WRITING ABOUT THE DATA

2nd TRAINING WORKSHOP

Project to strengthen national capacity in producing and disseminating vital statistics from civil registration records in Asia and the Pacific

Bangkok, Thailand, 6-10 March 2017

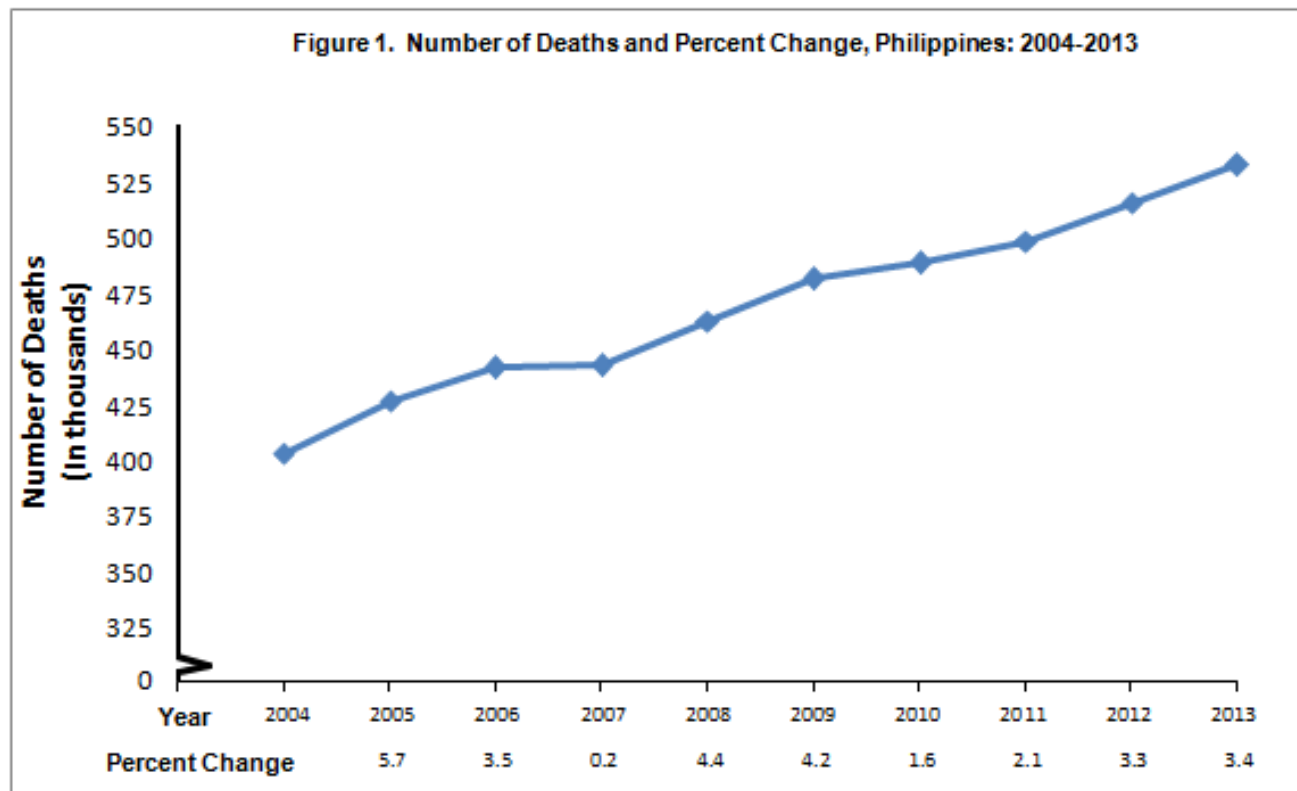# Visualizing Data

Visualizing Data

Tabulations

Table 12 Number of births and deaths in Thailand

year	Live births			Crude Birth Rate	Deaths			Crude Death Rate
	Total	Male	Female		Total	Male	Female	
2539 (1996)	994,118	486,202	457,916	15.8	342,643	208,950	133,693	5.7
2540 (1997)	897,604	461,916	435,688	14.8	300,323	181,884	118,439	5.0
2541 (1998)	897,201	461,837	435,364	14.7	310,534	181,592	128,942	5.1
2542 (1999)	754,685	389,285	365,400	12.3	362,607	213,432	149,175	5.9
2543 (2000)	773,009	397,523	375,486	12.5	365,741	213,907	151,834	5.9
2544 (2001)	790,425	407,400	383,025	12.7	369,493	213,298	156,195	6.0
2545 (2002)	782,911	403,397	379,514	12.5	380,364	219,480	160,884	6.1
2546 (2003)	742,183	382,621	359,562	11.8	384,131	221,962	162,169	6.1
2547 (2004)	813,069	418,361	394,708	13.0	393,592	225,027	168,565	6.3
2548 (2005)	809,485	416,474	393,011	13.0	395,374	225,622	169,752	6.4
2549 (2006)	793,623	409,231	384,392	12.7	391,126	222,811	168,315	6.2
2550 (2007)	797,588	410,921	386,667	12.7	393,255	222,170	171,085	6.3
2551 (2008)	784,256	404,043	380,213	12.4	397,327	224,090	173,237	6.3
2552 (2009)	765,047	394,555	370,492	12.1	393,916	222,815	171,101	6.2
2553 (2010)	761,689	392,098	369,591	12.0	411,331	232,791	178,540	6.5
2554 (2011)	795,031	409,699	385,332	12.4	414,670	235,189	179,481	6.5

Source: Thai Health Statistics, 2011

Visualizing Data

Charts, Graphs, and Figures

Figure 1. Number of Deaths and Percent Change, Philippines: 2004-2013

Visualizing Data

Tabulations

- numerical data
- comparisons
- relationships between various data sets
- degree of detail depends on the purpose of the table and the limitations of the vital statistics data

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Source: Thai Health Statistics, 2011

Visualizing Data

Tabulations

WHO recommendations
- standard groupings of data to improve comparability and has provided certain conventions for data summarization
- computation of basic vital statistics rates
- specified period of time.

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Source: Thai Health Statistics, 2011

Visualizing Data

- assumption that the events have been registered within the time period required in the civil registration laws
- **date of registration**
- **date of occurrence**
  - needs for a "cut-off" date for inclusion of vital events in the annual (or other time period)
  - "cut-off" date to have high percentage of vital events are included in the tabulations and such that events for smaller subgroups, such as infant deaths, are not missed

Visualizing Data

- place of occurrence of the event or usual place of residence of the person in the event

- assumption is generally made that there is relatively little difference between a country's resident population and the population present in the country at any particular time.

Births in Country, 2016

Usual Place of Residence of Mother	Place of Occurrence		
	Country	Capital City	State A
Country	500	300	200
Capital City	275	255	20
State A	225	45	180

Visualizing Data

Charts, Graphs, and Figures

- more easily and rapidly determine the meaning of the numbers
- how things are distributed, or patterns or relationships of data at a point in time or over time.
- use data in deciding which kind of chart, graph, map, diagram or figure

Visualizing Data

Charts, Graphs, and Figures

- issue of interest
- education and knowledge of the audience

Table 1: Live births by ethnic groups, Malaysia, 2013 and 2014 [P]

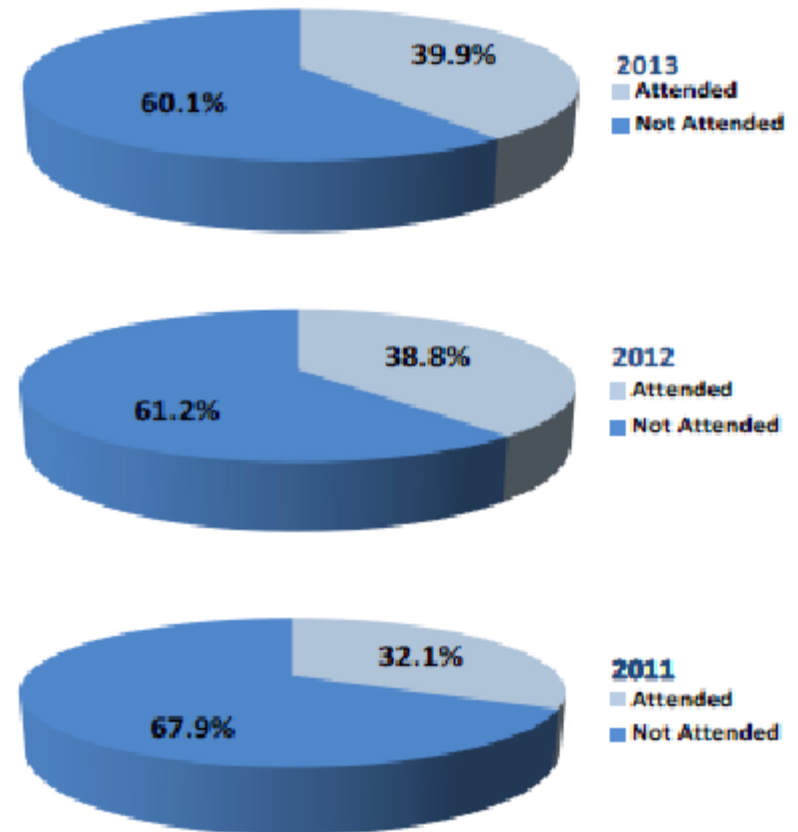| Year	Total	Bumiputera	Chinese	Indians	Others[1]
2013	503,914	378,366	69,561	24,378	31,609
	16.7	20.4	10.6	12.4	10.1
2014[p]	511,865	386,544	71,646	23,188	30,487
	16.7	20.5	10.9	11.7	9.6

[P] Preliminary
[1] Includes non-Malaysian citizens

Visualizing Data

- often numbers and/or rates are presented as tables of information accompanied by graphs or figures using the same data to illustrate the point or topic of interest

ATTENDANCE AT DEATH BY A HEALTH PROFESSIONAL

Source: Vital Statistics Report, 2011-2013
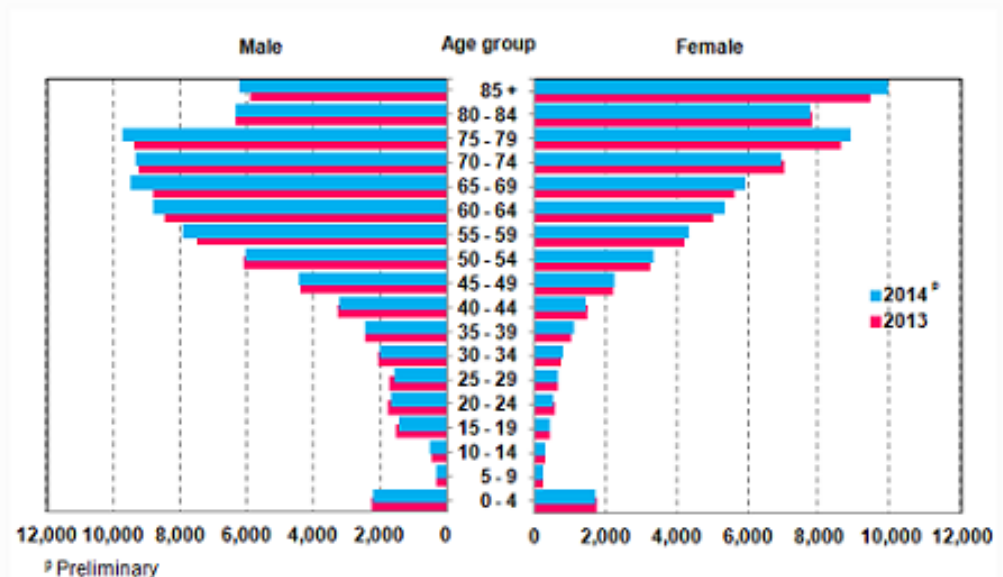
Visualizing Data

Natality data can be cross tabulated for multiple items on the birth certificate

- age of mother
- race or ethnicity of mother
- geographic area of mother's residence
- infant's birth weight
- number of children born to the mother (birth order)
- pregnancy care information
- other topics of importance for public health and demographic analysis

Visualizing Data

- mortality data can be done for various items on the death record at multiple levels of detail
- common and useful ways to present mortality data is by cause of death
- cross tabulations are presented for specific causes of death by various demographic items
  - age
  - sex
  - race or ethnicity
  - by geographic area
  - distributions over time.

Chart 2: Deaths by age groups and sex, Malaysia, 2013 and 2014 P

Male   Age group   Female

| 85 + |
| 80 - 84 |
| 75 - 79 |
| 70 - 74 |
| 65 - 69 |
| 60 - 64 |
| 55 - 59 |
| 50 - 54 |
| 45 - 49 |
| 40 - 44 |
| 35 - 39 |
| 30 - 34 |
| 25 - 29 |
| 20 - 24 |
| 15 - 19 |
| 10 - 14 |
| 5 - 9 |
| 0 - 4 |

2014 P
2013

12,000 10,000 8,000 6,000 4,000 2,000 0   0 2,000 4,000 6,000 8,000 10,000 12,000

P Preliminary

Comparing Numbers

- differences between groups (between men and women, between regions/districts or between various age groups)
- or changes over time
- or both

Comparing Numbers

Absolute and relative numbers

- Politician A (probably from an opposition party) says:
  - *The number of poor people has increased by more than two million in the past five years.*
- Politician B (probably from the governing party) replies:
  - *Yes, but the proportion of poor people has been reduced by 10 percent.*

Comparing Numbers

- **Absolute** *or* **relative numbers?**
- Depends on the purpose. But as a general rule we can say that relative numbers are to be preferred
- Compare the

Comparing Numbers

Deaths by age and sex, age-specific death rates by sex: latest available year, 2002 - 2011							
	Numbers				Rates		
	Both Sexes	Male	Female		Both Sexes	Male	Female
Maldives 2010 (C)							
Total	1,105	660	445		3.5	4.1	2.8
0	78	45	33		11.8	13.4	10.1
1 - 4	11	5	6		0.5	0.4	0.5
5 - 9	8	6	2		0.3	0.4	0.2
10 - 14	12	8	4		0.4	0.5	0.3
15 - 19	21	14	7		0.5	0.7	0.4
20 - 24	21	16	5		0.5	0.8	0.3
25 - 29	15	10	5		0.4	0.6	0.3
30 - 34	15	10	5		0.6	0.9	0.4

Comparing Numbers

Deaths by age and sex, age-specific death rates by sex: latest available year, 2002 - 2011						
	Numbers				Rates		
	Both Sexes	Male	Female		Both Sexes	Male	Female
Mongolia - Mongolie							
2010 (+C)							
Total	18,293	10,781	7,512		6.6	8.0	5.3
0	1,275	721	554		21.0	23.5	18.5
1 - 4	446	233	213		2.1	2.2	2.1
5 - 9	124	74	50		0.5	0.6	0.4
10 - 14	122	71	51		0.5	0.6	0.4
15 - 19	219	152	67		0.8	1.1	0.5
20 - 24	424	294	130		1.4	2.0	0.8
25 - 29	493	335	158		1.9	2.7	1.2
30 - 34	703	505	198		3.0	4.5	1.6
35 - 39	843	635	208		4.0	6.2	1.9

Comparing Numbers

- Per cent or percentage points?
- be careful when computing relative changes on the basis of small numbers
- Increase from 1 to 3 per cent is a 200 per cent increase, but in this case the increase should be presented as 2 percentage points

Comparing Numbers

- **Decimals and rounding**

- Decimals give an impression of a level of accuracy or precision → that is unfounded

- Percentages are frequently reported with two decimals

Comparing Numbers

- **Decimals and rounding**

- Decimals give an impression of a level of accuracy or precision → that is unfounded

- Percentages are frequently reported with two decimals

Comparing Numbers

VIETNAM COUNTRY REPORT

2) Vital Statistics
A) Population growth rate: 1.077% (2011)
B) Crude death rate: 6.8 per/1000 people
C) Crude birth rate: 17.07 per/1,000 people (2011)
D) Infant mortality rate (per 1000 live births): 20.9 deaths/1,000 live births
   Male: 21.27 deaths/1,000 live births
   Female: 20.48 deaths/1,000 live births (2011)
E) Under – five Mortality Rate (UM5R): 32/1000 live birth
F) Life expectancy at birth Total: 71.35 Years old, by sex:
      Male: 68.86
      Female: 74.02
G) Total Ferity Rate: 2.07 children (2007); 2.08 children (2008)
H) Unemployment rate (total, by age): 2, 88%

Source: 9th ASEAN & Japan High level officials meeting on Caring Societies: "Human Resource Development in the sectors of Welfare and Health with a focus on capacity building of service provides and employability promotion of vulnerable people" 25 October – 28 October 2011, Tokyo Japan

Constructing tables

Two types of tables

1. Reference tables (also called "library tables"/"source tables" or "documentation tables")

2. Presentation ("summary"/"demonstration") tables

Constructing tables

Reference tables

- future reference or documentation purposes
- often big (typically: One page or more)
- present exact, absolute numbers
- standardized structure
- Increasingly being replaced by data warehouses and data banks, where users can construct their own tables

Constructing tables

Presentation tables

- smaller and simpler (extract from or summary of a reference table)
- present the numbers in a user-friendly way
- present "indicators" (percentages, rates, indices, averages) rather than absolute numbers
- numbers are often rounded
- focused (few variables; often only two or three)

Constructing tables

Basic Principles

- Text column should be justified to the left
- Numbers should be right-justified
- No need for wide columns
- Vertical and horizontal lines should be dropped
- Group the data to increase readability; insert commas before every third digit

Constructing tables

Basic Principles

- For presentation, round to millions, use one decimal

- For comparison, calculate the relative growth in a separate column

- Sort by size of population in descending order to see the relative size of the population

Constructing tables

Basic Principles

- Simplify the tables
- For tables with absolute and relative numbers, presenst all the absolute numbers first, followed by percentages
- Leave out second decimal place

Exercise: Data Visualization

From your report on births, review/improve the data visualization, comparison of numbers and construction of tables.

Exercise: Data Visualization

From your report on **deaths**, review/improve the data visualization, comparison of numbers and construction of tables.

Do this for at least 3 tables, graphs or figures.