

Neural tube defects in the Czech Republic: incidence, prenatal diagnostics and sex ratio

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Czech Republic – Fact sheet



Population: 10,752,638 (2022 est)

Annual births: approx. 110 000

Regions: 13 regions and the capital Prague; 76 districts in total

Registry: started 1964, population-wide, compulsory by national law

Coding: ICD-10, From 2016 also OMIM, ORPHA and SSIEM codes

Termination of pregnancy: allowed (till 24th gestation week)

Sources: multiple

Cases: births (incl. stillbirths), TOPFAs

Prenatal diagnostics: covered by the health insurance (except NIPT)

Folic acid supplementation: recommended, no data available

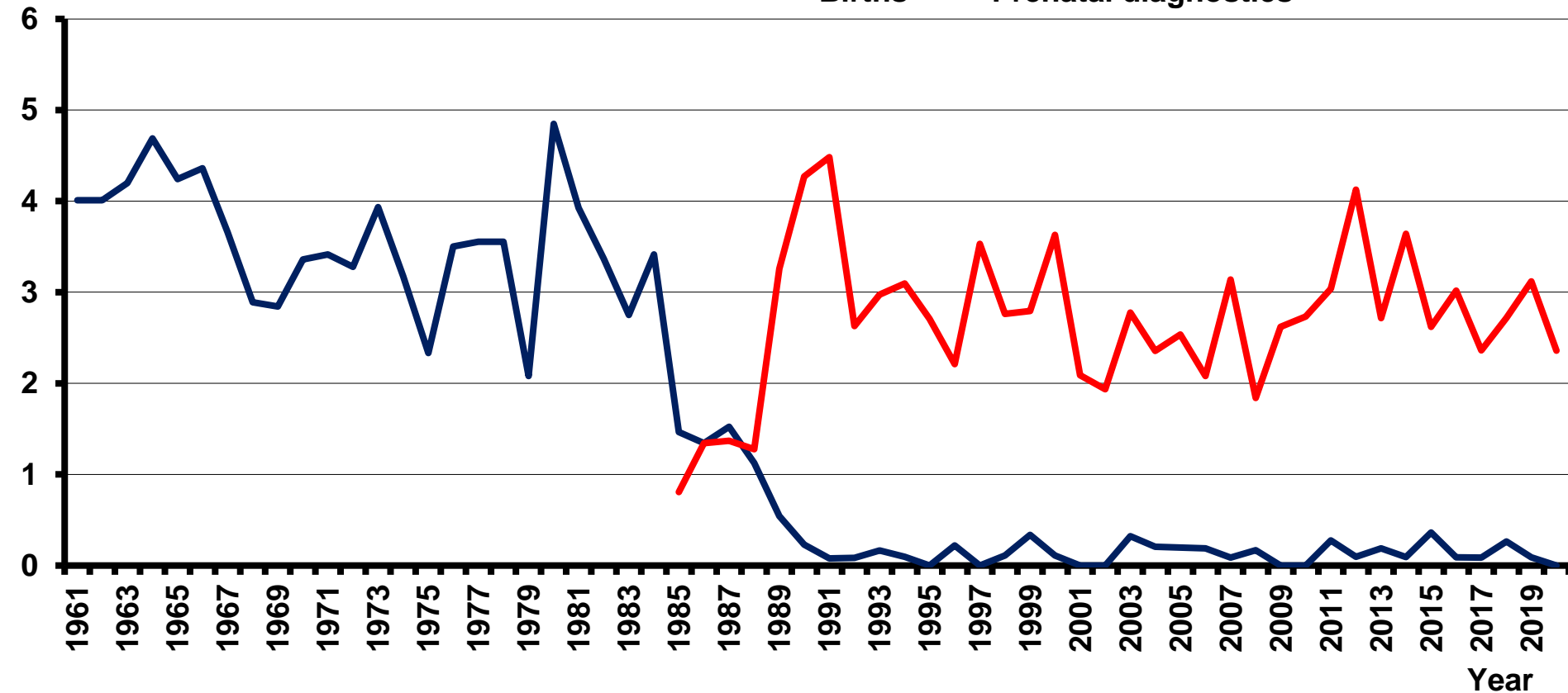
Outline of the study

- **Type:** Retrospective epidemiologic analysis of the incidences of neural tube defects: anencephaly, spina bifida and encephalocele (all appropriate ICD-10 codes). Time: 1961-2020.
- **Main data source:** National Registry of the Congenital Anomalies (part of the official National Registry of Reproductive Health run by the Institute of Health Information and Statistics of the Czech Republic).
- **Focus on:**
 - Incidence of selected anomalies (NTDs)
 - Proportion of prenatally diagnosed cases
 - Sex ratio
 - Change of trends in selected periods
- **Statistical analysis:** The statistical significance was evaluated using Pearson χ^2 and Fisher's exact test in R-software. P values < 0.05 were considered significant.

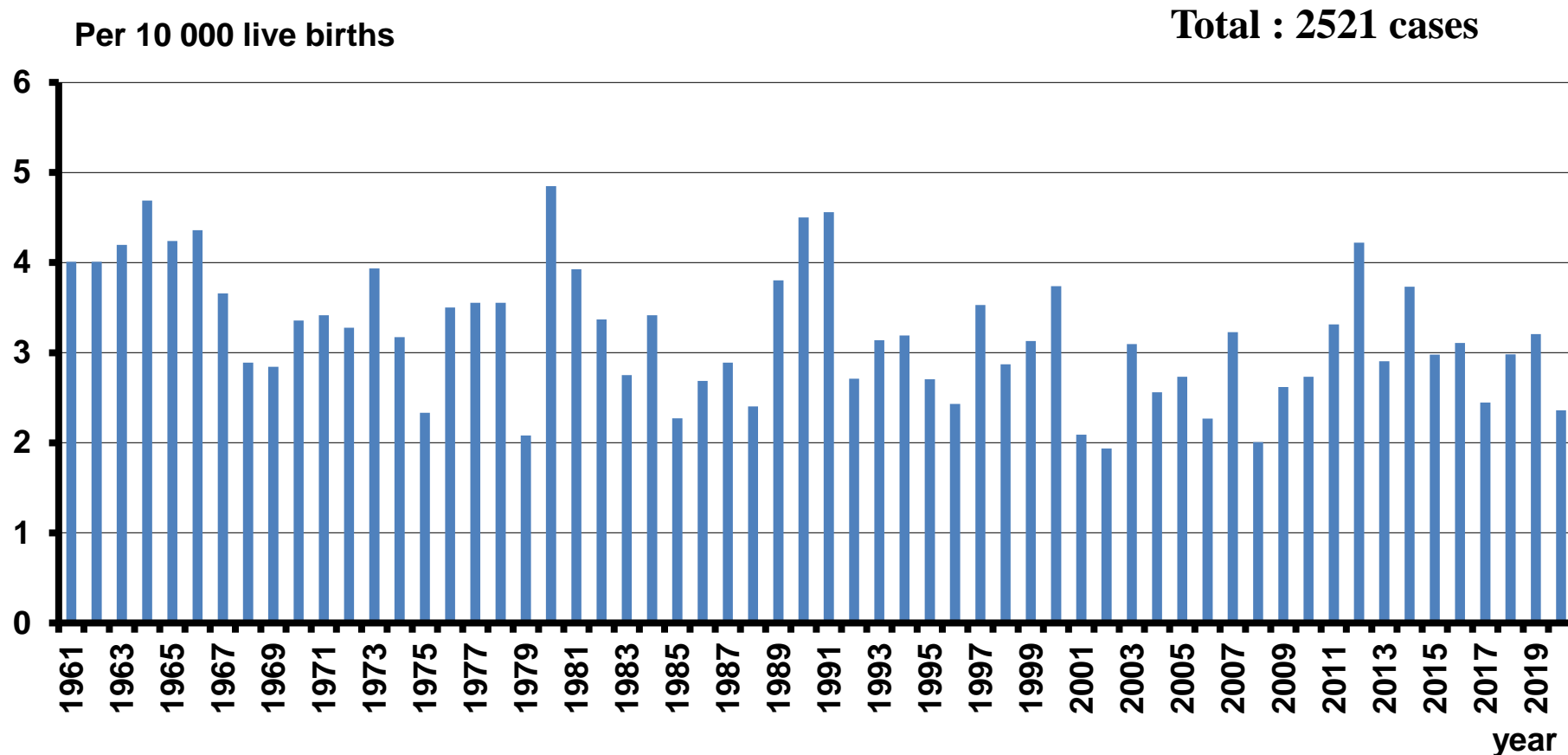
Anencephaly, 1961-2020, births and prenatal diagnostics

Per 10 000 live births

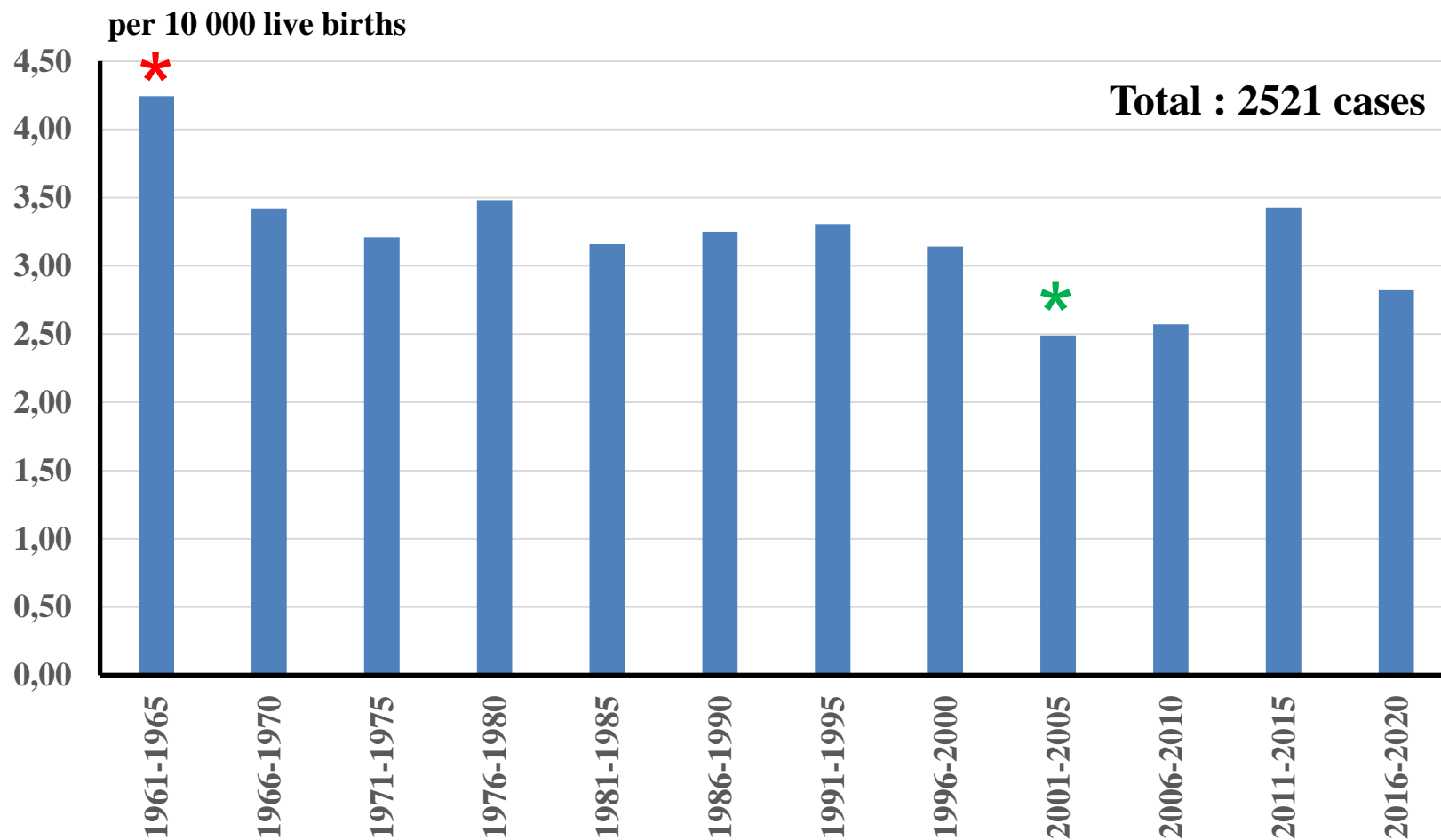
— Births — Prenatal diagnostics



Anencephaly, 1961-2020, all cases



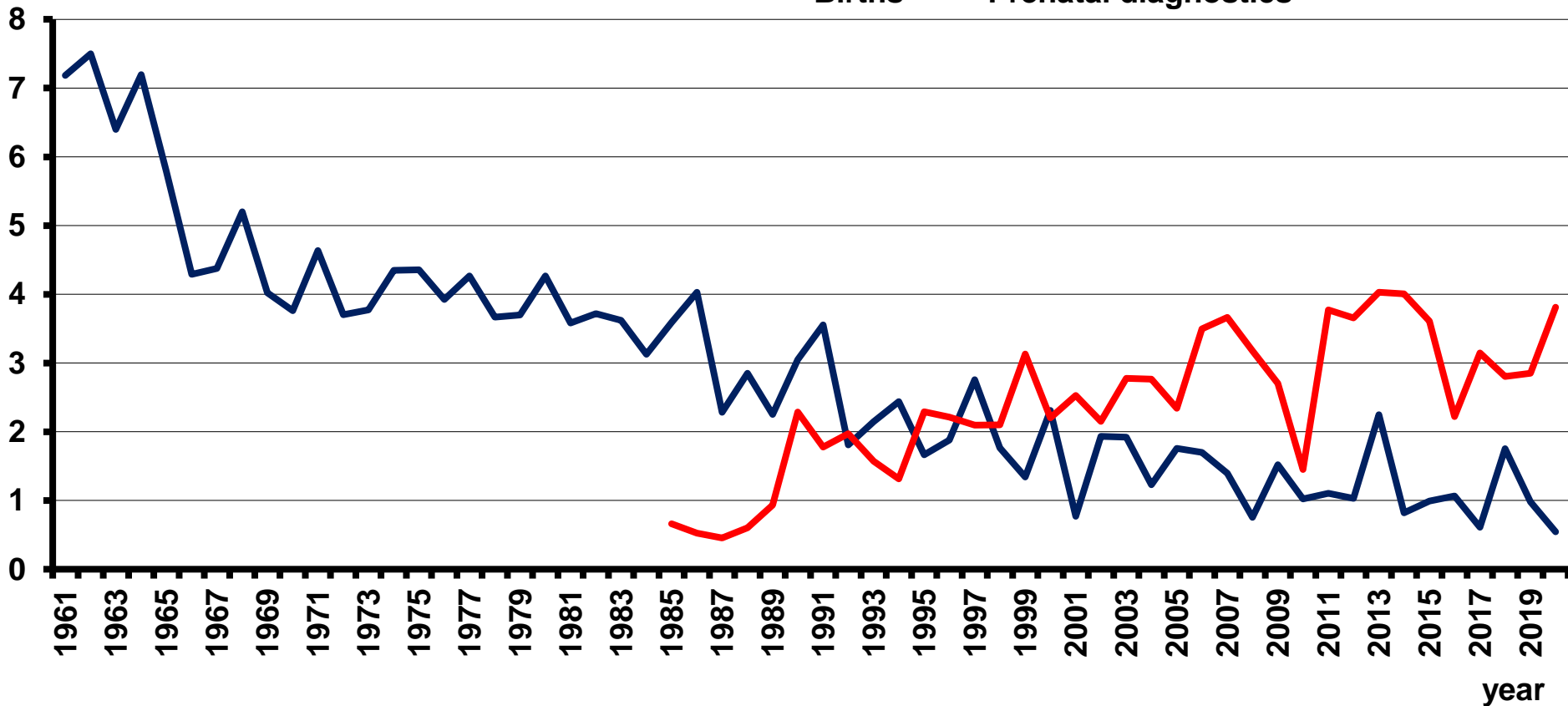
Anencephaly, 1961-2020, all cases



Spina bifida, 1961-2020, births and prenatal diagnostics

na 10 000 živě narozených

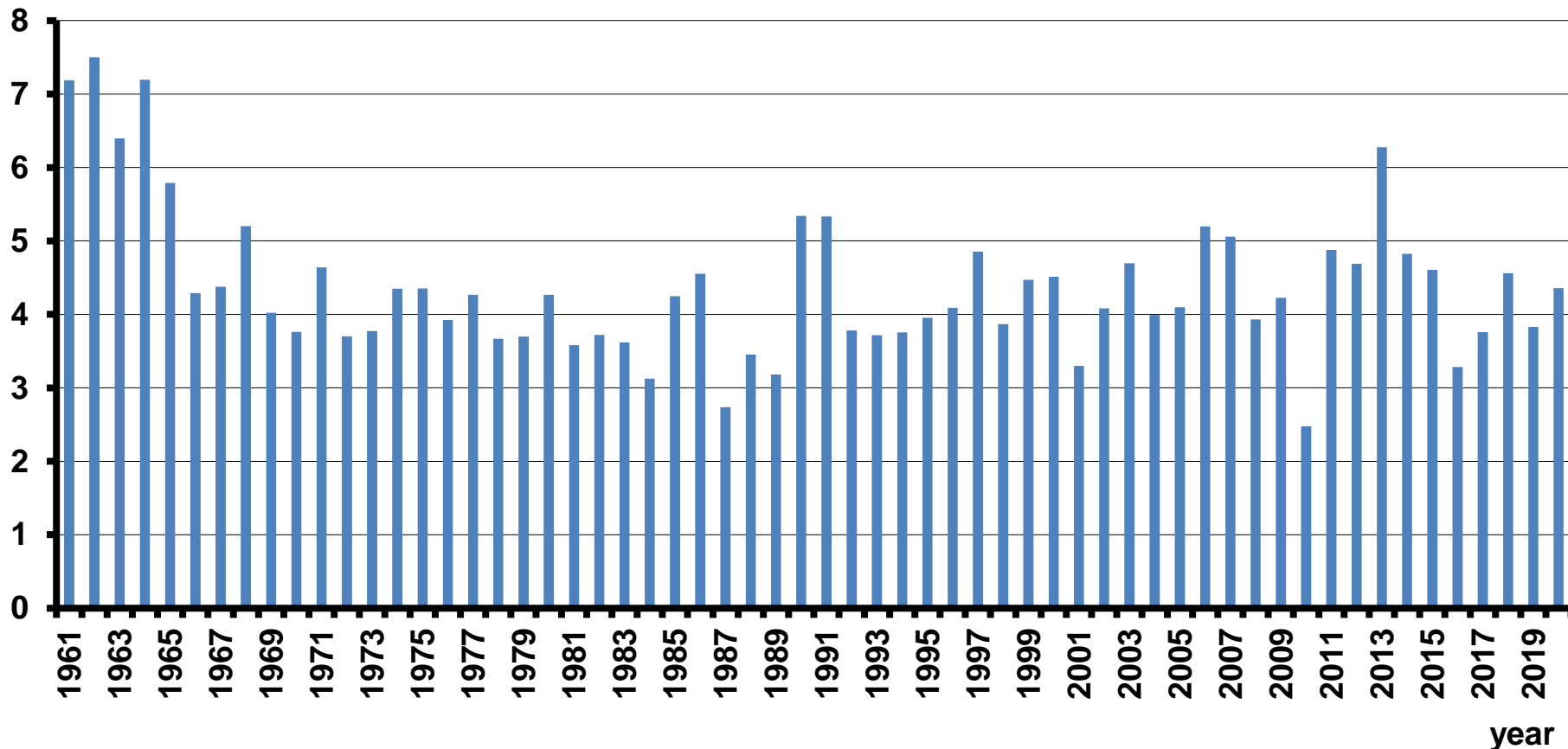
— Births — Prenatal diagnostics



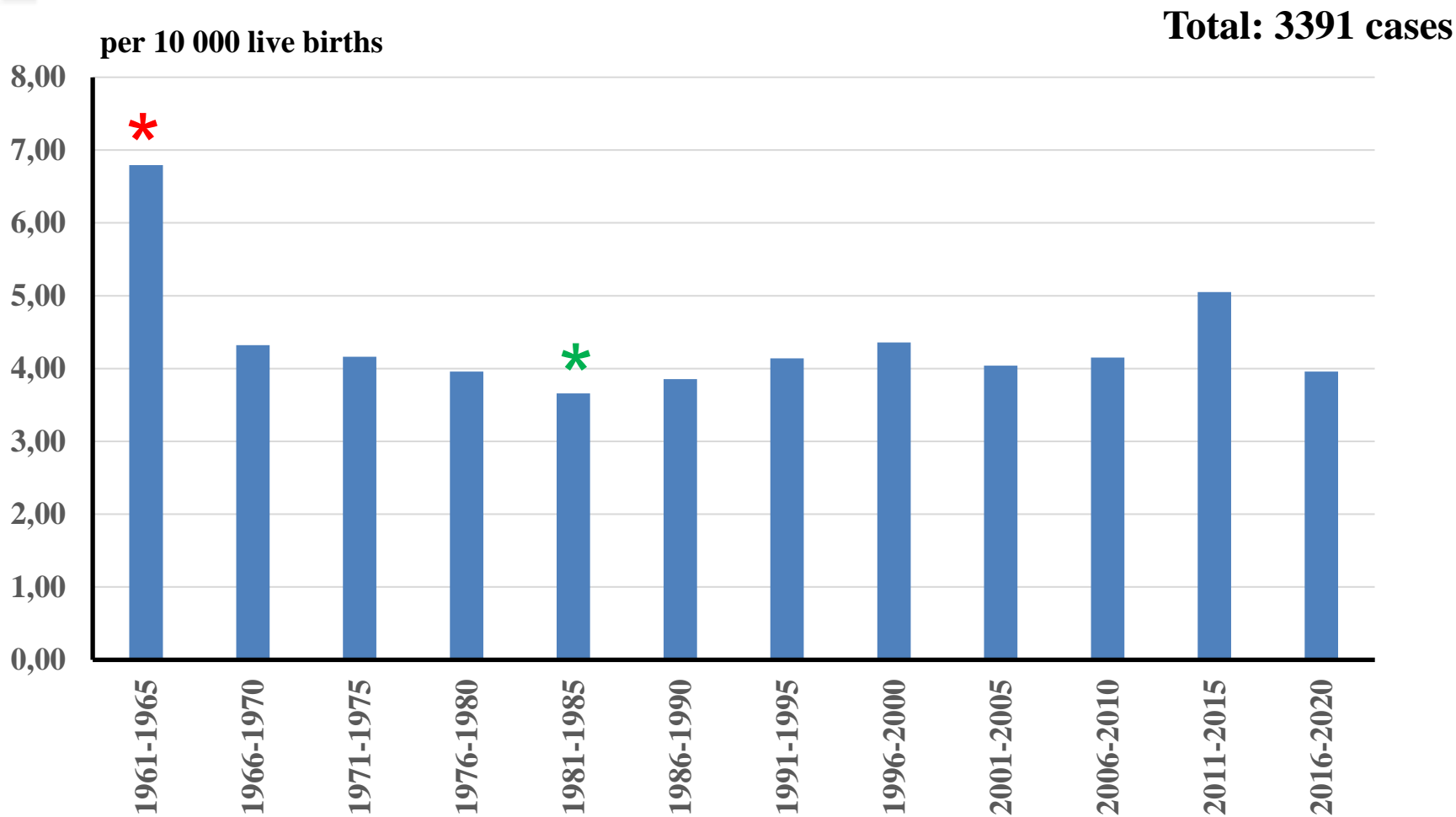
Spina bifida, 1961-2020, all cases

Per 10 000 live births

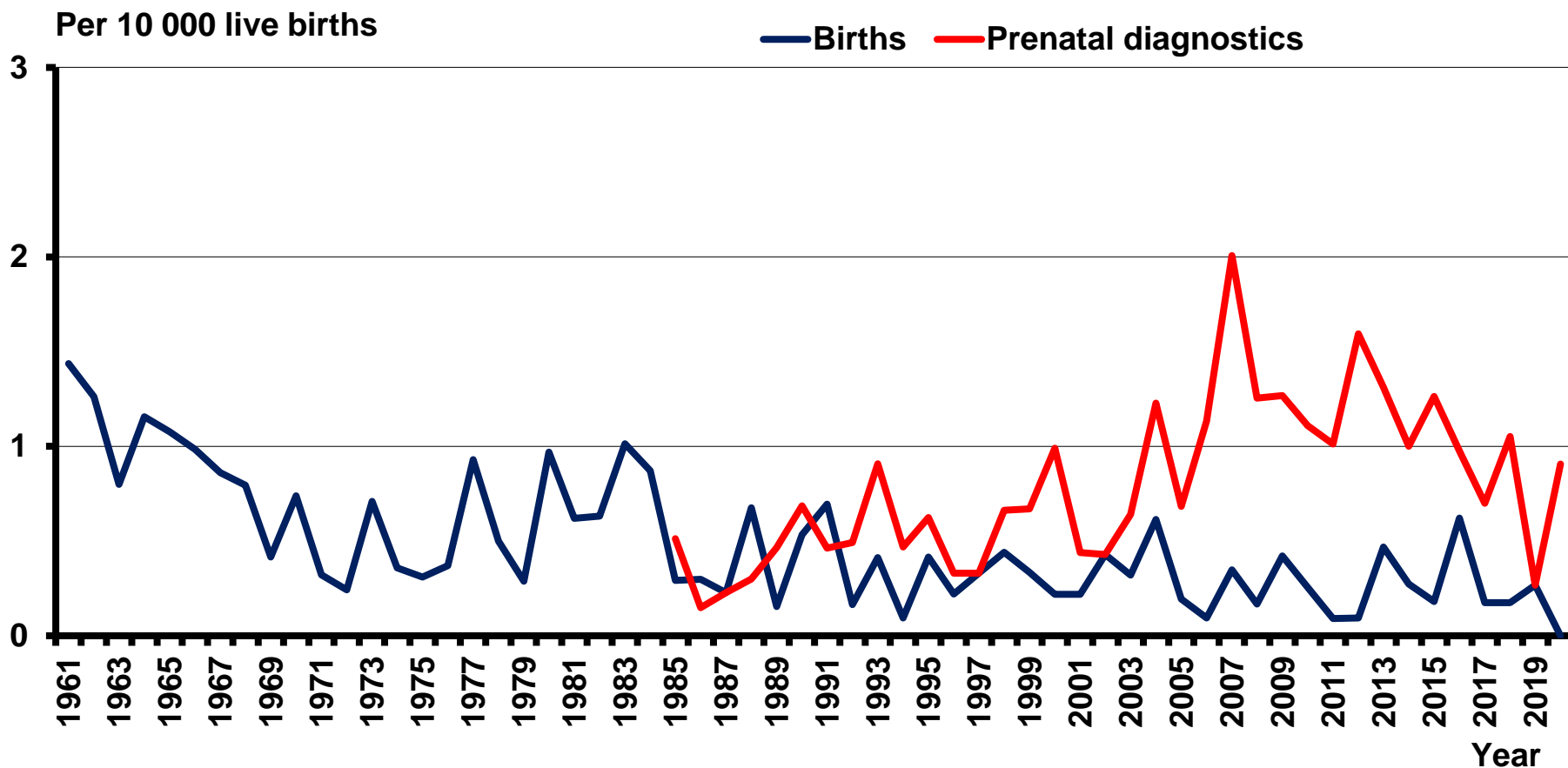
Total: 3391 cases



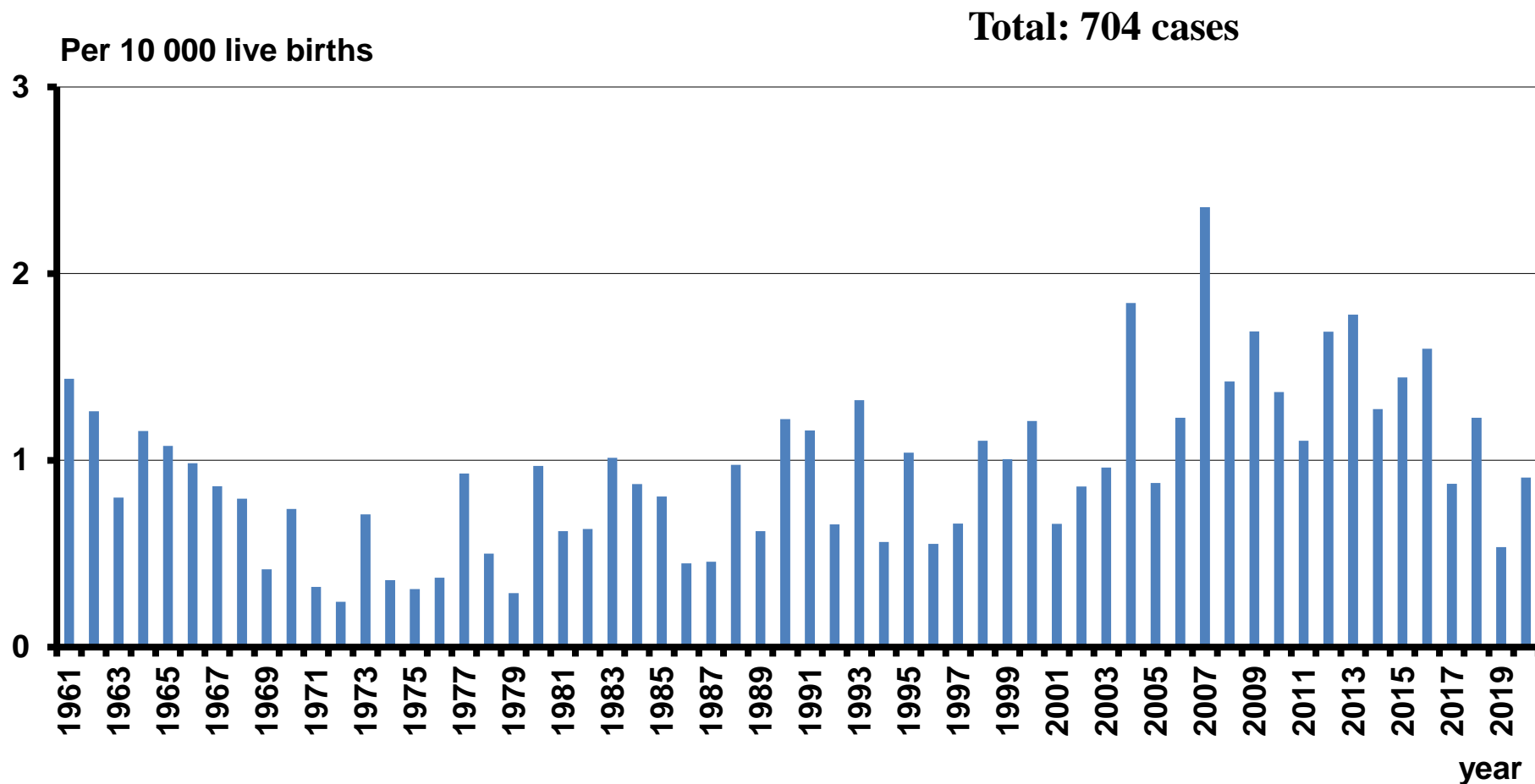
Spina bifida, 1961-2020, all cases



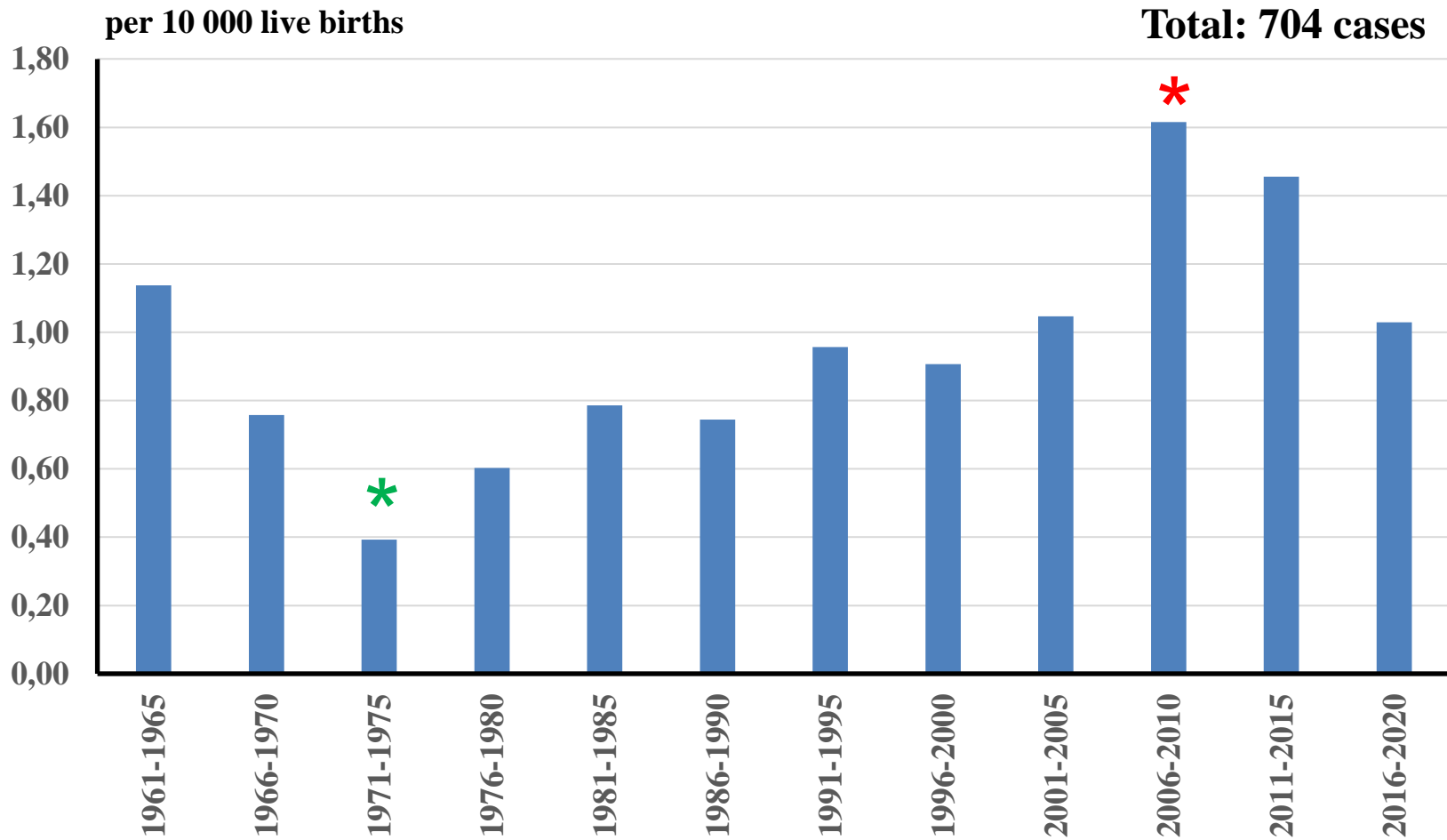
Encephalocele, 1961-2020, births and prenatal diagnostics



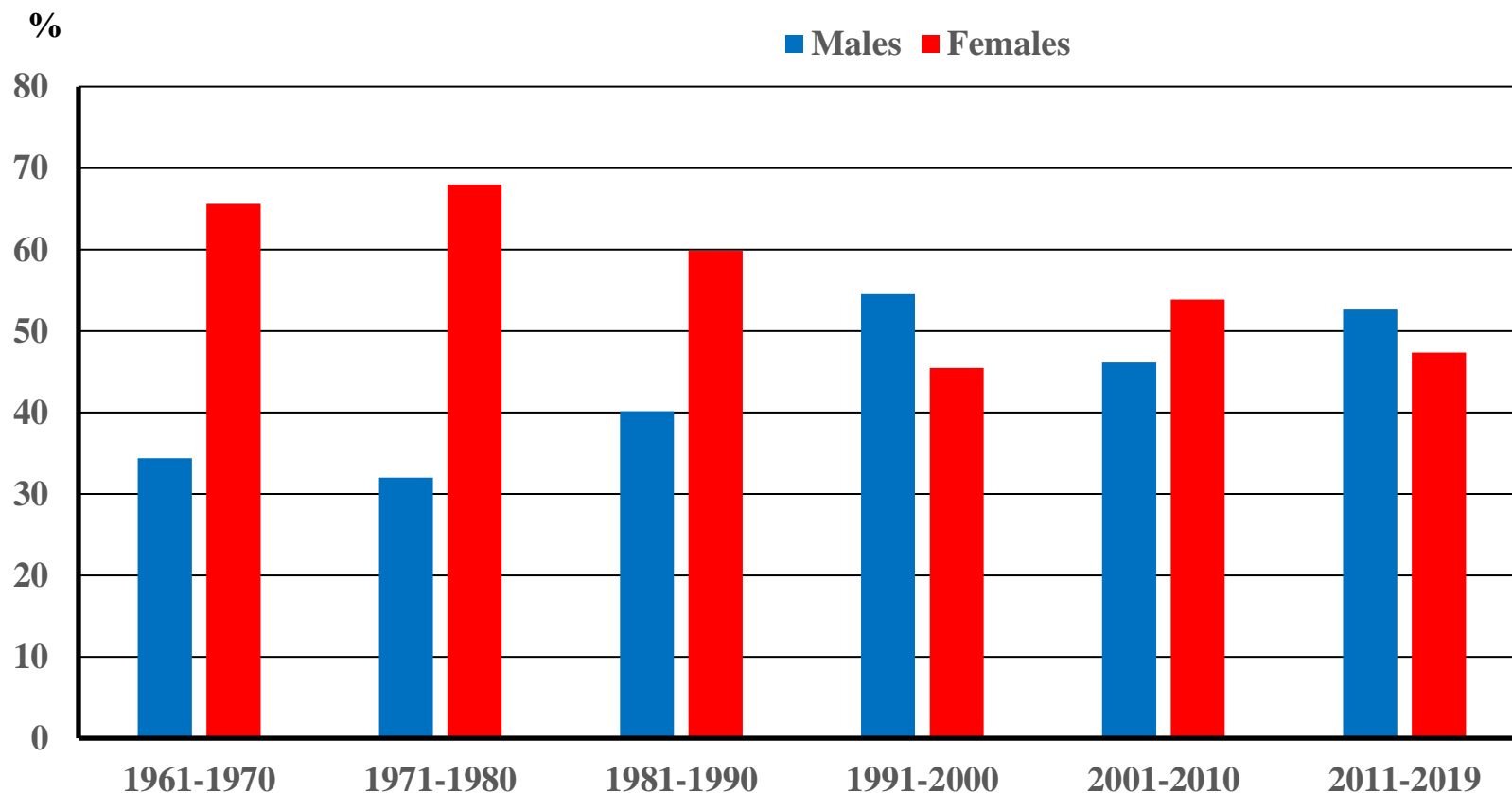
Encephalocele, 1961-2020, all cases

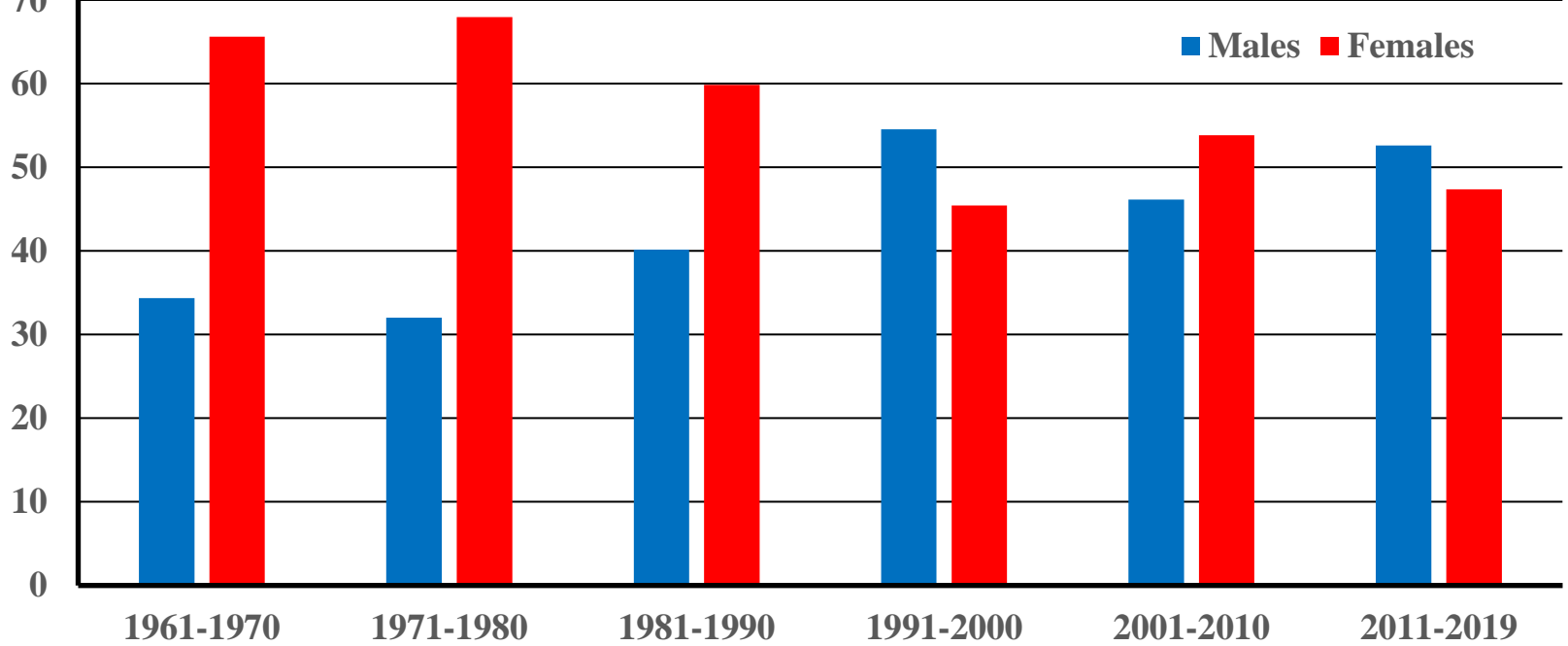


Encephalocele, 1961-2020, all cases



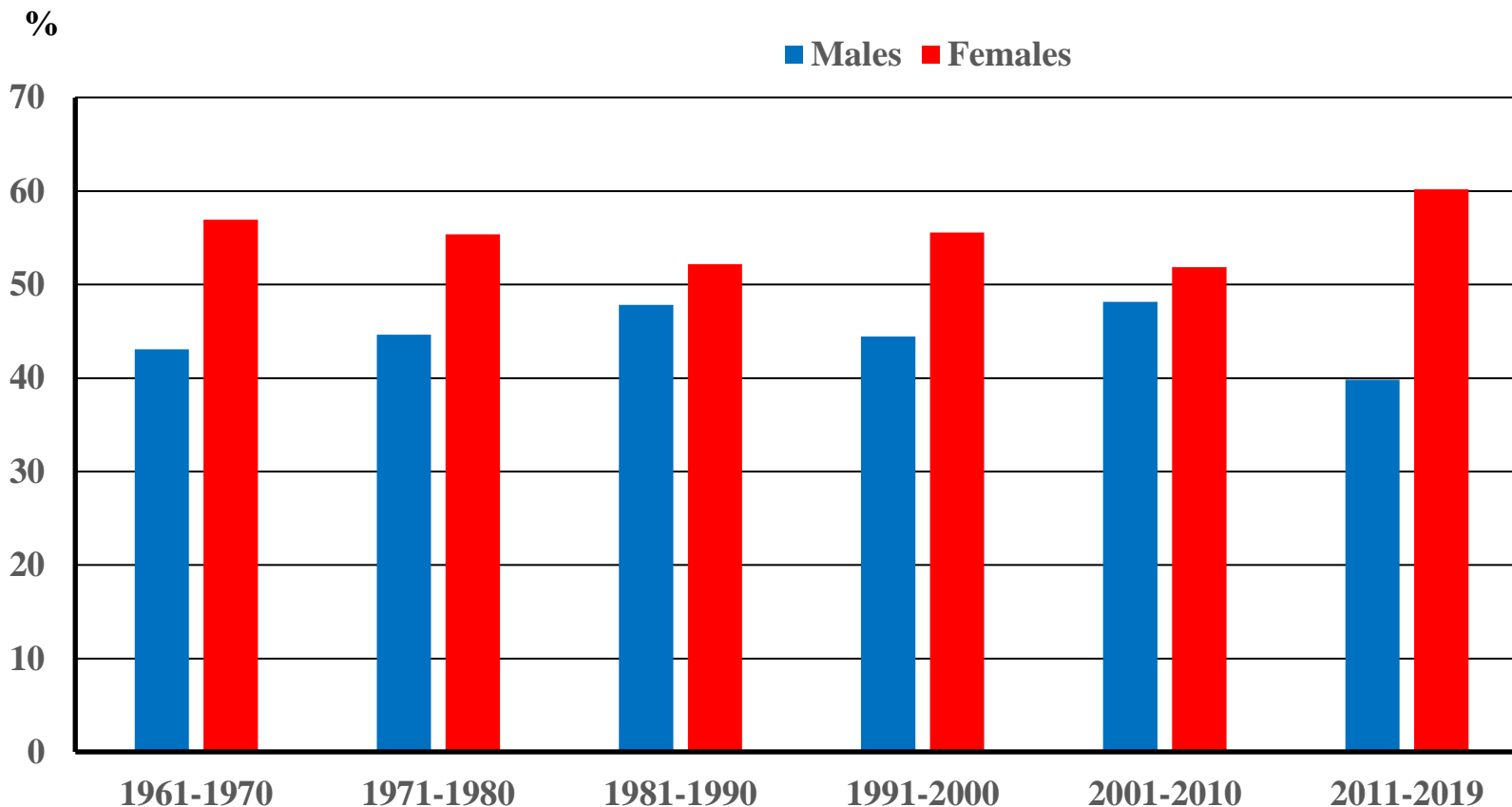
Anencephaly, 1961-2019, sex ratio

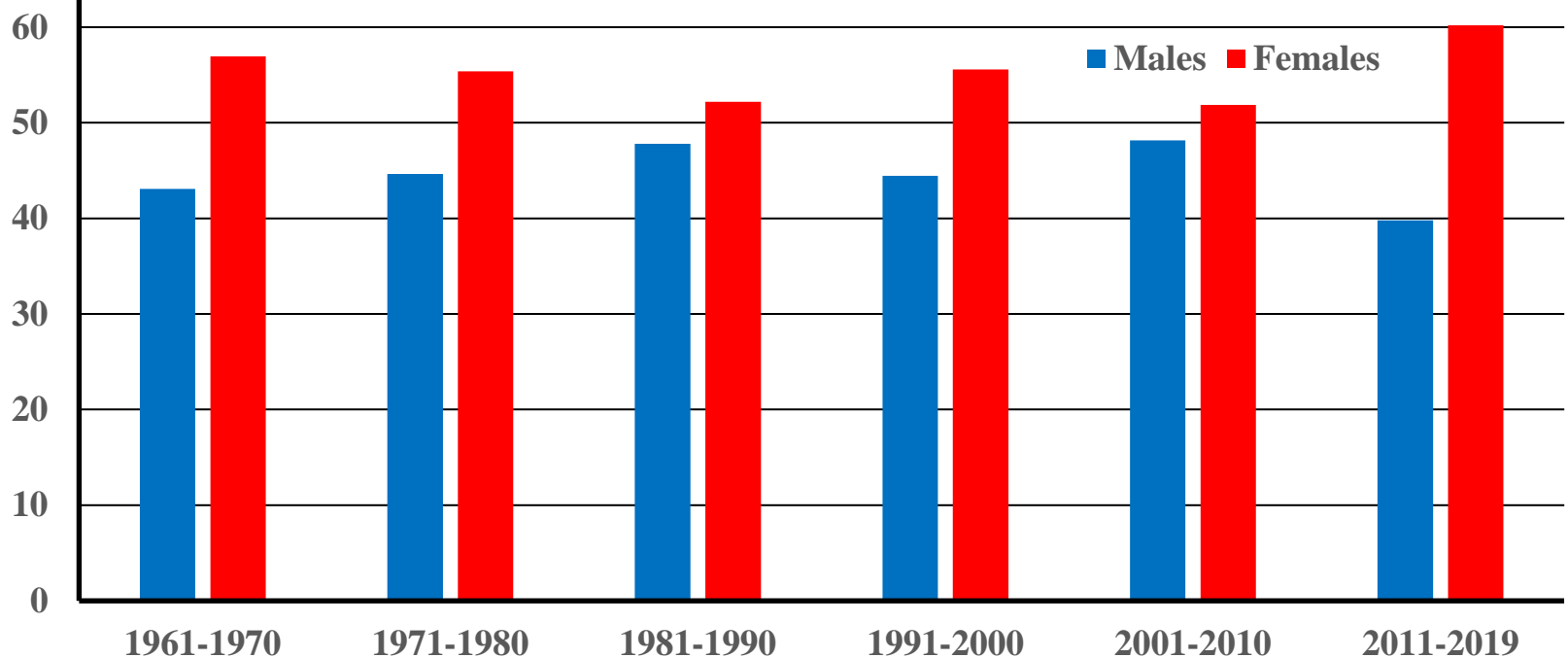




Period	Pearson χ^2	Fisher's exact
1961-1970	Pr <0,001	Pr <0,001
1971-1980	Pr <0,001	Pr <0,001
1981-1990	Pr <0,001	Pr <0,001
1991-2000	Pr =0,828	Pr =1,00
2001-2010	Pr = 0,726	Pr = 0,787
2011-2019	Pr = 0,878	Pr = 1,00

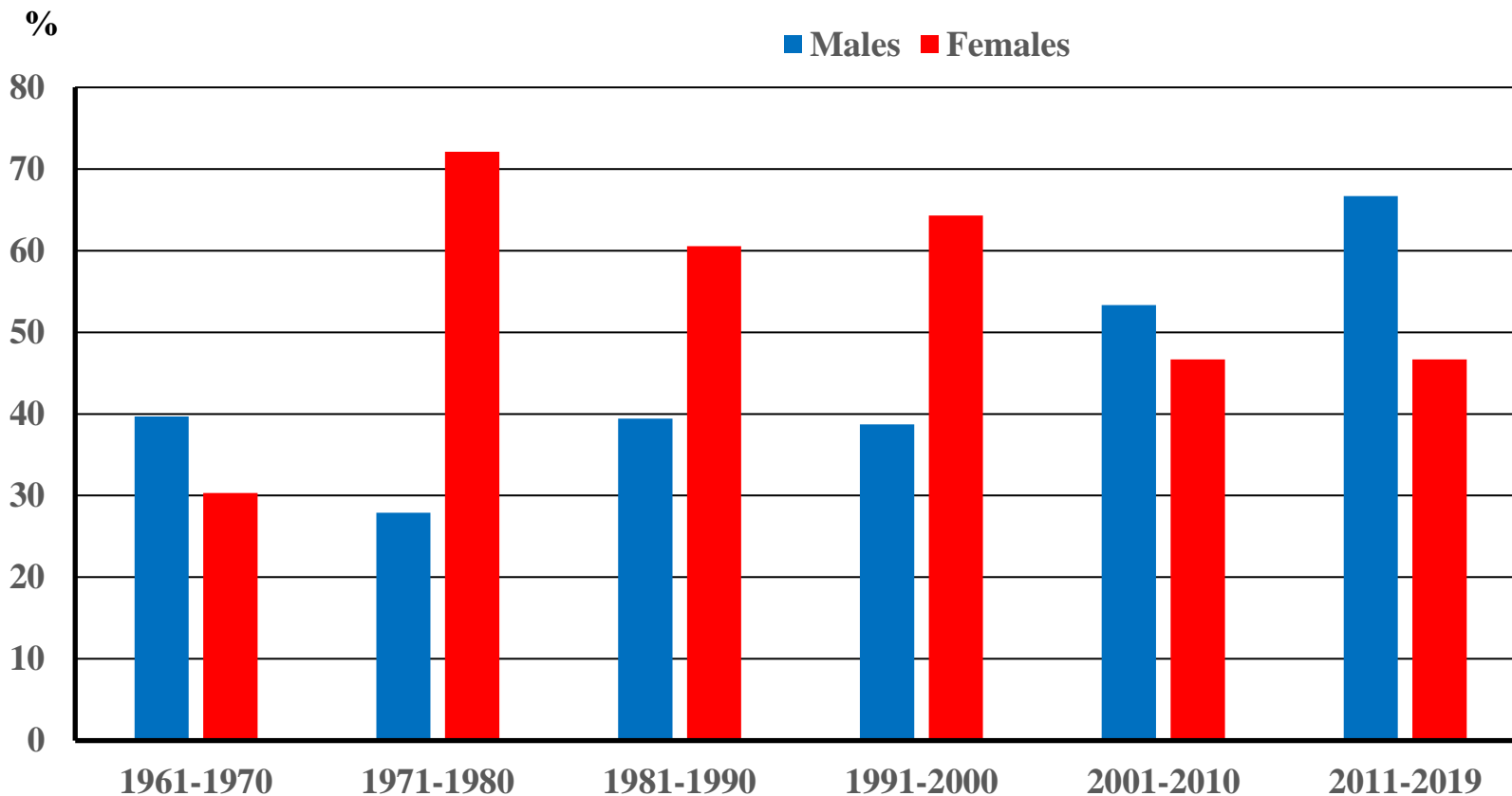
Spina bifida, 1961-2019, sex ratio

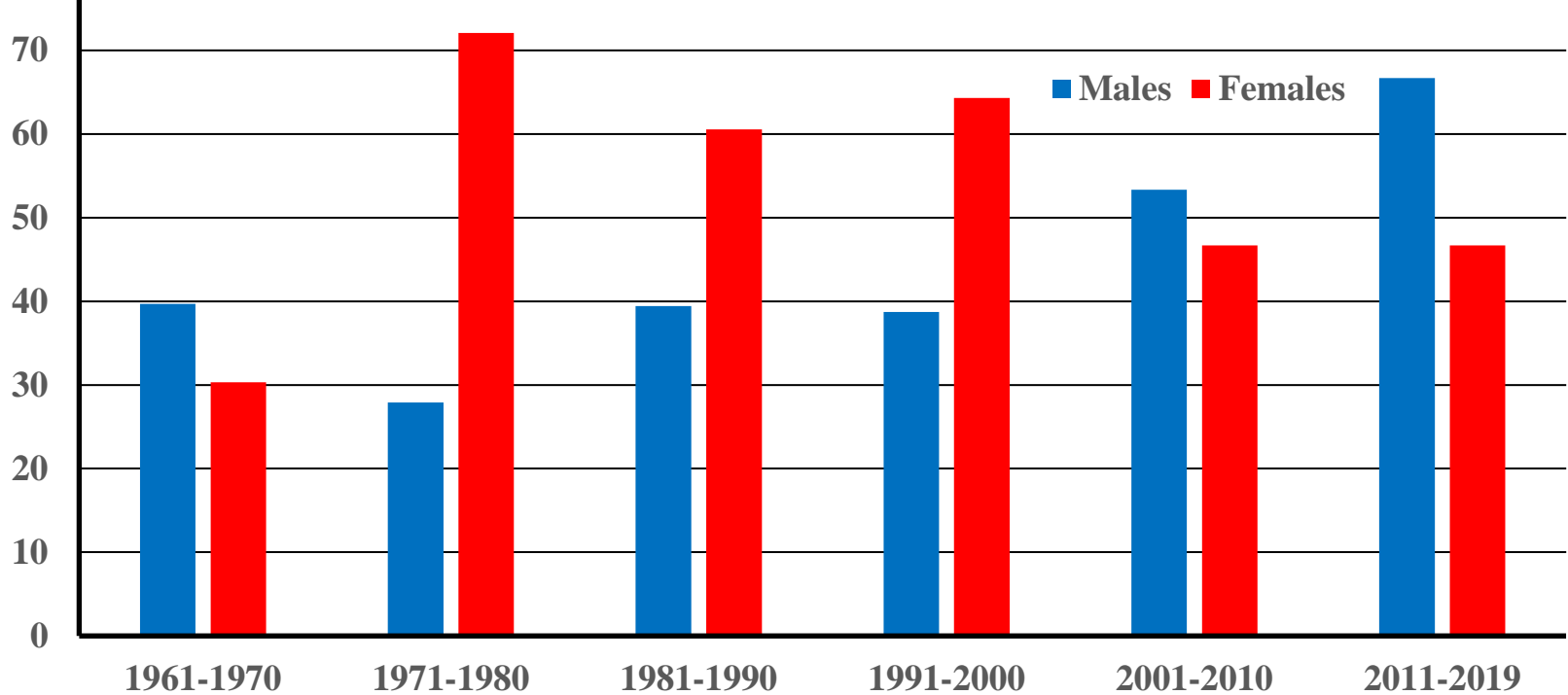




Period	Pearson χ^2	Fisher's exact
1961-1970	Pr <0.001	Pr <0.001
1971-1980	Pr <0.001	Pr <0.001
1981-1990	Pr <0.173	Pr <0.187
1991-2000	Pr = 0.055	Pr = 0.055
2001-2010	Pr = 0.505	Pr = 0.547
2011-2019	Pr = 0.021	Pr = 0.026

Encephalocele, 1961-2019, sex ratio





Period	Pearson χ^2	Fisher's exact
1961-1970	Pr = 0,007	Pr = 0,009
1971-1980	Pr <0,001	Pr <0,001
1981-1990	Pr = 0,046	Pr =0,057
1991-2000	Pr = 0,100	Pr = 0,130
2001-2010	Pr = 0,800	Pr = 0,856
2011-2019	Pr = 0,101	Pr = 0,124

Discussion

- **The implementation of ultrasound prenatal diagnostics significantly lowered the incidence of NTDs in births.**
- **The total incidences, however, are following different trends.**
- **The sex ratio is also changing, namely for anencephaly.**
- **The role of folic acid supplementation is debatable *.**

* Lopez-Camelo JS, Castilla EE, Orioli IM. Folic acid flour fortification: Impact on the frequencies of 52 congenital anomaly types in three South American countries. *Am J Med Genet A*. 2010.

** Poletta FA, Rittler M, Saleme C, Campaña H, Gili JA, Pawluk MS, et al. (2018) Neural tube defects: Sex ratio changes after fortification with folic acid. *PLoS ONE 13(3)*: e0193127.

*** Liu J, Xie J, Li Z, et al. Sex differences in the prevalence of neural tube defects and preventive effects of folic acid (FA) supplementation among five counties in northern China: results from a population based birth defect surveillance programme. *BMJ Open* 2018;8

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Thank you



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