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Each year, more than 4500 pregnancies in the European Union are affected by neural tube defects. Unambiguous evidence of the effectiveness of periconceptional folic acid in preventing neural tube defects has been available since 1991, and improving folic acid status sufficiently could result in the prevention of more than two thirds of all neural tube defects. We report on trends in the prevalence of neural tube defects up to 2001, in the context of a survey in 16 European countries of periconceptional folic acid policies and their implementation.  

### Participants, methods, and results

Eurocat is a network of population based congenital anomaly registries in Europe (www.eurocat.ulster.ac.uk). A total of 9,273,212 births were surveyed by 31 registries in 16 countries 1980-2001, including 8913 babies or fetuses with neural tube defects (anencephaly, spina bifida, or encephalocele); 3298 live births, 844 stillbirths, and 4771 terminations of pregnancy after prenatal diagnosis. In the United Kingdom and Ireland, yearly prevalence of neural tube defects declined, predating any periconceptional folic acid supplementation policy initiatives, from 45 per 10,000 births in 1980 to 10 to 15 per 10,000 in the 1990s (figure). In contrast, in the rest of Europe the prevalence during the 1980s and thereafter was close to 10 per 10,000 births (figure).

The first governments to formulate a periconceptional folic acid supplementation policy were the United Kingdom (1992), Ireland (1993), and the Netherlands (1993); six more (Switzerland 1996, Denmark 1997, Norway 1998, Portugal 1998, France 2000, and Spain 2001) followed. Malta (1994) and Finland (1995) recommended raising folic acid status by dietary means only. Austria, Belgium, Croatia, Germany, and Italy had no government policy, although in all these countries professional bodies have issued guidelines or recommendations.

For 23 of the registries with data going back to at least 1990, we compared changes in prevalence over time according to policy type by estimating, for each registry, the ratio of prevalence in 1999-2001 to 1989-91 and calculating the mean of such ratios (on a log scale) for all registries in countries with similar policy types (as introduced by 1999), using standard random effects meta-analysis techniques. In the United Kingdom and Ireland we found a significant overall mean reduction in the prevalence of neural tube defects in 1999-2001 compared with 1989-1991 (32% (17% to 44%)), continuing a trend that preceded policies of folic acid supplementation. Registries in other countries with a policy of raising periconceptional folic acid status (by supplementation or dietary means) introduced by 1999 had a mean reduction in prevalence of 17% (44% reduction to 4% increase), whereas registries from countries with no policy by

### Comment

The prevalence of neural tube defects in Europe has not declined substantially in the past decade despite national policies of folic acid supplementation in half the countries. The prevalence in the United Kingdom and Ireland fell by 32% continuing a stronger pre-existing trend and remains slightly higher than overall European levels. These data suggest that policies simply recommending periconceptional supplementation of folic acid in planned pregnancies are not effective enough. Many women may not receive or respond to health promotion messages stressing the need to commence supplementation preconceptionally, or may remain unaware that dietary modifications are unlikely to achieve sufficient folate intake, and a large proportion of pregnancies in most countries are unplanned. Folate status of most women of childbearing age could be raised by fortifying a staple food with folic acid, which would also help to reduce socioeconomic inequalities in the prevalence of neural tube defects. Health effects of supplementation and fortification should be monitored, and policies should be reviewed periodically in light of the findings. The potential for preventing neural tube defects in Europe by raising folate status is still far from being fulfilled, and it is unacceptable to continue to rely mainly on prenatal screening and termination to reduce the number of babies born with neural tube defects.
Contributors: AB designed, did, and interpreted the statistical analysis and drafted the paper. LA designed the survey, gathered information, provided neural tube defect data, interpreted the results, and drafted the paper. HD designed the survey and statistical analysis, interpreted the results and drafted the paper. BA designed and interpreted the statistical analysis and drafted the paper. All the above authors are guarantors. Members of the Eurocat Folic Acid Working Group, who were involved in design, completion and interpretation of survey, development of Eurocat recommendations, contributed neural tube defect data to the Eurocat central database and commented on drafts of the paper: Marie-Claude Addor, Nicola Armstrong, Ingeborg Barisic, Andrea Berghold, Paul Braun, Elisa Calzolari, Marianne Christiansen, Guido Cocchi, Anne Kjersti Daltveit, Hermien De Walle, Grace Edwards, Miriam Gott, Blanca Gener, Yves Gillerot, Romana Gjergia, Janine Goujard, Martin Hauser, Anna Latoes-Bielenska, Robert McDonnell, Amanda Neville, Annukka Rvitainen, Christine Rösch, and Volker Steinbicker. Maria Loane extracted the data from the Eurocat central registry database. The following Eurocat registry leaders contributed data to the Eurocat central database: Sebastiano Bianca, Fabrizio Bianchi, Patricia Boyd, Catherine de Viguerie, Maria Feijoo, Ester Garne, Lorentz Ingens, David Lilis, Maria Luisa Martinez-Frias, Carmen Mosquera Tenreiro, Vera Nelen, Annette Queisser-Luft, Elisabeth Robert, Gioacchino Scarrano, Claude Stoll, David Stone, Romano Tencorni, and David Tucker.

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