The Infectious Diseases Index: Its Calculation and Application

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Abstract

The Infectious Diseases Index has different values for countries with differences in population size but similar or identical disease rates. The Infectious Diseases Index summarises huge amounts of data. The factors influencing the total number of cases are indirectly considered in a realistic mix by the Infectious Diseases Index. There are seven levels for the Infectious Diseases Index, with a higher level corresponding to a higher burden of disease and general risk. The levels establish categories in the form of ordinal data. This is advantageous since categories on their own contain less information. The categorical scale may indicate how urgently investigations should be conducted and how urgently actions should be taken. Comparing countries and developments over time with the help of the Index has the advantage that the magnitude of problems can be demonstrated.

Keywords: Public health, Infectious Diseases Index, infectious diseases, HIV, risk assessment, epidemiology, epidemiological measurements, monitoring tool, burden of disease, setting priorities

Background

The bigger picture

In the article the author proposes the Infectious Diseases Index (IDI) as an additional tool for analysis in epidemiology.

Fracastoro's contagion theory from the middle of the 16th century already contains the idea of transmission which is connected to populations [1]. Following the increase in the population of the world one can see that the time to increase the global population by 1 billion has decreased over the last one hundred years [2].

Globally, almost 25 % of estimated deaths are due to infectious diseases [3]. In developing countries, mortality and morbidity are still largely due to infectious diseases [3]. Infectious diseases pose new challenges which require worldwide monitoring with appropriate tools such as the IDI.

It is not an exception when epidemics occur due to new or rare viruses [4]. Viral infections, such as Japanese encephalitis, can be endemic and can cause epidemics [4]. Chronic diseases, such as HIV infections, pose heavy burdens in terms of care [5]. In this situation it would be advantageous to have a tool which helps to obtain a larger picture when monitoring developments with respect to infectious diseases. The proposed IDI is such a tool.

The population in the World Health Organization (WHO) South East Region is about 1.4 billion, 1.2 billion of whom live with the threat of malaria [6]. India's population constitutes the majority of people who are confronted with the risk of contracting

malaria in the WHO South East Region [6]. 80.5 % of India's population is in regions were malaria poses a risk [6]. The prevalence of malaria in India has fluctuated from large values to low values which indicated the closeness to eradication of the disease [6, 7]. In particular areas of India it has been observed that epidemics for certain diseases such as malaria may have huge annual differences [8].

In 1933 economic calculations were based on 100 million malaria cases per year in India [9]. In 1947 India had a population of 330 million and an estimated 75 million cases of malaria [9]. In India malaria continues to be a huge threat for the population [10].

Increase and wider distribution of drug resistant malaria strains contribute to further complications in the fight against malaria in India [7, 9].

At the beginning of the 20th century tuberculosis declined mainly as a result of better nutrition [11, 12]. Considerable differences exist between populations with respect to innate immunity and influenza [13]. Indirectly, the total number of cases for infectious diseases where nutrition and factors other than the infectious agent play a role contains information about these other factors and the infectious agent. The proposed IDI considers these factors, at least indirectly to a certain extent, by using the total number of cases and entire populations.

Data quality

Many differences exist between countries with respect to obtaining data about infectious diseases. There are different reporting systems. Data obtained through

disease surveillance have a better quality the developed countries compared to the data obtained the developing countries [14]. Therefore any analysis should take into account that the reported numbers of cases for developing countries might have a higher degree of uncertainty compared to the reported numbers for developed countries.

In developed countries the quality of health data has been improved through the use of electronic patient records (EPR), and there is still scope for improvements [15]. EPRs can be used for surveillance and research [15]. Electronic data pools containing data about diagnosis, treatment and outcome are extremely useful for research, and various institutions may have access to the data [16]. Implementation of EPRs can be slow even in developed countries such as the US [17].

Mayon-White [18] argues that for certain infectious diseases surveillance should be done with the help of various systems in order to obtain a higher quality of surveillance.

In primary care the quality of the electronic data fluctuates, and the enthusiasm of practitioners affect the quality of the data entered into the electronic systems [19]. Quality standards and measurements for assessing the data quality are key issues which still have to be developed [19]. A common coding system is essential if data are intended to be used for large scale research. This coding has to be developed and implemented in order to improve the data quality [19].

Disease rates, case numbers and the IDI

The usually used rates of an infectious disease show the occurrence of a particular disease or group of diseases per 100,000 members of a population or some other base. Countries may have identical disease rates but they might differ considerably in their population sizes. Therefore, a calculated rate might not show the real extent of the problem.

Blank and Burau [20] point out that the design of health policies for smaller populations is easier. Therefore, the collection of data and containment of epidemics should be easier for countries with small population sizes.

Interactions of diseases may complicate the interpretation of the decrease of the mortality rate for a particular disease since cardiovascular disease may be precipitated by an infection and this may also be precipitated by influenza [21].

Mayon-White [18] points out that fatality rates based on a small number of cases in Britain put limitations on the employment of mortality statistics when investigating infectious diseases.

A tendency of underreporting cases may therefore be assumed to have occurred, and this may be seen as a systematic error with respect to the data for the countries. There is a general tendency for practicing physicians to report fewer cases of numerous communicable diseases [22]. Increasing rarity and severity of a communicable disease causes a higher likelihood for reports to have a higher level of sensitivity and to

contain more details [22]. Case numbers alone may not give any indication of the magnitude of the problems [23].

Measurements for influenza epidemics face huge challenges and lack precision [24]. Many of these measurements are not direct [24].

According to Dancey and Reidy [25] a population may be described by a parameter. The parameter considers the whole of a population, and this might be seen as an advantage over rates which refer to sections of populations. The parameter may provide an overview and may aide analysis on a large scale.

Kendall, Stuart and Ord [26] discuss a weighted index in the area of business activity, and they state that an index may just be an artefact. Kendall et al. [26] point out that the decision to assign the status of correspondence to economic reality to an index is based on interpretation of knowledge. It should be clear that this means available knowledge at that particular time. It is a similar situation in the case of the IDI when limitations are imposed due to the current quality of the data.

The Hypotheses

The first hypothesis states that the IDI has different values for countries which have identical or similar disease rates while these countries have vast differences in population size and as a consequence these countries have vast differences in the total number of cases. The general risk and burden of disease may differ because of differences in case numbers in relation to population size.

The second hypothesis assumes that the IDI shows developments over time.

The third hypothesis states that the definitions of levels and the creation of categories as ordinal data are useful for showing clusters of countries with similar general risk or burden of disease.

Methods

The data used here are for 2007, 2008 and 2009 and have been provided by the WHO [27, 28, 29]. The IDI considers data about the reported number of cases for selected diseases and the entire population of a country:

The proposed IDI is calculated by squaring the total number of cases, dividing the result by the total population, and then obtaining the log (x).

For Table 1 the calculation of the IDI for selected diseases has been performed for selected countries for 2007, 2008 and 2009 [27, 28, 29].

<< Table 1 >>

The author suggests the definition of levels for the IDI in Table 2.

<< Table 2 >>

Table 3 compares the HIV Index with the total number of HIV cases and the prevalence per 100,000 of the population. In Table 3 the calculation of the HIV Index

has been performed for a set of countries, and in Table 4 levels are defined for the HIV Index.

<< Table 3 >>

<< Table 4>>

The levels are intended to serve as a tool. The categories of the levels may serve as a scale in the decision making process for setting priorities in health care systems. Higher levels correspond to higher urgency of problems. The levels classified as extremely serious, critical or high constitute the elevated levels of risk and burden of disease.

The advanced level means that values within this level have not reached the elevated levels. The moderate level contains values above the low and very low levels which have negative values for the IDI.

Two different sets of infectious diseases data have been used as examples for calculating the IDI. For the first set, data from part II of the WHO report [27], are used. From the WHO report [27] all data for 2007 about selected diseases have been used for calculating the total number of cases for particular countries except neonatal tetanus because this is included in total tetanus.

The selected diseases used in Table 1 and Table 2 include ‘cholera, diphtheria, Japanese encephalitis, leprosy, malaria, measles, mumps, pertussis, plague,

poliomyelitis, congenital rubella syndrome, rubella, total tetanus, tuberculosis (TB) and yellow fever' [27]. Demographic data about the total population stem from the WHO report Part II [27]. The second set contains the prevalence of HIV from part I of the WHO report [27].

Data for 2008 and 2009 about selected diseases stem from the WHO report 2010 and WHO report 2011 [28, 29].

Results and discussion

The four tables in this article provide an overview of the findings.

Definition of levels

The creation of levels establishes categories which may lead to a reduction in sensitivity, but it is intended to aide the decision making process of policy makers and other health care professionals. The categories may enable them to obtain an overview since the categories summarize huge amounts of data.

The established categories are ordinal data. This is an advantage since data are put together in categories and the data are also arranged in order which increases the amount of information compared to categories on their own [30].

The categorical scale may indicate how urgently investigations should be conducted and how urgently actions should be taken. Data obtained through the calculation of the IDI and their levels may be used to set priorities in health care systems and may also indicate the impact of health promotion on a global scale. The IDI may

contribute to a new approach towards analysis of infectious diseases in aspects such as general risk assessment and burden of disease on a global level.

A level is a category in which countries with similar index values are placed. Level 6 is described as extremely serious, and the value range for this level starts at 4. Outliers with much higher values, such as the 2008 Index values for India and Togo in Table 1, are still in the extremely serious category since there is no further increase in urgency in attention, and no further increase in urgency for action for decision makers is assumed. The same principle of categorizing applies for the other levels.

The definition of levels has the advantage that the current quality of data prevents a precise calculation, but nevertheless it may be possible to assign the correct level to a particular country. Therefore the IDI does not pretend a degree of precision which currently cannot be achieved when the quality of the available data is considered.

Data

The shortcomings of the WHO data may cause difficulties in the interpretation of the data; however, the way the IDI is calculated and the definitions of the levels can be understood as a condensation and further abstraction.

According to Dancey and Reidy [25] it can be assumed that the vast majority of scores can be found within the range of the standard deviation. In 2008 the standard deviation for the IDI is much larger compared to the standard deviations for 2007 and 2009. The 2008 data have a wider spread of Index values around the mean compared

to the data for 2007 and 2009. Outliers with large values have influenced the standard deviation of the IDI for 2008, the outliers being India and Togo.

Considering that the IDI uses data about entire countries the standard deviations for 2007 and 2009 are fairly close. There are only small differences between the standard deviations of the HIV Index for 2007 to 2009. The HIV Index has the largest standard deviation in 2007, with an outlier of –0.8. All three standard deviations of the HIV Index can be considered to be close together when the scale of the data is considered.

The median has the advantage of being insensitive to extreme values [25]. In Table 1 the median for the IDI for the years 2007 – 2009 does not change for the first two years and is similar for the third year. For the HIV Index in Table 3 the median does not change significantly from 2007 to 2009. Central tendency measurements may also be calculated for the indices of the WHO regions in order to perform further analysis. In the skewed distributions the mean is distorted.

In this article the calculations of the standard deviation, the mean and the median were performed only for selected countries, and this is a limitation which should be considered. Increasing the sample size by calculating the IDI for all countries in the WHO World Health Statistics reports may influence the skewness of the data.

The IDI

The IDI for selected diseases shows different values for countries with similar or identical disease rates but vast differences in population sizes. Table 1 shows developments over time for the years 2007 to 2009.

It can be hypothesised that the levels of the IDI correspond to the risk posed to populations and to the burden of disease for populations. Hypothesising that a positive correlation may exist between risk and burden of disease, it can be based on the assumption that both the total number of cases and the population sizes affect both the risk and the burden of disease.

Countries with Western health systems, such the UK and Germany, where infectious disease are tightly monitored and controlled, are in the low and the very low levels in Table 2 for 2007. For the same year, France is in the moderate level in Table 2, indicating a slightly higher burden of disease. This could be the subject of further investigation.

El Salvador, Honduras, Israel, Tajikistan and Togo constitute a population size cluster which contains countries with a similar population size of approximately 7 million [27]. In this population size cluster Israel has the lowest value for the HIV Index, being located in the moderate level in Table 4 in 2007. Israel is also in the moderate level of the IDI in Table 2. Lower values for the Index can be due to a variety of reasons such as a better performance of the health system. Infectious diseases still pose challenges even for highly developed health care systems, so the IDI could be used as a monitoring tool. The IDI may indicate how health systems cope with new

challenges such as pandemics. In a comparison over time for a particular country such as Israel the successful implementation of further improvements should be reflected by obtaining lower Index values for time periods after the successful implementation of further improvements. Priority setting is a key issue in health care systems, and the levels of the proposed IDI create categories. These categories can be used to inform the decision making process with respect to priority setting.

Health policy research could apply the calculation principle of the IDI for every infectious disease mentioned in the WHO report 2009 and compare the obtained values in order to analyse the performance of a health care system with respect to a particular infectious disease. In 2007, El Salvador is shown in the low level of the IDI in Table 2 whereas it is in the high level of the HIV Index in Table 4. Here health policy research could investigate the reason for the vast difference in the levels in which El Salvador is placed.

In India, the case numbers for cholera increased in 2008 over the previous year by 45 cases, for diphtheria by 2,727 cases, for malaria by 94,258,017 cases, for measles by 11,281 cases, and for tuberculosis by 23,390 cases [27, 28]. The largest decrease in case numbers for India in 2008 compared to 2007 occurred in Japanese encephalitis (decreased by 3,723 cases) [27, 28]. India's total population increased by 12,396,000 from 2007 to 2008 and from 2008 to 2009 by 16,591,000 [27, 28, 29]. The data indicate that the large increase in the IDI for India was mainly driven by the huge increase in the malaria cases in 2008. Compared to 2008, the malaria cases dropped dramatically by 94,171,235 cases in India in 2009. The IDI for India also reflects this

enormous drop in 2009 in Table 1. The observed fluctuations of the IDI for India are in line with fluctuations mentioned earlier.

In India the number of reported cases of malaria was much too low for more than 30 years [31]. India has annually up to 100 million estimated cases of malaria [31]. According to this critical opinion the high number of malaria cases in 2008 is closer to reality compared to the much lower malaria case numbers in 2007 and 2009 in India. For the extreme case of India the definition of levels has the advantage that India was already in the critical level in 2007 and 2009. India moved to the extremely serious level in 2008 which is the highest level of the IDI. The critical level already indicates that there is urgent need for action and the move to the extremely serious level indicates that the situation has worsened.

In Togo there were increases in the case numbers for cholera in 2008 compared to 2007 (increased by 332 cases), malaria (increased by 612,673 cases), pertussis (increased by 129 cases), rubella (increased by 129 cases) and tuberculosis (increased by 438 cases) [27, 28]. Compared to 2008 in 2009 case numbers decreased for cholera (decreased by 179 cases), malaria (decreased by 279,270 cases), pertussis (decreased by 84 cases) and rubella (decreased by 49 cases) [28, 29]. From 2007 to 2008 the total population of Togo decreased from 6,585,000 to 6,459,000, but the population then increased to 6,619,000 in 2009 [27, 28, 29]. These data suggest that the relatively large increase in case numbers for malaria in Togo was the main reason for the high value of the IDI in 2008.

The data also suggest that changing population sizes can significantly influence the value of the Index.

In Togo malaria poses a risk for the entire population [32]. In Togo neither morbidity nor mortality routine data for malaria has been reduced, this despite the fact that anti-malarial drugs and nets are widely available [33].

In 2008 a flood warning was issued by the WHO for African countries including Togo, with the comment that this could lead to a severe increase in malaria cases [34]. The flood may have contributed to the large increase in the value of the IDI for Togo in 2008.

The IDI can also be used for comparisons between countries. Further health policy research could investigate why a certain country is placed in a particular level of the IDI. Togo is in the extremely serious level of the IDI and in the critical level of the HIV Index. If the IDI is used to monitor the development of a particular country over time a decreasing value of the Index may indicate improvements in the health care system of that country.

The IDI may complement analysis since the widely used rates are not sufficient to demonstrate the magnitude of problems. The IDI may also inform the decision making process when priorities are set in a particular health system, and it may be used as an indicator for interventions in health promotion.

Further research is needed to explore the application of the proposed Index. Ideally the IDI should be calculated for all countries listed in the WHO report 2009. Future studies may apply the calculation principle of the IDI and the use of levels to non-communicable diseases. The obtained Diseases Population Index may aid analysis of non-communicable diseases on a global scale.

The HIV Index

Table 3 compares case numbers with prevalence rates and the HIV Index. In Table 3 Equatorial Guinea, Romania and Tajikistan have similar case numbers. These countries, however, differ considerably in population size. Furthermore the case numbers do not show the magnitude of the burden of disease. In general, case numbers lack the ability to reflect the magnitude of the problem [23]. From these three countries Equatorial Guinea has the smallest population and the highest value for the HIV Index. Tajikistan has a bigger population and a lower value for the HIV Index. Romania has the largest population of these three countries and the lowest value for the HIV Index.

The proposed HIV Index shows the magnitude of the problems with the help of absolute numbers for population size and number of reported cases. The HIV Index shows risk and burden of disease on a worldwide scale in the Tables 3 and 4.

The WHO [27] provides the table ’Prevalence of HIV among adults aged ≥15 years per 100,000 population’. In this WHO table [27] the HIV prevalence for Malta and Poland is 59. Lithuania and Romania both have 77 for the HIV prevalence [27]. Despite having identical HIV prevalence in the WHO report [27], Malta has a total of

240 HIV cases whereas Poland has a total of 22,468. For the WHO European Region the populations for 2007 in thousands for Malta is 407, for Poland it is 38,082, for Lithuania it is 3,390, for Romania 21,438 [27].

A similar picture exists for other countries which have a similar prevalence in the WHO Chart 10 [27] but which have vast differences in population sizes. As a consequence there are vast differences for the total number of cases and the resources required to deal with the problem.

For 2007 the HIV prevalence per 100,000 for India is 290 and for the Congo it is 3,330 [27]. These prevalence rates do not show the magnitude of the problems. A calculation based on the data provided by the WHO [27] shows that India has 3,390,146 HIV cases and the Congo has 125,474 cases. India's total number of HIV cases is over 3.3 million and the resources required to deal with this problem are enormous [27]. The HIV Index puts this enormous number of HIV cases in the context of India's huge population size.

The enormous burden of disease caused by more then 3.3 million cases is expressed through a higher HIV Index value for India compared to the HIV Index value for The Congo which has a much smaller total number of HIV cases [27]. The Congo has a relatively high prevalence rate and a relatively small population. This may also indicate large associated problems although the total number of cases is relatively small. The HIV Index places India in level 6, which is described as extremely serious, and the Congo is placed in level 5 which is described as critical. In India the general risk is huge since over 3.3 million HIV cases are present in a huge population. This

also justifies that the HIV Index for India is higher than the HIV Index for The Congo. Thus the HIV Index considers the magnitude of the problems.

The Congo and Equatorial Guinea are examples from the WHO [27] African region. A comparison across WHO [27] regions between India and Italy shows a similar prevalence despite a great difference in population sizes. The HIV Index table of this article shows that the values for the proposed Index differ for countries with similar or identical prevalence but vast differences in population sizes.

In the HIV Table 4 Italy has reached the high level which indicates the need to explore the reasons for this high value. Values of the Index may be used to point research towards a particular direction.

Rates, case numbers, expectancies and the IDI

The WHO [27] provides mortality rates which are specific for different communicable diseases. Mortality rates do not provide a complete picture about the burden of disease since outcomes which are not fatal are not considered [27]. There is a higher degree of uncertainty about estimating death rates for particular diseases compared to rates for all causes of death [23]. This uncertainty can reach +/- 35% [23]. Life expectancy is an estimate, and this should be considered when data about life expectancy are used [27]. Healthy life expectancy has an even higher degree of uncertainty compared to life expectancy [27]. This higher degree of uncertainty is due to the fact that the quality of data used for different countries varies and that different countries may use different definitions of disability [27].

In their 2009 report the WHO [27] states that burden of disease is not well indicated by case numbers. In this respect the WHO [27] mentions that the mortality rate for certain diseases, such as plague, is high but that the mortality rates for other diseases, such as leprosy, are low despite a substantial loss of health for these other diseases.

For a particular subjective point of view morbidity and mortality might have similar outcomes: loss of an employee, loss of main income for the family, etc. Considering the complexity of the contexts it might be impossible to find an objective and precise measurement for burden of disease. Worldwide analysis with the proposed IDI may deliver insights which might otherwise not be obtainable with respect to burden of disease.

Convergence of health systems

Convergence has been postulated for the different heath systems, and phenomena such as globalisation and the development of the internet contribute to this convergence [20]. The WHO, the European Union (EU), the Organisation for Economic Co-operation and Development (OECD) and other organisations lay the foundations for convergence with respect to the frameworks and the intellectual bases of health care policies [20].

Convergence is also promoted by the fact that problems, which are similar across different countries, may be solved with similar solutions [20]. Therefore, convergence may contribute to increases in the quality of the data about infectious diseases. It can be assumed that convergence will further improve the quality of data in health care.

Perfect data about infectious diseases may never be available for all countries in the WHO report 2009. Waiting for next-to-perfect data would postpone the use of the data until an uncertain date in the far future when it might be right to assume that the quality of the data would be almost perfect.

In the meantime the use of the current data may help to gain valuable insights, and this justifies the use of the current data. Opportunities may be missed, and time and money be lost due to problems with the quality of data [35].

Improvements in the quality of the data which forms the basis of the calculations will positively affect the interpretation of the IDI. Grain and Procter [35] point out that continuous improvements in the quality of health data are essential while it is not absolutely necessary that all elements of data be perfect. Shortcomings of the data used have to be taken into account by any analysis.

The IDI considers data about the reported number of cases for selected diseases. In addition the size of the population is taken into account, and therefore changes in population size are considered when the IDI is calculated for several years for the same country. Monitoring developments over time as well as comparing different countries is possible on a large scale with the help of the proposed IDI. Maps can be drawn using different colours for the different levels of the IDI, thereby visually aiding analysis.

The selection of infectious diseases in the WHO report 2009 may be seen as a limitation.

Conclusion

The proposed IDI calculation and the definition of levels demonstrate a principle. The IDI provides a summary for vast amounts of data.

The first hypothesis is confirmed since the IDI has different values for countries which have identical or similar disease rates while these countries have vast differences in population size and as a consequence these countries have vast differences in the total number of cases. The IDI has the advantage that it shows the magnitude of the problem with respect to burden of disease in relation to case numbers and population size. This has been demonstrated in detail for Malta, Poland and other countries for the HIV Index.

The second hypothesis has been verified by the ability of the IDI to show developments over time. Table 1 shows the changing values for IDI for selected countries for the years 2007 to 2009. India and Togo are discussed in detail since they have large index values for 2008.

The third hypothesis could be confirmed through Table 2 since it shows how countries are placed in the different levels and it also shows changes over time for the period 2007 to 2009. The categories are organized as ordinal data and this data can be used in the decision making process in health policy.

The IDI can be used as a global monitoring tool. This is aided by the definition of levels in Table 2 and Table 4. Considering the huge case numbers for the selected infectious diseases in the WHO report and for particular infectious diseases such as malaria, HIV and tuberculosis a global monitoring which shows the real magnitudes of risk and burden of disease is advantageous.

The IDI can also be calculated for a particular disease such as the HIV infection in Table 3.

List of abbreviations

EPR	Electronic Patient Record
EU	European Union
HIV	Human Immunodeficiency Virus
IDI	Infectious Diseases Index
OECD	Organisation for Economic Co-operation and Development
TB	Tuberculosis
WHO	World Health Organisation

Competing interests

The author declares that he has no competing interests.

Author's contribution

RG is the sole author of the article.

Author's information

RG completed a wide range of university qualifications:
Postgraduate Diploma in Medical Physics, M.Sc., M.B.A., Diploma in Psychology, Certificate in Health and Social Care, Certificate in Managing Care, Certificate in Promoting Health, Certificate in Reflective and Evidence-Based Practice, B.Sc. (Honours) Health Studies, B.Sc. (Honours) Health & Social Care.
These qualifications provide the base for his scientific and professional work as a consultant.

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Table 1 Infectious Diseases Index for Selected Diseases

Country	**Log (X)** [a]		
	2007 [b]	**2008** [c]	**2009** [d]
China	2.8	3.0	3.2
Egypt	0.7	-0.1	0.2
El Salvador	-0.6	-0.5	-0.3
France	0.2	-1.3	-0.5
Germany	-1.4	-1.4	-0.7
Honduras	-0.1	1.2	1.3
India	3.7	6.9	3.9
Israel	0.2	0.2	-0.1
Tajikistan	0.6	3.6	1.0
Thailand	1.5	1.9	2.4
Togo	4.1	5.1	4.8
Turkey	0.9	0.6	0.7
UK	-0.2	-0.2	0.7
USA	-0.2	0.1	-0.2
Vietnam	1.6	2.1	2.4
Min	-1.4	-1.4	-0.7
Max	4.1	6.9	4.8
Mean	0.92	1.41	1.25
Median	0.6	0.6	0.7
Standard deviation	1.52	2.3	1.65
Confidence intervals	0.77	1.16	0.84

a: Figures are rounded
b: Calculation based upon data from [27]
c: Calculation based upon data from [28]
d: Calculation based upon data from [29]

Table 2 Levels Assigned for the Infectious Diseases Index

Index Range for Levels [a]	Level [a]	Description of Level [a]	Countries in particular Levels [b]		
			2007	2008	2009
4 and above 4	6	Extremely serious	Togo	India Togo	Togo
3 – 3.9	5	Critical	India	China Tajikistan	China India
2 – 2.9	4	High	China	Vietnam	Thailand Vietnam
1 – 1.9	3	Advanced	Thailand Vietnam	Honduras Thailand	Honduras Tajikistan
0 – 0.9	2	Moderate	Egypt France Israel Tajikistan Turkey	Israel Turkey USA	Egypt Turkey UK
-0.1 – -1	1	Low	Honduras El Salvador UK USA	Egypt El Salvador UK	El Salvador France Germany Israel USA
below -1	0	Very low	Germany	France Germany	

a: Index Range for Levels, Level, Description of Level as defined by the author.

b: Countries located in levels according to the calculated Infectious Diseases Index Log (X) in table 1.

Table 3, Total Number of HIV Cases, Prevalence Ratio and HIV Index			
© 2012 by R. Grawath	**Case Numbers [a]**	**Prevalence per 100 000 [b]**	**HIV Index [a, c]**
Country	**2007**	**2007**	**2007**
Congo	125,474	3330	3.6
El Salvador	50,947	743	2.6
Equatorial Guinea	16,949	3343	2.8
Honduras	42,494	598	2.4
India	3,390,146	290	4.0
Israel	6,789	98	0.8
Italy	174,275	296	2.7
Lithuania	2,610	77	0.3
Malta	240	59	-0.8
Poland	22,468	59	1.1
Romania	16,507	77	1.1
Tajikistan	16,099	239	1.6
Togo	209,666	3184	3.8
Min	240	59	-0.8
Max	3,390,146	3343	4.0
Mean	313,435.69	953.31	1.99
Median	473,340	290	2.4
Standard deviation	890,626.32	1293.62	1.39
Confidence intervals	484,141.09	703.21	0.76

a: Based upon country data from [27].

b: Country data from [27].

c: Figures are rounded.

Table 4 Levels Assigned for HIV Index

Index Range for Levels [a]	**Level** [a]	**Description of Level** [a]	**Countries in Particular Levels** [b]
4 and above 4	6	Extremely serious	India
3 – 3.9	5	Critical	Congo, Togo
2 – 2.9	4	High	El Salvador, Equatorial Guinea, Honduras, Italy
1 – 1.9	3	Advanced	Poland, Romania, Tajikistan
0 – 0.9	2	Moderate	Israel, Lithuania
-0.1 – -1	1	Low	Malta
below -1	0	Very low	Not present in the sample

a: Index Range for Levels, Level, Description of Level as defined by the author.

b: Countries located in levels according to the HIV Index Log (X) in Table 3.