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# Cartogram of Down syndrome incidence in Kazakhstan

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# Summary Slide

**Background.** Down syndrome (DS) is one of the most common birth defects, which, according to various sources, affects 1 child in 800–1100 and it occurs in people of all races, both boys and girls. Analysis of the epidemiological situation by drawing up cartograms permits to acquire a spatial assessment and use the data obtained to monitor the current situation.

**Aim.** To create a cartogram of the incidence of DS in Kazakhstan.

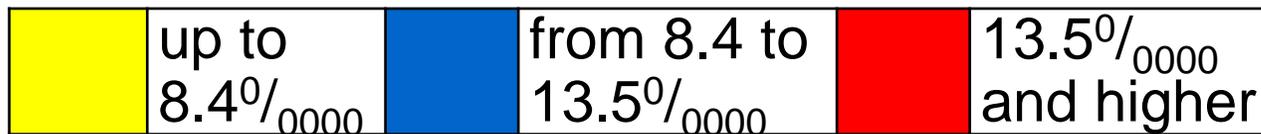
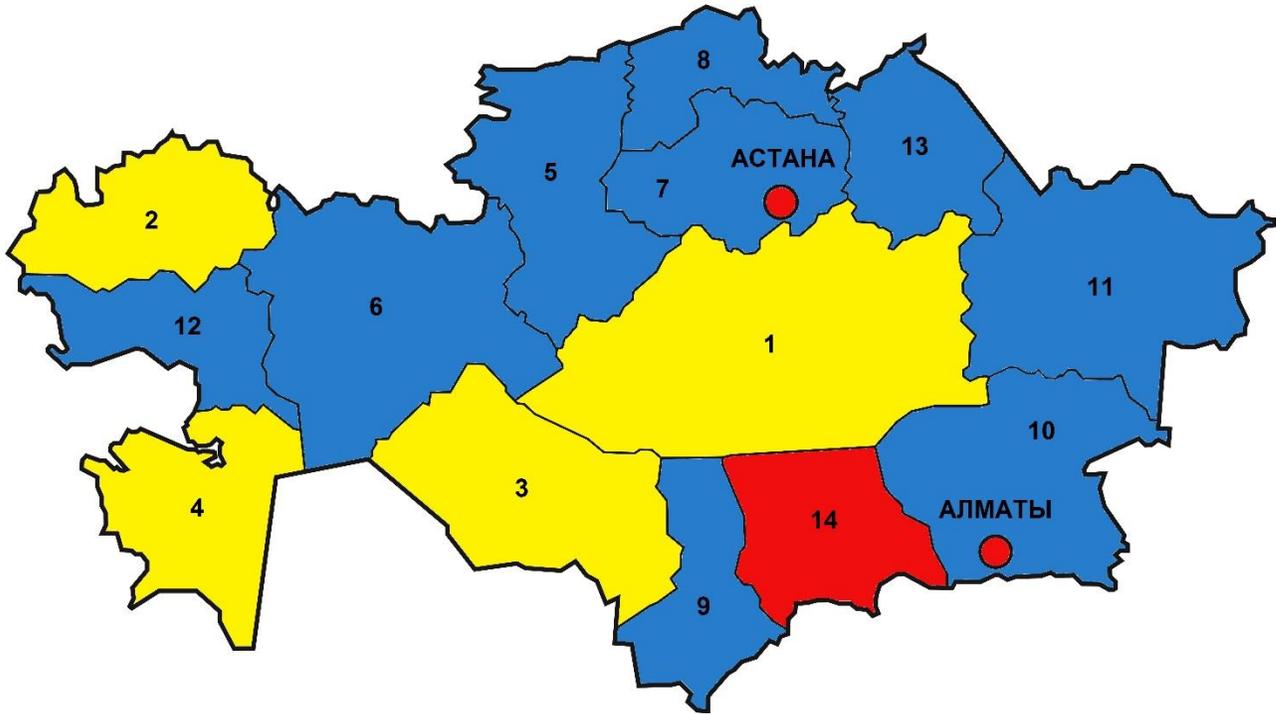
**Methods.** When compiling cartograms, indicators of Down syndrome morbidity (ICD 10–Q90) for 10 years (2009–2018) were used and a method of compiling cartograms was used, based on determining the standard deviation ( $\sigma$ ) from the mean ( $x$ ).

# Research Results

During the study period, 5 689 new cases of DS were registered. The average annual incidence of diabetes was  $11.0 \pm 0.4$  per 100 000 population. To compile cartograms, at the beginning, the incidence rates of DS were determined, which corresponded to the following criteria: low – up to  $8.4/_{0000}$ , medium – from 8.4 to  $13.5/_{0000}$ , high – above  $13.5/_{0000}$ .

On the basis of which the following groups of areas were determined

# Research Results



- Regions:**
1. Karaganda ( $4.4 \pm 0.5^{0}/_{0000}$ );
  2. West Kazakhstan ( $6.3 \pm 0.4^{0}/_{0000}$ );
  3. Kyzylorda ( $7.6 \pm 1.2^{0}/_{0000}$ );
  4. Mangistau ( $7.9 \pm 0.9^{0}/_{0000}$ );
  5. Kostanay ( $8.9 \pm 0.9^{0}/_{0000}$ );
  6. Aktobe ( $9.2 \pm 0.5^{0}/_{0000}$ );
  7. Akmola ( $9.3 \pm 0.8^{0}/_{0000}$ );
  8. North Kazakhstan ( $9.4 \pm 0.8^{0}/_{0000}$ );
  9. South Kazakhstan ( $9.4 \pm 0.7^{0}/_{0000}$ );
  10. Almaty ( $9.5 \pm 0.5^{0}/_{0000}$ );
  11. East Kazakhstan ( $9.6 \pm 0.5^{0}/_{0000}$ );
  12. Atyrau ( $9.8 \pm 0.4^{0}/_{0000}$ );
  13. Pavlodar ( $11.4 \pm 1.1^{0}/_{0000}$ );
  14. Zhambyl ( $19.1 \pm 0.9^{0}/_{0000}$ );
  15. Almaty city ( $20.4 \pm 1.0^{0}/_{0000}$ );
  16. Astana city ( $22.6 \pm 1.8^{0}/_{0000}$ ).

# Conclusions

Thus, the established regional features of the incidence of diabetes indicate variability with territorial differentiation in terms of incidence rates. The obtained results will allow healthcare organizers to have a clear spatial picture of the incidence of DS, which is necessary for carrying out treatment and preventive measures.