Basic skills and essential concepts in statistics

Workshop
on communicating official statistics

Astana, 19-21 October 2022

Session outline

1. Statistical literacy
2. Concepts, variables, classifications, indicators
3. Measurement: proportions and percentages, ratios, rates, averages

Skills for understanding statistics – statistical literacy

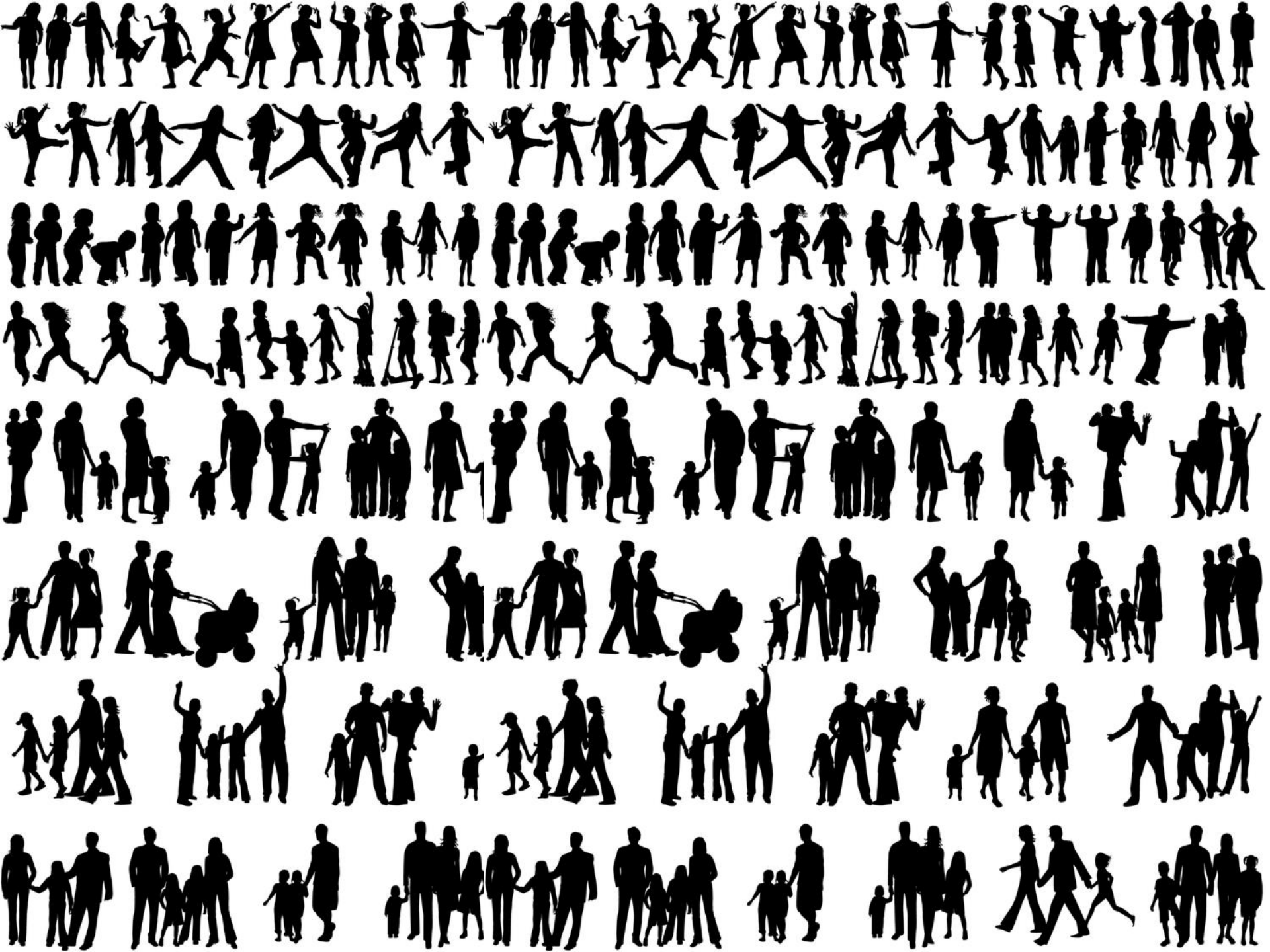
1. Data awareness
2. Ability to understand statistical concepts
3. Ability to analyse, interpret and evaluate statistical information
4. Ability to communicate statistical information

counting

is complicated

2, 2.5, 3, 3.5, 4

Source: Blastland, M. and Dilnot, A. 2007. The Tiger That Isn't: Seeing Through a World of Numbers. Profile Books.

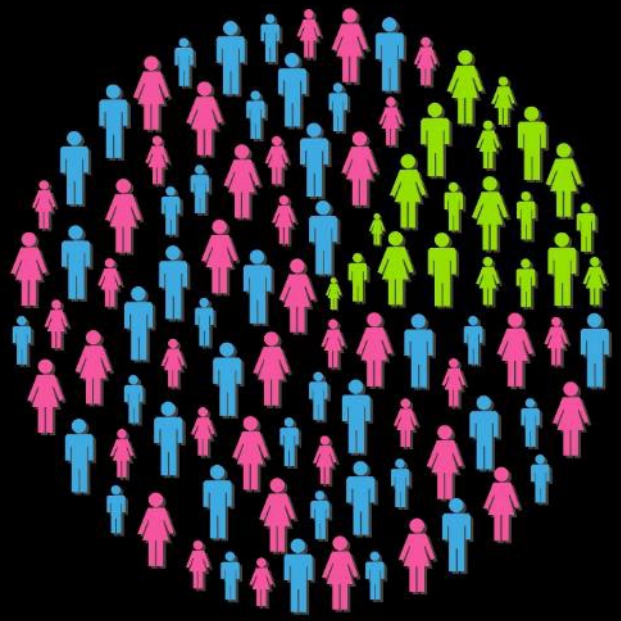


Statistical measurement:

proportions, percentages, rates, ratios, averages

Proportion or percentage

- Number of observations in a given category, relative to the total number…
- Most often, proportions are expressed in percentages



Economic activity status of the population aged 15 and older in Kazakhstan, 2019

	Number of people		Distribution by economic activity, %		Distribution by sex, %	
	Women	Men	Women	Men	Women	Men
Employed	4,245,500	4,535,400	61	73	48	52
Unemployed	236,300	204,300	3	3	54	46
Not economically active	2,480,200	1,500,700	36	24	62	38
Population 15+	6,962,000	6,240,400	100	100	53	47

Source: UNECE statistical database

Ratios

- Relationship of one number to another by division
- Expresses the relative size of two numbers
- How many times one number contains the other
- Common examples
  - sex ratio: the number of males per 100 females
  - student to teacher ratio: number of students for every teacher
  - maternal mortality ratio: number of maternal deaths per 100,000 live births

Rates

- To study the dynamics of change
- Rates of incidence

  Number of events in a given time interval divided by the number of members of the population who were exposed to the risk of the event during the same interval

  - Adolescent birth rate

    live births to women of 15-19 years of age per 1000 women of that age group

  - Death rate due to road traffic injuries

    number of road traffic accident deaths per million inhabitants

- Growth rates: gross domestic product; exports; imports; population

Averages

- Mean: sum of values divided by number of observations
  - Mean age of women at first birth
  - Mean age at first marriage
- Median divides ranked observations into two groups of equal size
  - Median age of the population
  - Median income

Indicators

- An indicator is a measure that signals the state or level of something. It represents statistical data for a specified time, place, and other characteristics
- Examples:
  - Total fertility rate
  - Growth rate of the gross domestic product
  - Remittance costs as a proportion of the amount remitted
  - Gender pay gap
  - Proportion of women in managerial positions

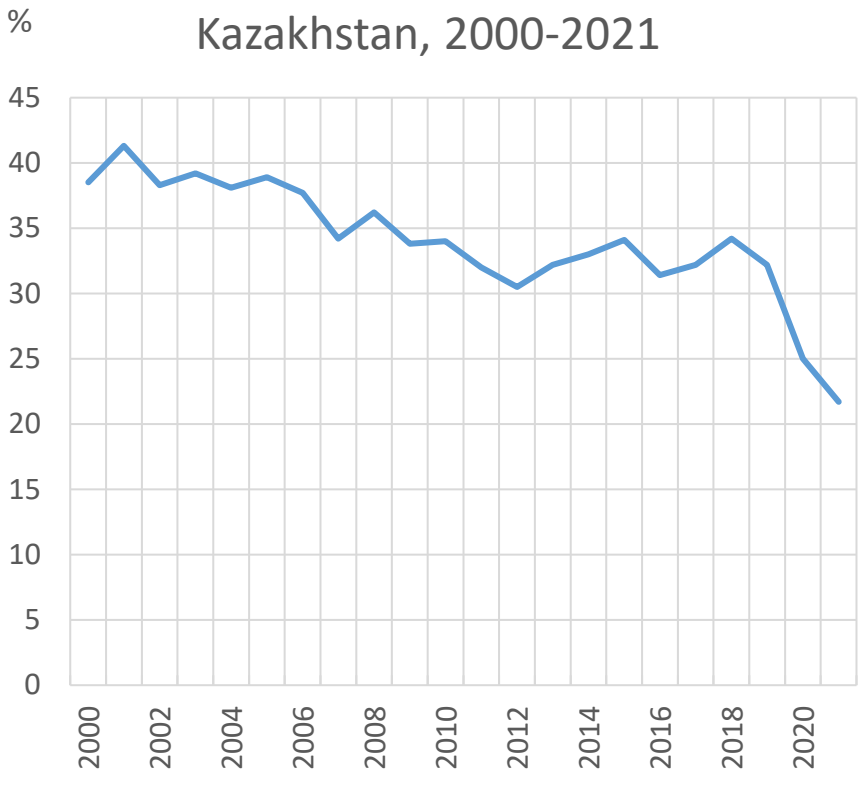
Gender pay gap

$$100 \times \frac{Men's\ average\ monthly\ earnings - Women's\ average\ monthly\ earnings}{Men's\ average\ monthly\ earnings}$$

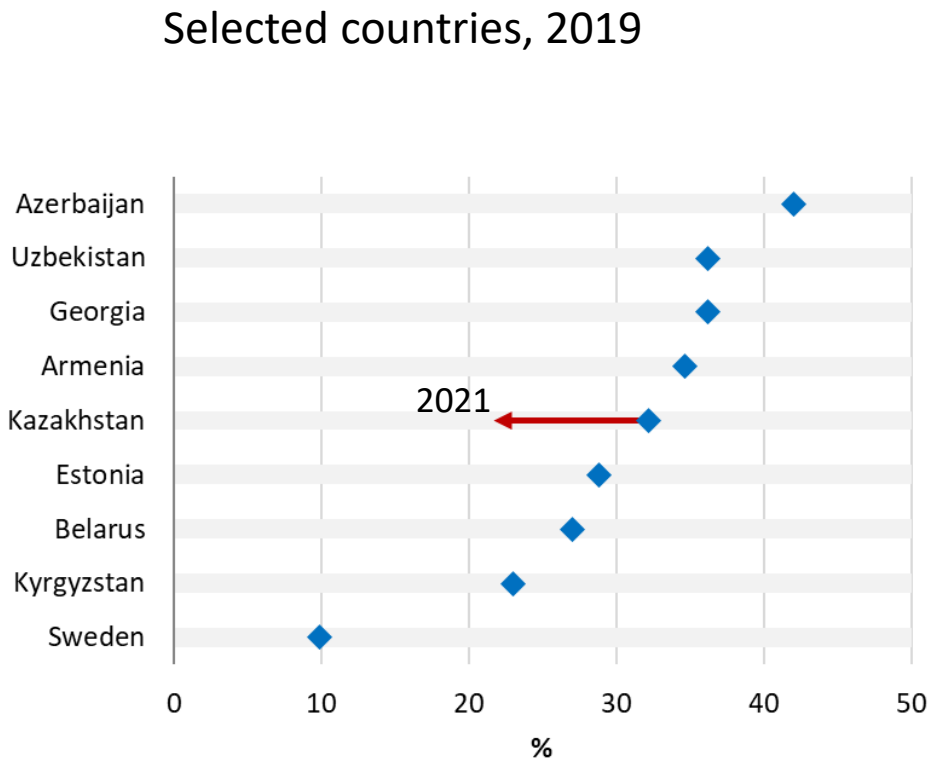
Kazakhstan 2021

	Women	Men	Difference
Average monthly earnings	220,160 ₸	281,239 ₸	61,079 ₸
Pay gap			21.7%

Gender pay gap



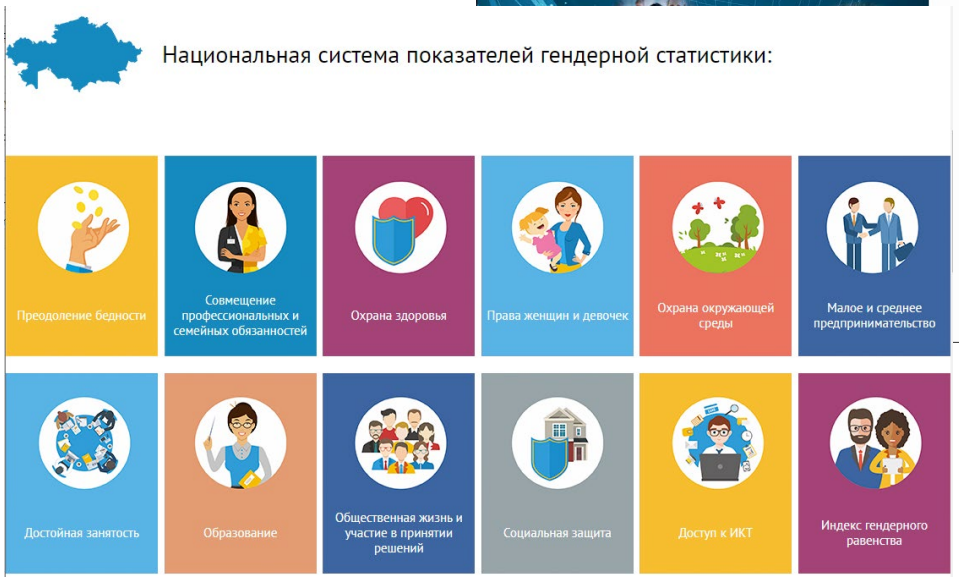
Source: Bureau of National Statistics



Source: UNECE statistical database;
Bureau of National Statistics

Indicator sets

- Sustainable Development Goals
  - Global
  - Regional: UNECE
  - National: Kazakhstan
- Gender indicators
  - Global minimum set
  - Regional: UNECE indicators, database
  - National: Kazakhstan
- …



To consider

- What does the indicator measure?
- What is the context?
  - How does this compare to previous measurements?
  - How does it compare to neighbouring countries or other countries with not too distant context?
- What is important for interpretation?
- What is the message?