

Birth defects incidence in children from single and twin pregnancies in the Czech Republic - current data

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- **Aim of study: An analysis of occurrence of birth defects in children from single and twin pregnancies in the Czech Republic in 1994 - 2007. An assessment of total numbers and relative incidences of birth defects in births according to 10th Revision of International Classification of Diseases (ICD-10).**
- **Type of study: Retrospective epidemiological analysis of birth defects incidences from the Czech National Birth Defects Register database.**

Material and methods:

- **Data from the National Birth Defects Register (Institute for Health Information and Statistics) in the Czech Republic in the 1994 – 2007 period were used.**
- **In this study, particular diagnoses - as they were registered in the National Register - were analyzed.**
- **Birth defects were analyzed separately for children from single and twin pregnancies.**

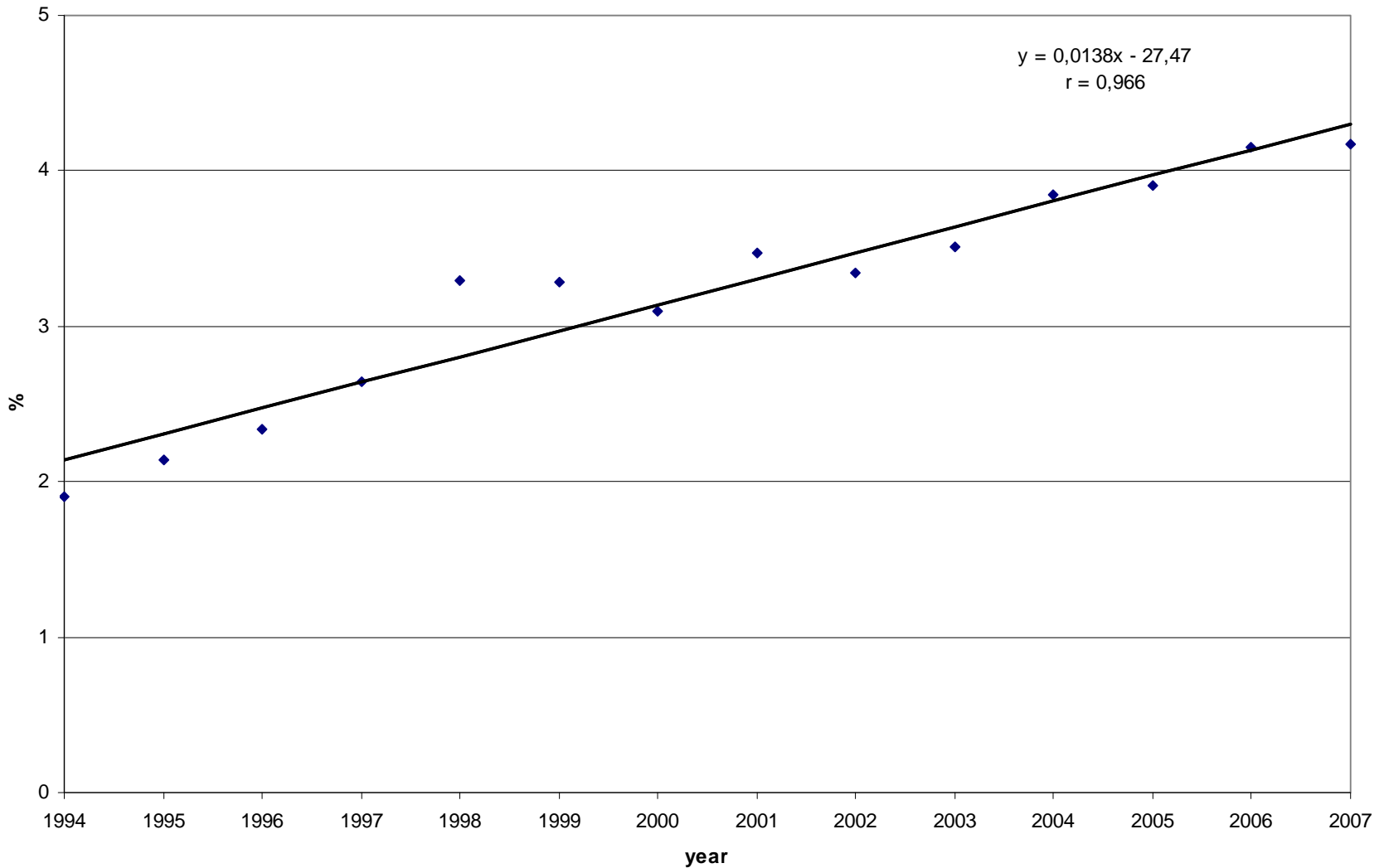
- **The diagnoses in study were divided into following eleven birth defects groups according to ICD-10 classification:**
 - (Q00 - Q07) nervous system,
 - (Q10 - Q18) eye, ear, face and neck,
 - (Q20 - Q28) circulatory system,
 - (Q30 - Q34) respiratory system,
 - (Q35 - Q37) cleft lip and cleft palate,
 - (Q38 - Q45) digestive system,
 - (Q50 - Q56) genital organs,
 - (Q60 - Q64) urinary system,
 - (Q65 - Q79) musculoskeletal system,
 - (Q80 - Q89) other defects and
 - (Q90 -Q99) chromosomal abnormalities, not elsewhere classified.
- **Total numbers and mean incidences of birth defects separately for children from single and twin pregnancies were assessed for all these 11 groups**

Statistical analysis

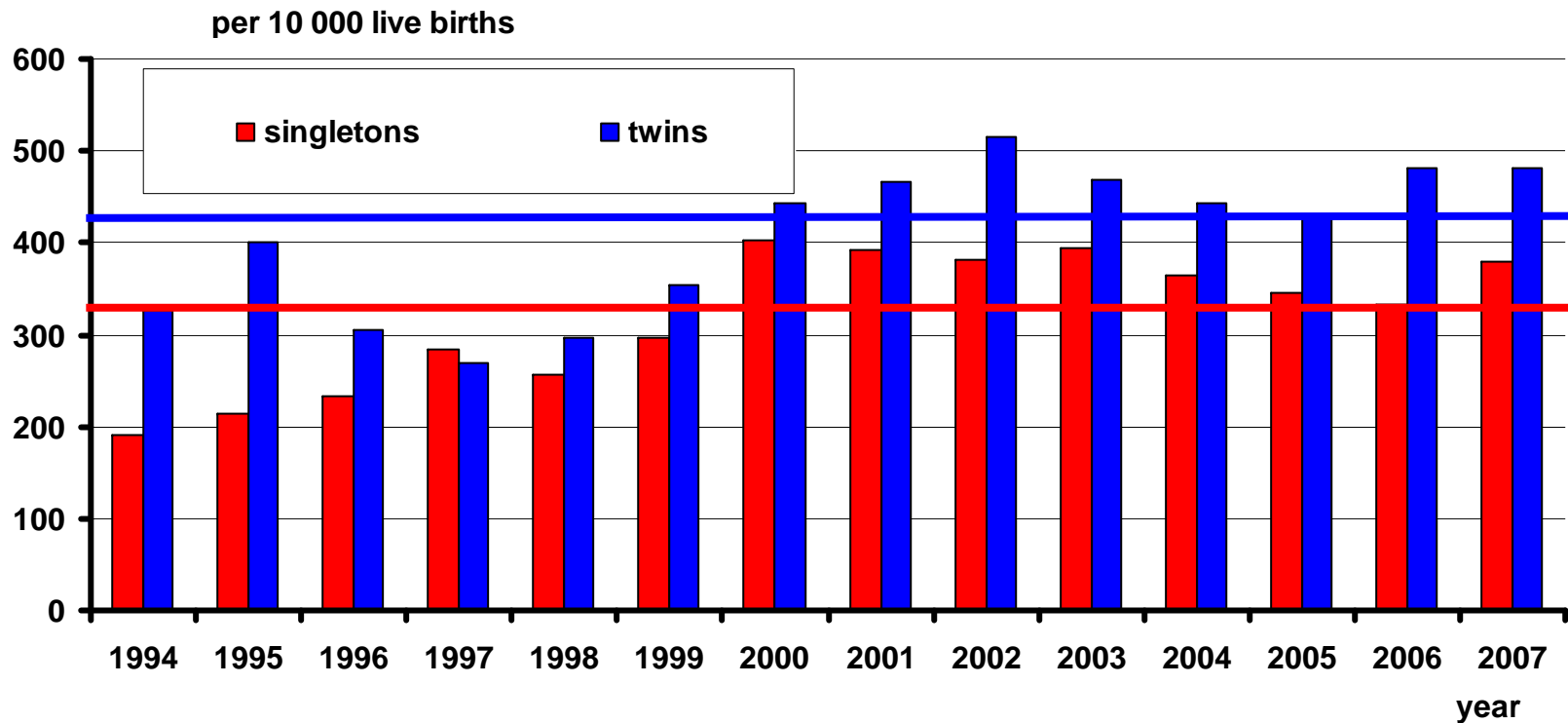
- For statistical evaluation confidence intervals were estimated. Confidence intervals for incidences were calculated per 10.000 livebirths from confidence limits for number of cases providing Poisson distribution.
- These limits were calculated using an exact method (*Johnson, Kotz, 1969*) in BD with less than 10 registered cases, in other BD Byar approximation (*Breslow a Day, 1989*) was used.
- Relative frequencies were compared using Z-statistics with arsin transformation based approximation.

Twins frequency

Czech Republic, 1994 – 2007

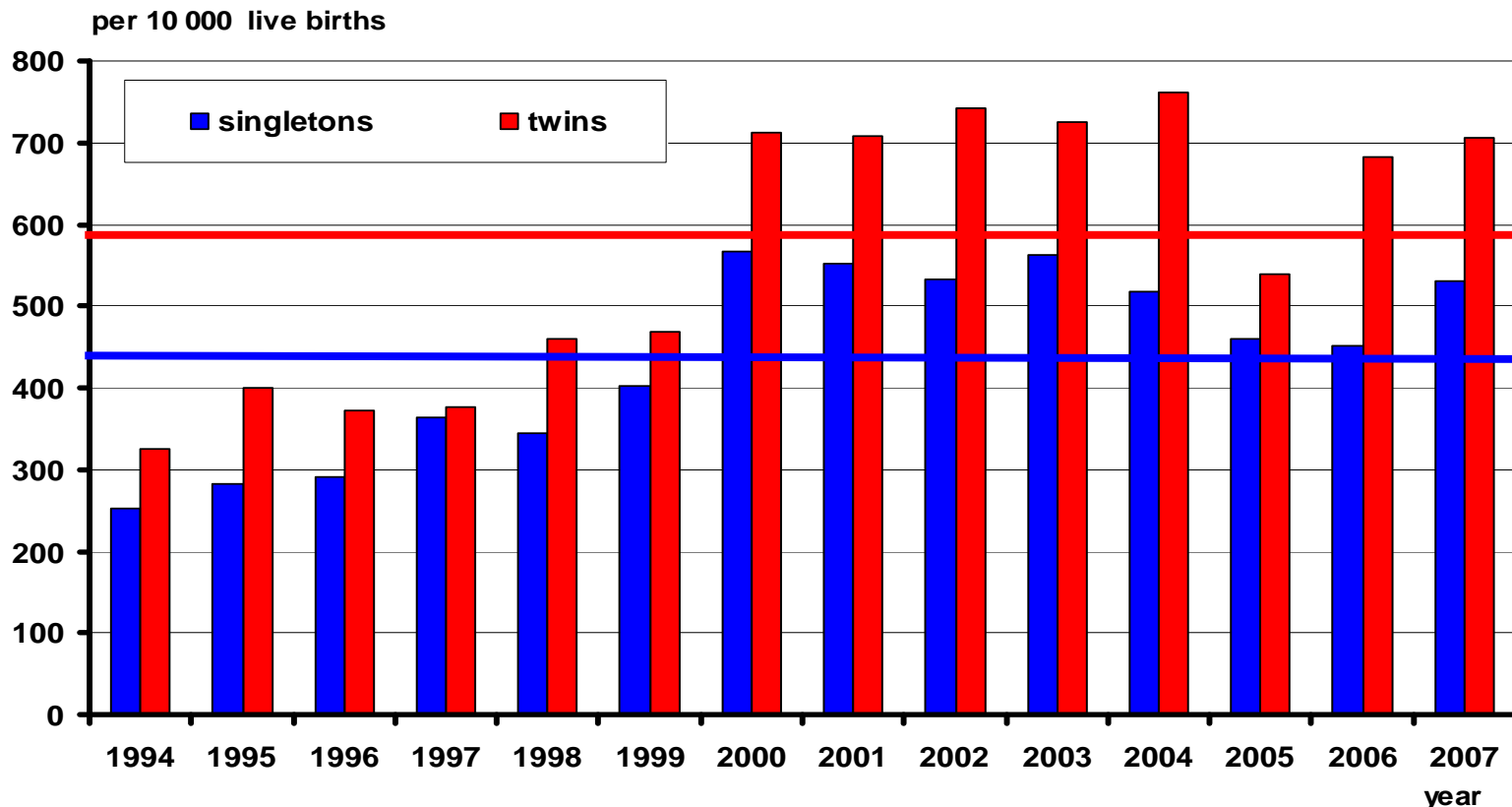


Children born with birth defect according to multiplicity of pregnancy (singletons/twins), Czech Republic, 1994 – 2007



Diagnosed birth defects according to multiplicity of pregnancy

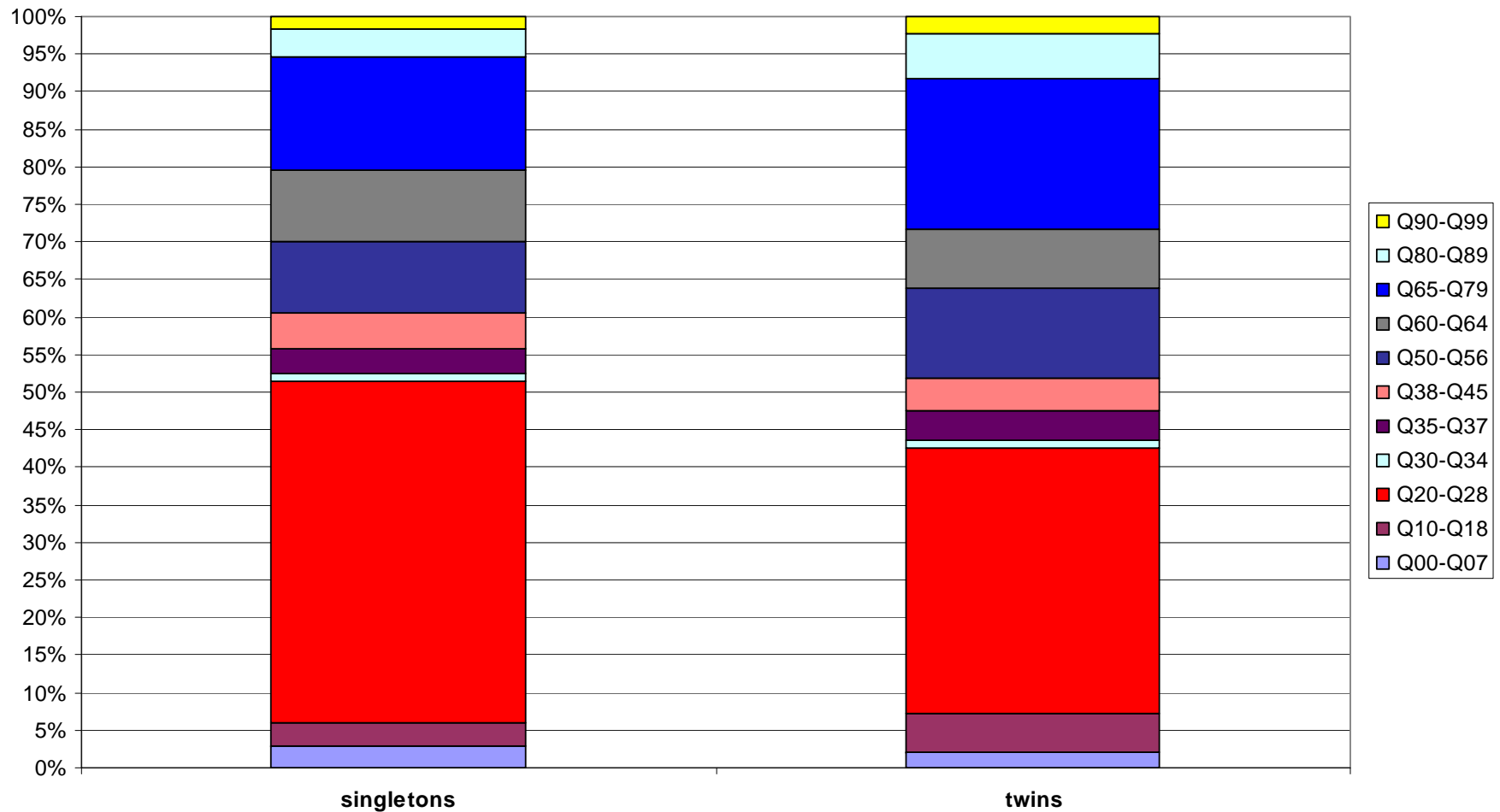
(singletons/twins), Czech Republic, 1994 – 2007



Singletons 1.50 of BD per child
Twins 1.56 of BD per child

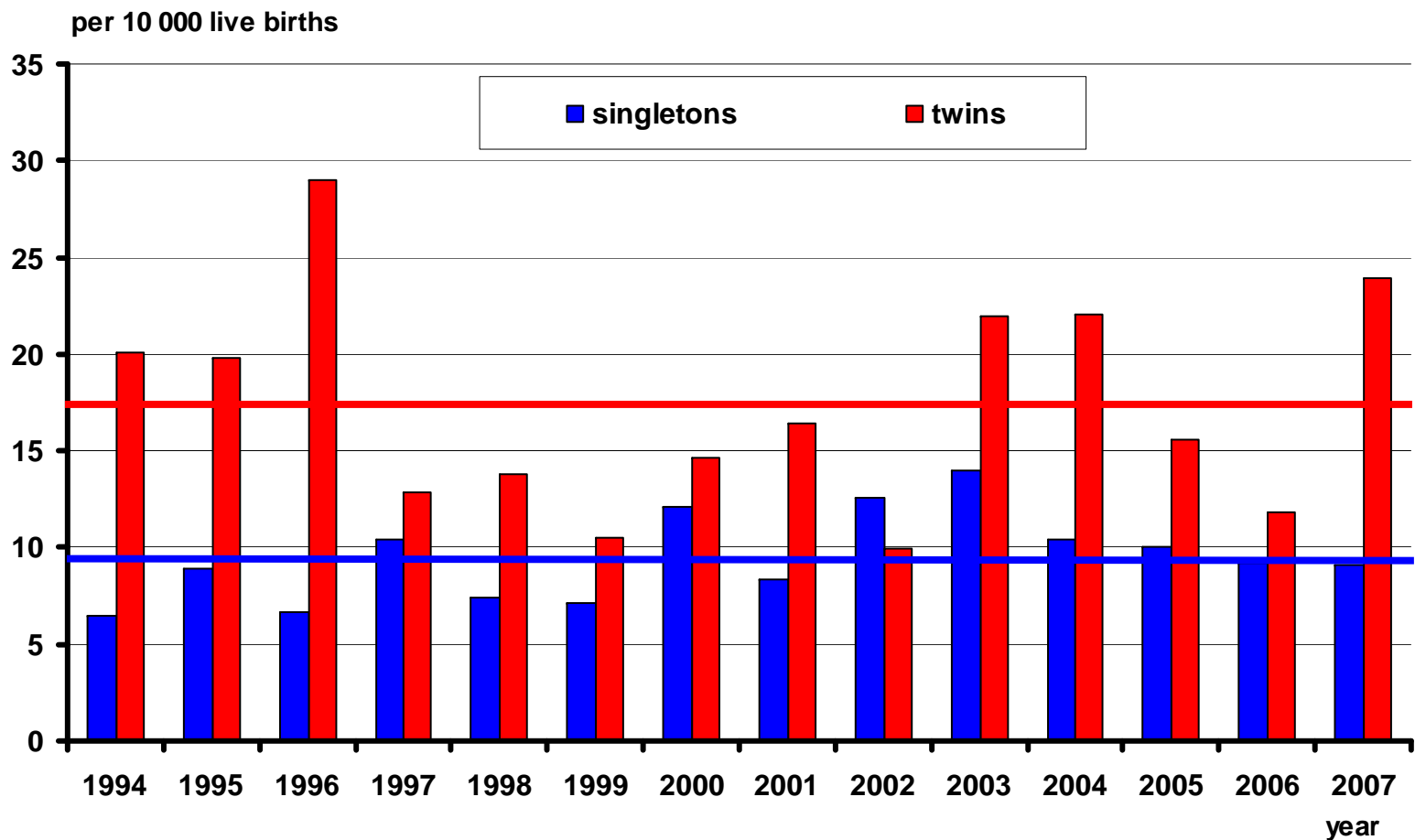
Diagnosed birth defects according to multiplicity of pregnancy (singletons/twins), Czech Republic, 1994 – 2007

Frequency of diagnoses groups - %



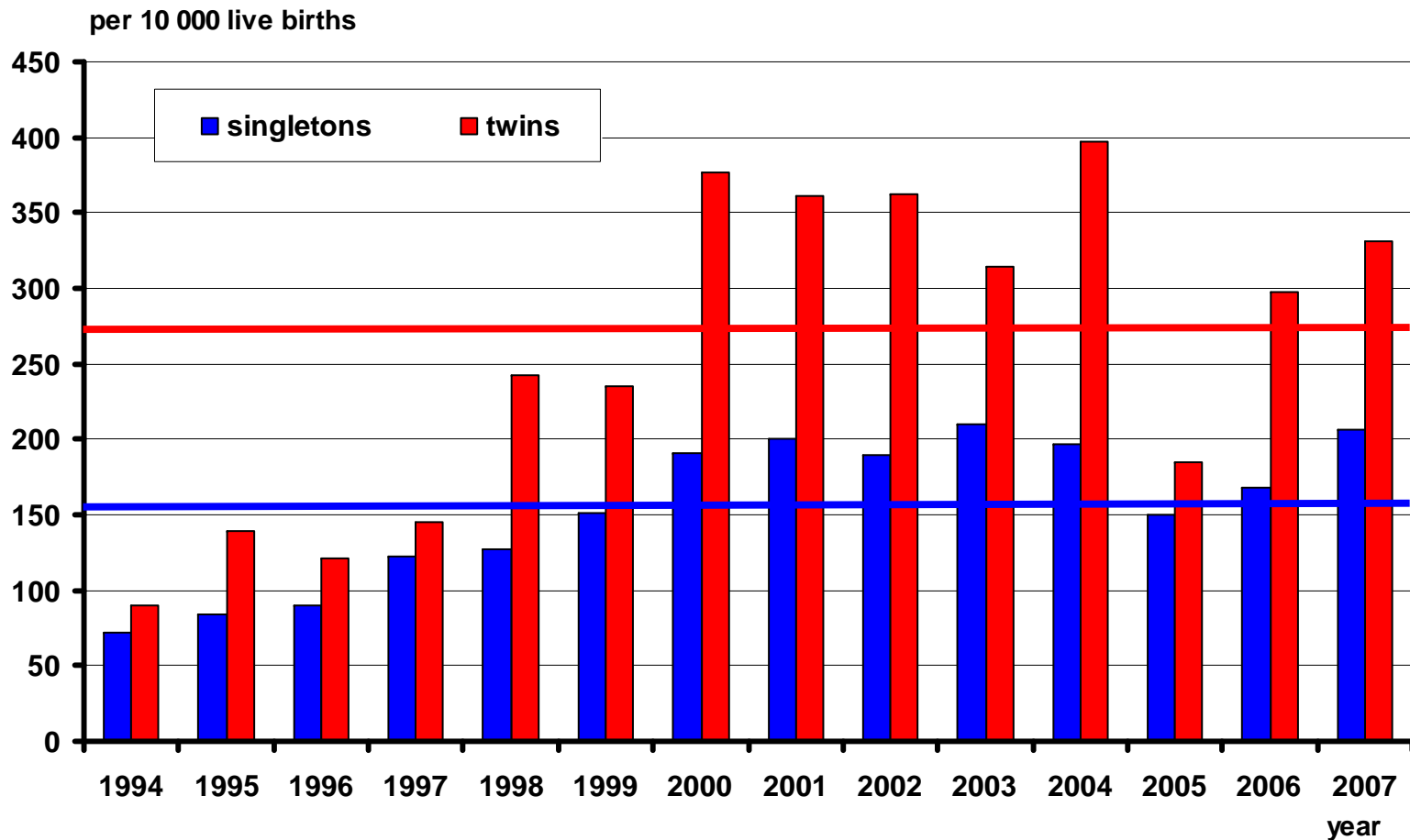
Birth defects diagnosed in live births according to multiplicity of pregnancy (singletons/twins), Czech Republic, 1994 – 2007

Congenital malformations of the nervous system (Q00-Q07)



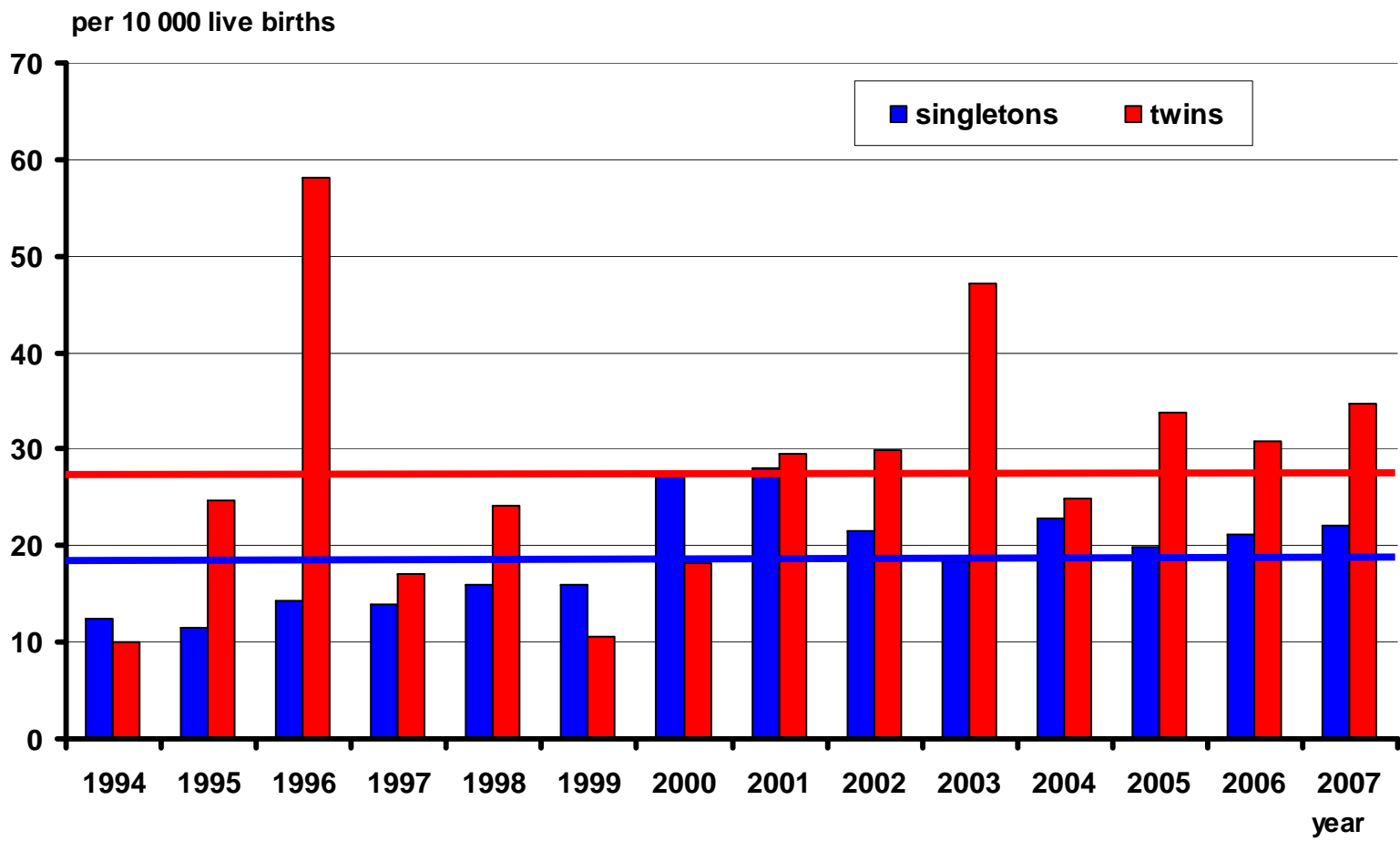
Birth defects diagnosed in live births according to multiplicity of pregnancy (singletons/twins), Czech Republic, 1994 – 2007

Congenital malformations of the circulatory system (Q20-Q28)



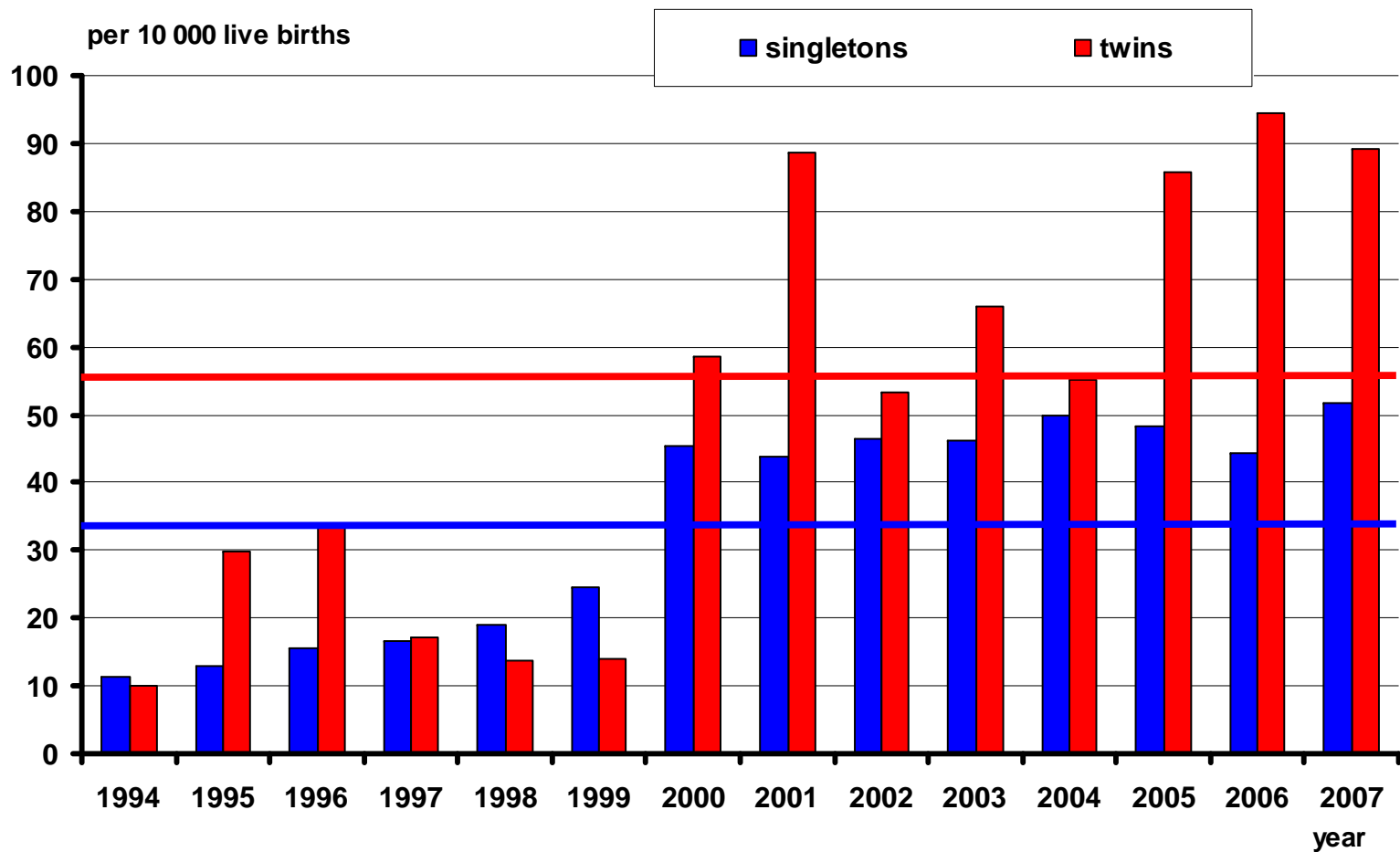
Birth defects diagnosed in live births according to multiplicity of pregnancy (singletons/twins), Czech Republic, 1994 – 2007

Other congenital malformations of the digestive system (Q38-Q45)



Birth defects diagnosed in live births according to multiplicity of pregnancy (singletons/twins), Czech Republic, 1994 – 2007

Congenital malformations of the urinary system (Q60-Q64)

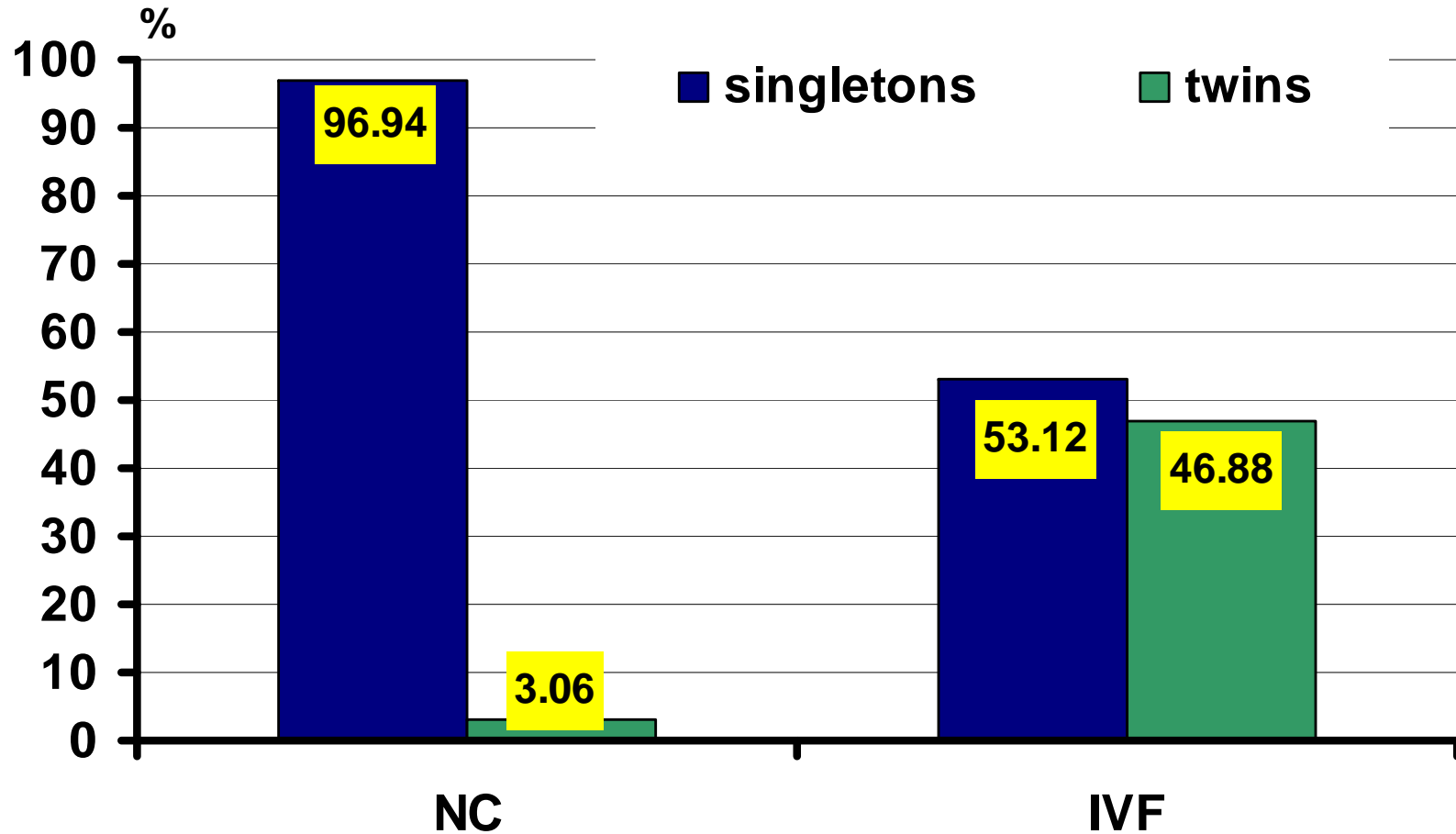


Results

- In the Czech Republic during 1994 – 2007 period, totally 1 312 930 children were born (live births and stillbirths) from single pregnancies, whereas 42 448 from twin pregnancies.
- A twin rate (out of a total number of births) increased from 2.33 % in 1997 to 4.17 % in 2004.
- An overall incidence of diagnosed birth defects was 436.03 per 10 000 live births in singletons and 598.38 in twins.
- Birth defects incidence (per 10 000 live births) in singletons and twins in each of 11 birth defects groups under the study was during the 1994 – 2007 period as follows:
 - **(Q00 - Q07) nervous system** 9.45 in singletons and 17.20 in twins,
 - **(Q10 - Q18) eye, ear, face and neck** 21.69 in singletons, and 18.38 in twins,
 - **(Q20 - Q28) circulatory system** 154.16 in singletons and 272.57 in twins,
 - **(Q30 - Q34) respiratory system** 4.92 in singletons and 5.65 in twins,
 - **(Q35 - Q37) cleft lip and cleft palate** 16.79 in singletons and 20.02 in twins,
 - **(Q38 - Q45) digestive system** 18.97 in singletons and 28.74 in twins,
 - **(Q50 - Q56) genital organs** 52.07 in singletons and 56.30 in twins,
 - **(Q60 - Q64) urinary system** 34.21 in singletons and 56.78 in twins,
 - **(Q65 - Q79) musculoskeletal system** 87.49 in singletons and 90.93 in twins,
 - **(Q80 - Q89) other defects** 26.06 in singletons and 22.14 in twins and
 - **(Q90 - Q99) chromosomal abnormalities** 10.20 in singletons and 9.66 in twins.

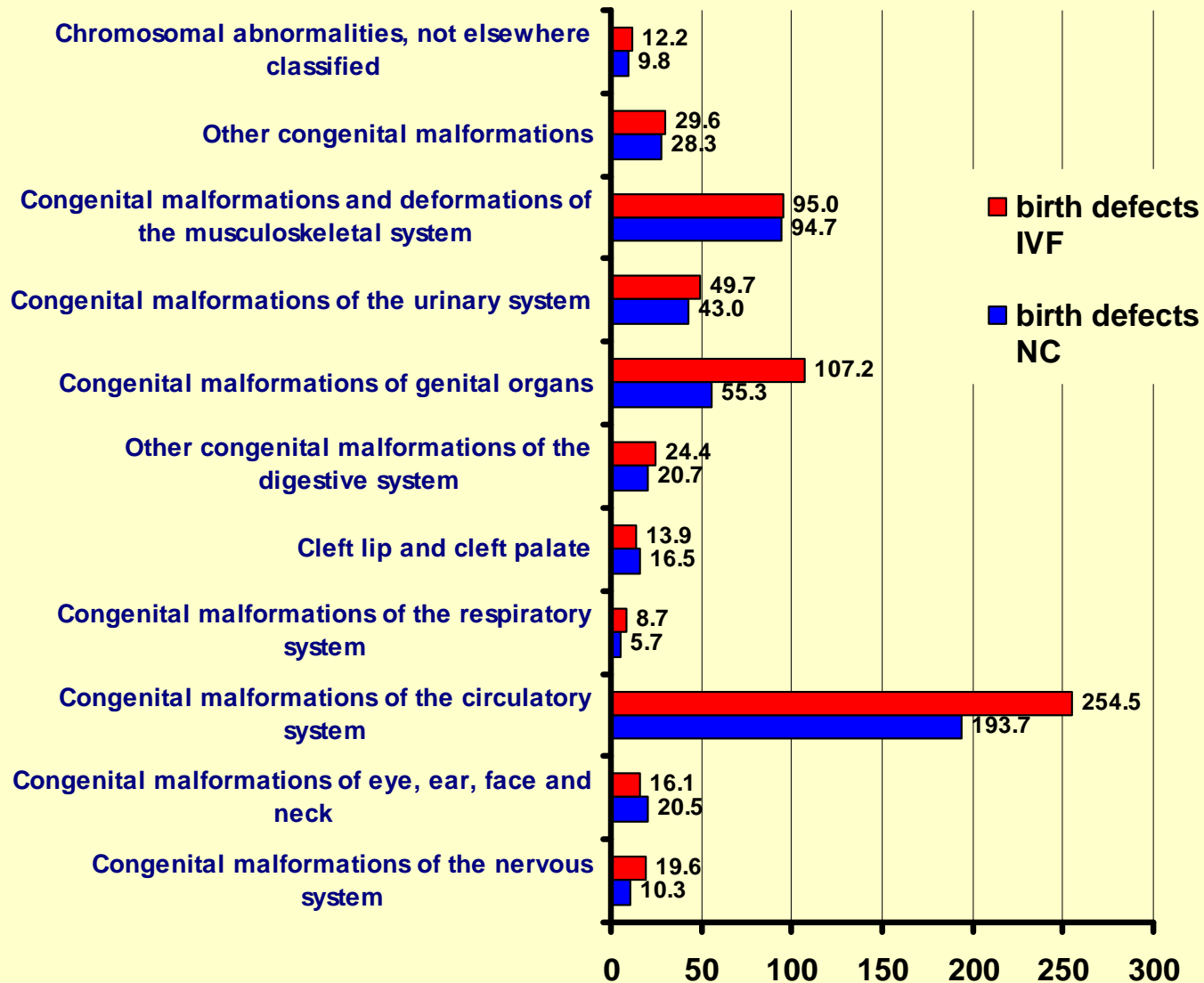
Proportion of singletons and twins

Naturally conceived children group (NC) x IVF children group (IVF)



Comparison of birth defects incidence

naturally conceived children group (NC) x IVF children group (IVF)



Conclusions I

- **The study gives differentiated results of incidences of selected types of birth defects in births according to pregnancy multiplicity.**
- **A statistically significant difference ($p < 0.001$) in total birth defects incidence in twins compared to singletons was confirmed.**
- **Same statistical significance ($p < 0.001$) was also found (twins compared to singletons) in following birth defects or their groups: (Q00 - Q07) nervous system, (Q20 - Q28) circulatory system, (Q38 - Q45) digestive system, (Q60 - Q64) urinary system.**

Conclusions II

- **Same statistical significance ($p < 0.001$) was also found (twins compared to singletons) in following birth defects: congenital hydrocephalus, some congenital heart defects, cleft lip and/or palateoesophageal atresia, anorectal malformation, hypospadia, congenital hydronefrosis, polydactyly and syndactyly.**
- **A statistically significant difference ($p < 0.01$) was found in spina bifida, hypoplastic left heart syndrome, duodenal atresia/stenosis, diaphragmatic hernia and Down syndrome**

Acknowledgement

We would like to express our thanks to all our colleagues and co-workers who have been and still are involved in birth defects reporting and data collecting in our country.