from the year 2007 to the year 2009. All data was transferred to an excel program file where it could be analyzed. Based on that information, we were able to find a relationship between tuberculosis and HDI.

Results

In the table bellow (table 2) we can see the raw data found during our research.
The number of tuberculosis cases (according to the WHO database), HDI (according to the UN database) and per capita income (according to nationalmaster.com)

Comm: Conventions respected in the table but decimal places need to be consistent

COUNTRY	Incidence of tuberculosis (per 100000 population per year)			HDI		
	2007	2008	2009	2007	2008	2009
POLAND	34	33	32	0,784	0,788	0,791
GERMANY	8,4	6	5,9	0,863	0,885	0,883
HUNGARY	18	16	16	0,803	0,804	0,803
SWITZERLAND	6,5	4,9	4,9	0,876	0,871	0,872
PORTUGAL	32	30	30	0,785	0,789	0,791

The averages of the incidence of tuberculosis and HDI for the five countries

Comm: Could add "… over three consecutive years"

Comm: Units for incidence of tuberculosis are missing in this table.

An: it would require an explanation of how statistics like HDI can be averaged as this is uncertain.

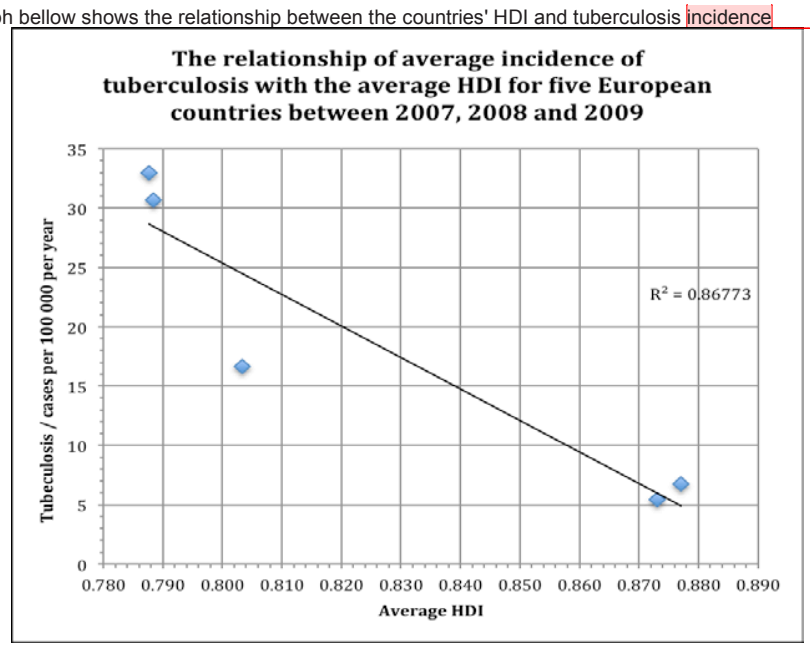
COUNTRY	Average Incidence of Tuberculosis	Average HDI
POLAND	33	0.788
GERMANY	7	0.877
HUNGARY	17	0.803
SWITZERLAND	5	0.873
PORTUGAL	31	0.788

In the graphs bellow, we can see the mean number of incidence of tuberculosis (per 100000 population per year) and HDI in the researched countries.
Graph 1 - Mean number of incidence of tuberculosis (per 100000 population per year) between the years of 2007, 2008 and 2009

Comm: Needs a page break. The title is not on the same page as the graph.

2

The graph bellow shows the relationship between the countries' HDI and tuberculosis incidence



An: Plotting the 15 pairs of data as a scatter graph would have probably been more useful than plotting five averages.

Comm: Graph is clear and uses correct conventions.

Comm: Uncertainties expressed in the trend line plus scatter of points and the coefficient of determination (R^2) is given.

Conclusion

Based on the studies made, we found a strong negative relationship between number of tuberculosis cases and countries' HDI. Therefore, the hypothesis made in the introduction can be supported by the data collected during this research.

An: Interpretation made from the graph is correct but a correlation coefficient would have been more precise.

An: No reference is made to the uncertainties.

Evaluation

The WHO database was very detailed, but I think it should have more information about the national health policies. They should not show only how many cases but also why this was happening and what governments were doing to stop it. A way that I could have used to improve this report was to study the health policies of the studied countries, to measure if the increase in the per capita income and HDI was accompanied by a decrease in tuberculosis cases. I could also have increased the number of countries researched therefore having more data in order to build a more reliable distribution graph.

Ev: Conclusion remains a rather bold statement. Though it is supported by the data there is no real explanation.

Ev: No reference here to the scientific context.

Biography

- NATIONAL CENTER OF BIOTECHNOLOGY INFORMATION, available at http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001141/ [accessed 24, April, 2010 at 13:30]
- NATIONAL MASTER, available at http://www.nationmaster.com/qraph/eco hum dev ind-economv-human-development-index [accessed 24 April, 2010 at 13:00]
- WHO, available at http://www.who.int/research/en/ [accessed 23 April, 2010 at 14:00]

Ev: No reference to the data.

Ev: No consideration of any errors in the methodology.

Ev: A suggested modification is made but it remains vague. How many countries? Which ones might be useful?

Ev: An Extension is proposed but remains vague. Could have suggested vaccination campaigns for more focus.