eurocat
european surveillance of congenital anomalies

Calculation of Prevalence and their 95% Confidence Intervals

In EUROCAT prevalence calculations, a baby/fetus with several anomalies is counted once within each class of anomaly. The number in different classes cannot be added to reach a total number of babies/fetuses. A baby is counted once only in any given prevalence.

EUROCAT prevalence is always cited as per 10,000 births.

$$\text{Total prevalence} = \frac{\text{No. Cases (LB + FD + TOPFA)}}{\text{No. Births (live and still)}} \times 10{,}000$$

$$\text{Livebirth prevalence} = \frac{\text{No. Cases (LB)}}{\text{No. Births (live)}} \times 10{,}000$$

$$\text{Fetal death prevalence} = \frac{\text{No. Cases (FD)}}{\text{No. Births (live and still)}} \times 10{,}000$$

$$\text{TOPFA prevalence} = \frac{\text{No. Cases (TOPFA)}}{\text{No. Births (live and still)}} \times 10{,}000$$

Cases =	Cases of congenital anomaly in population
LB =	Live birth
FD =	Fetal deaths from 20 weeks' gestation
TOPFA =	Termination of pregnancy for fetal anomaly after prenatal diagnosis, at any gestational age
Birth (live and still) =	All live and still births in the population as declared on official birth registrations

Note: Slight discrepancies are present between numerator and denominator as terminations of pregnancy are included in the numerator but not the denominator, but are not great enough to have an important effect on prevalence.

$$\text{Lower 95\% confidence limit} = \frac{\left(\frac{1.96}{2} - \sqrt{c + 0.02}\right)^2}{b} \times 10{,}000$$

$$\text{Upper 95\% confidence limit} = \frac{\left(\frac{1.96}{2} + \sqrt{c + 0.96}\right)^2}{b} \times 10{,}000$$

c = No. Cases

b = No. Births

Note: The confidence intervals are calculated using the Poisson distribution.
Reference: Bégaud B, Martin K, Abouelfath A, Tubert-Bitter P, Moore N, Moride Y. Any easy to use method to approximate Poisson confidence limits. European Journal of Epidemiology (2005) 20: 213-216.

Differences in total prevalence over time or between regions may reflect one or more of the following factors: genetic differences, environmental differences, differences in diagnostic services, differences in the methods of collecting epidemiological data, and even chance differences (see Interpretation of prevalence).

Differences in livebirth or fetal death prevalence over time or between regions may reflect the same factors as above, but also differences in prenatal screening policies and differences in frequency with which prenatal diagnosis is followed by termination of pregnancy.

Calculation of Proportions and their 95% Confidence Intervals

$$\text{Livebirth proportion} = \frac{\text{No. Cases (LB)}}{\text{All Cases (LB + FD + TOPFA)}} \times 100$$

$$\text{Fetal death proportion} = \frac{\text{No. Cases (FD)}}{\text{All Cases (LB + FD + TOPFA)}} \times 100$$

$$\text{TOPFA proportion} = \frac{\text{No. Cases (TOPFA)}}{\text{All Cases (LB + FD + TOPFA)}} \times 100$$

Cases = Cases of congenital anomaly in population
LB = Live birth
FD = Fetal deaths from 20 weeks' gestation
TOPFA = Termination of pregnancy for fetal anomaly after prenatal diagnosis, at any gestational age

$$\text{Lower 95\% confidence limit} = \frac{\mathrm{p} + \frac{1.96^2}{2\mathrm{a}} - 1.96\sqrt{\frac{\mathrm{p}(1-\mathrm{p})}{\mathrm{a}} + \frac{1.96^2}{4\mathrm{a}^2}}}{1 + \frac{1.96^2}{\mathrm{a}}} \times 100$$

$$\text{Upper 95\% confidence limit} = \frac{\mathrm{p} + \frac{1.96^2}{2\mathrm{a}} + 1.96\sqrt{\frac{\mathrm{p}(1-\mathrm{p})}{a} + \frac{1.96^2}{4\mathrm{a}^2}}}{1 + \frac{1.96^2}{\mathrm{a}}} \times 100$$

a = All cases (LB + FD + TOPFA)

p = Proportion/100

Note: The confidence intervals are calculated using the Binomial distribution.
Reference: Agresti A, Coull BA. Approximate is Better than "Exact" for Interval Estimation of Binomial Proportions. The American Statistician, Vol. 52, No. 2 (May, 1998), pp. 119-126.