

# Basic skills and essential concepts in statistics

The background features a series of horizontal blue lines. Overlaid on this is a white, jagged line that resembles a statistical data series. A prominent 3D arrow starts from the bottom left and points towards the top right. The arrow is colored red and has a grey shadow beneath it, giving it a three-dimensional appearance. The arrow's path follows the general upward trend of the white jagged line.

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

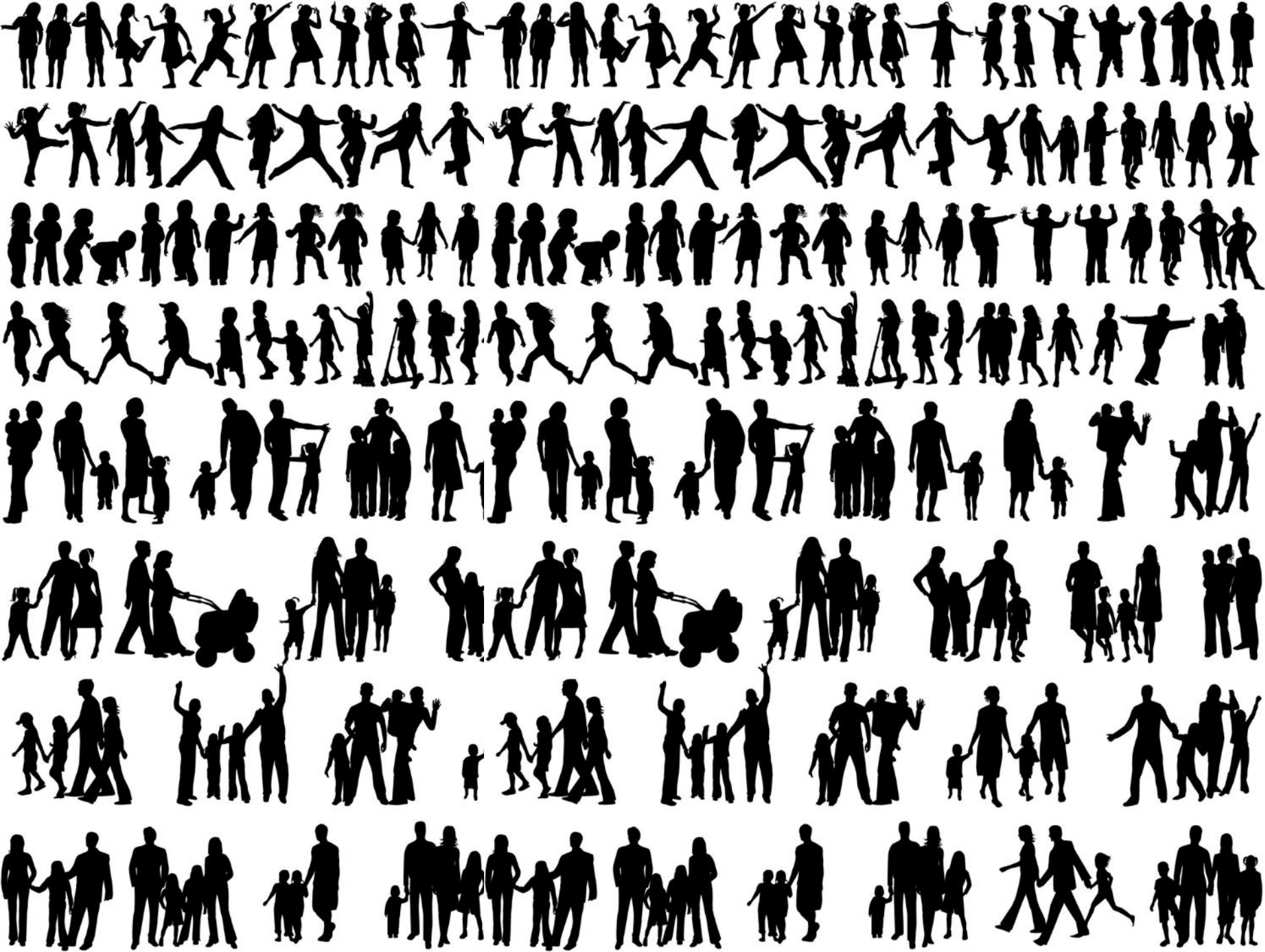
1. Data awareness
2. Ability to understand statistical concepts
3. Ability to analyse, interpret and evaluate statistical information
4. Ability to communicate statistical information

counting

is complicated



2, 2.5, 3, 3.5, 4

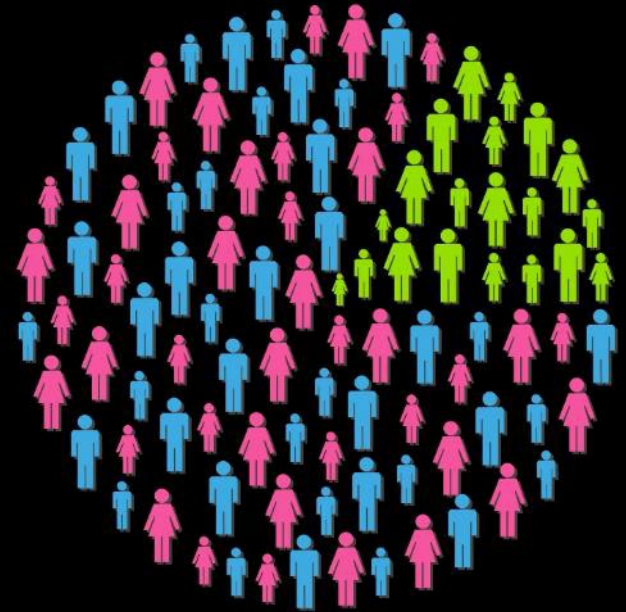


Statistical  
measurement:  
proportions, percentages,  
rates, ratios, averages



# 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

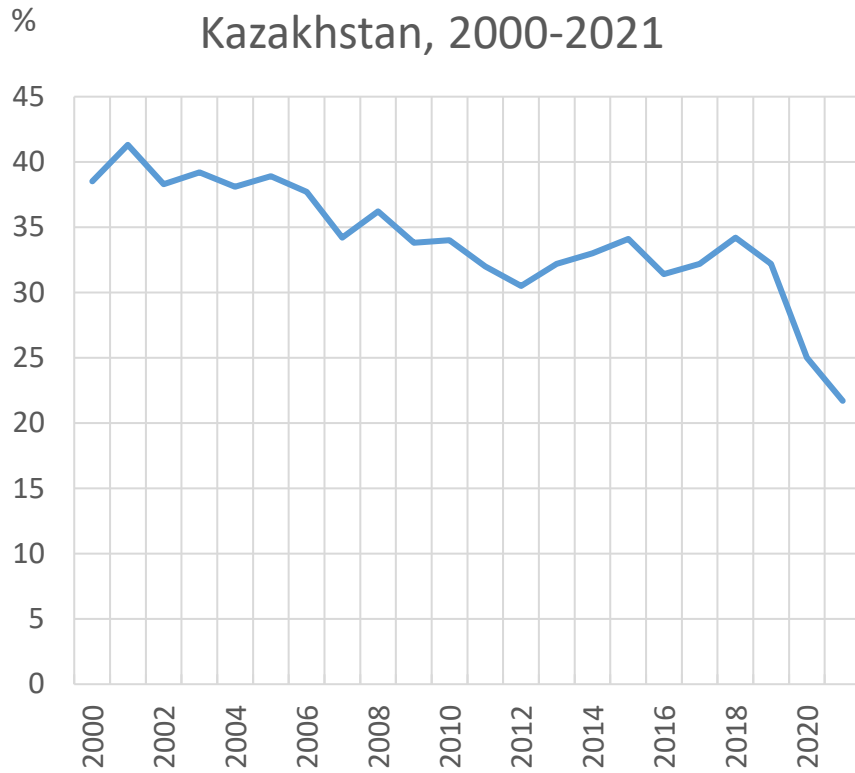
# Gender pay gap

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

## Kazakhstan 2021

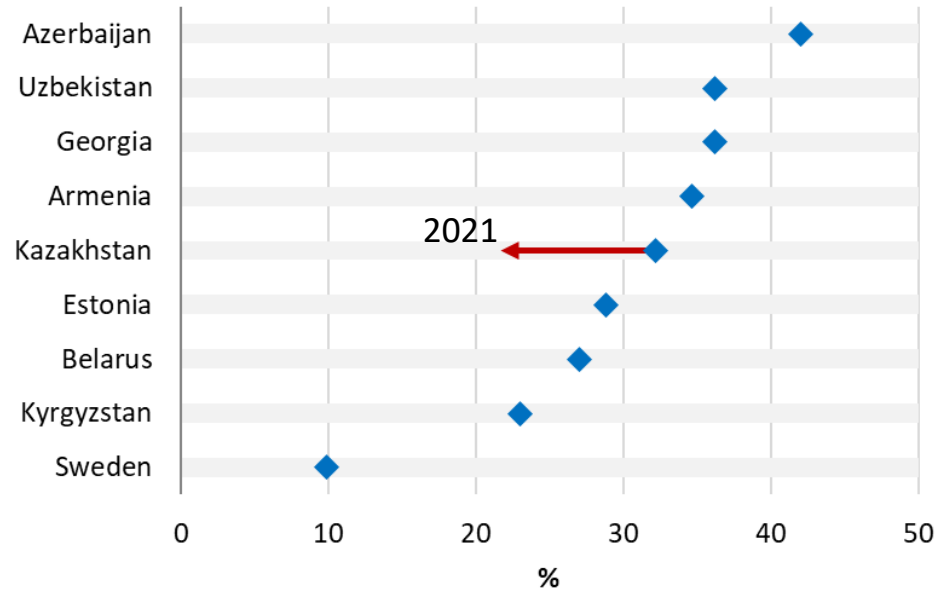
	Women	Men	Difference
Average monthly earnings	220,160 ₸	281,239 ₸	61,079 ₸
Pay gap			21.7%

# Gender pay gap



Source: Bureau of National Statistics

Selected countries, 2019



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](#)

- ...

 **UNECE** Dashboard for SDGs

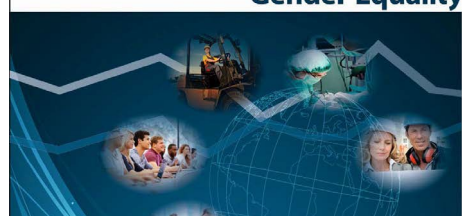
Browse data on global SDG indicators for UNECE countries. Click on one of the goals to begin. [Switch to Russian](#)



The image shows a grid of 17 Sustainable Development Goals (SDGs) icons. Each icon is a colored square with a white symbol and text. The goals are: 1. No Poverty, 2. Zero Hunger, 3. Good Health and Well-being, 4. Quality Education, 5. Gender Equality, 6. Clean Water and Sanitation, 7. Affordable and Clean Energy, 8. Decent Work and Economic Growth, 9. Industry, Innovation and Infrastructure, 10. Reduced Inequalities, 11. Sustainable Cities and Communities, 12. Responsible Consumption and Production, 13. Climate Action, 14. Life Below Water, 15. Life on Land, 16. Peace and Justice, 17. Partnerships for the Goals. At the bottom right of the grid is the text 'SUSTAINABLE DEVELOPMENT GOALS'.

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

**Indicators of Gender Equality**



The image shows the cover of the 'Indicators of Gender Equality' report. It features a blue background with a globe in the center. The globe is surrounded by various icons representing different aspects of gender equality, such as a woman, a child, a person, and a group of people. The title 'Indicators of Gender Equality' is written in white text at the top right.

 Национальная система показателей гендерной статистики:



The image shows a grid of 12 gender equality indicators. Each indicator is represented by a colored square with a white icon and text. The indicators are: 1. Преодоление бедности (Overcoming poverty), 2. Совмещение профессиональных и семейных обязанностей (Combining professional and family responsibilities), 3. Охрана здоровья (Health care), 4. Права женщины и девочек (Women's and girls' rights), 5. Охрана окружающей среды (Environmental protection), 6. Малое и среднее предпринимательство (Small and medium entrepreneurship), 7. Достойная занятость (Decent work), 8. Образование (Education), 9. Общественная жизнь и участие в принятии решений (Public life and participation in decision-making), 10. Социальная защита (Social protection), 11. Доступ к ИКТ (Access to ICT), 12. Индекс гендерного равенства (Gender equality index).



# 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?