EUROCAT: 25 years of European surveillance of congenital anomalies

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The surveillance of congenital anomalies serves two main purposes: to facilitate the identification of teratogenic (malformation causing) exposures and to assess the impact of primary prevention and prenatal screening policy and practice at a population level. EUROCAT, the European network of population based registers for the epidemiological surveillance of congenital anomalies, now covers 1.2 million births per year, a quarter of births in Europe. The added value of European collaboration is particularly great for congenital anomalies, coming from the opportunity to pool data, to compare data between regions and countries, to give a common response to European public health questions, and to share expertise and resources, including computing tools. EUROCAT provides essential epidemiological information on congenital anomalies in Europe, facilitates the early warning of teratogenic exposures, evaluates the effectiveness of primary prevention, assesses the impact of developments in prenatal screening, acts as an information and resource centre regarding clusters, provides a ready collaborative network and infrastructure for research, and acts as a catalyst for the setting up of registries throughout Europe.

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EUROCAT, the European network of registers for the epidemiologic surveillance of congenital anomalies (box 1), has a 25 year history (box 2). It now covers 1.2 million births per year, a quarter of births in Europe (table 1), and includes almost all population based registers of congenital anomaly in Europe as its members. Maintaining high quality data usually requires a limit to the total size of the population to be covered by a register, thus the preference in larger nations for regional rather than national registries, networked nationally and at a European level by EUROCAT. The added value of European collaboration is particularly great for congenital anomalies, coming from the opportunity to pool data, to compare data between regions and countries, to give a common response to European public health questions, and to share expertise and resources, including computing tools. Funding for network coordination currently comes from the European Commission’s Directorate General for Health and Safety, under its Public Health Programme, as a component of the European information system for rare diseases. EUROCAT is also a WHO Collaborating Centre for the Epidemiologic Surveillance of Congenital Anomalies.

Prevalence data on a wide range of congenital anomalies in all member regions is made freely available on the EUROCAT website, detailing the number of cases of more than 80 types of congenital anomaly reported among live births, stillbirths, and terminations of pregnancy after prenatal diagnosis, and the prevalence as a proportion of all births. The seemingly effortless appearance of these figures belies the years of work that have gone into establishing registers across Europe, agreeing a common dataset and coding scheme, and identifying, and where possible addressing, variation in diagnostic or organisational factors that may contribute to “artefactual” geographic and temporal differences in prevalence. The total reported prevalence of congenital anomalies—including live births, stillbirths, and terminations of pregnancy after prenatal diagnosis—has increased during the last 25 years, mainly because the age at diagnosis of many internal anomalies, such as certain cardiac and urinary system anomalies, has been brought forward to the prenatal or early postnatal period, thus entering the main information sources for registries, and also because prenatal diagnosis followed by termination of pregnancy brings into the information system cases of congenital anomaly that would otherwise have gone undiagnosed or unreported among spontaneous abortions. Two congenital anomalies show a clear real increase in total prevalence since 1980: Down syndrome, because of the increasing average maternal age across Europe; gastroschisis, because of unknown environmental factors. The situation regarding hypospadias, of interest as a potential outcome of endocrine disrupting exposures, is unclear, although EUROCAT data do not indicate an increase in prevalence since 1980. Geographic variation within Europe is evident for a number of anomalies, including oral clefts and omphalcele, whereas variation is reducing for neural tube defects.

Population based registries are a particularly powerful tool for evaluation of health services because they represent the experience of the entire community, not the outcomes of specialist units, which may serve only a selected group of
women or children, or which may have atypical human or financial resources. EUROCAT’s 25 year history has spanned the expansion of prenatal screening and diagnosis. For some anomalies, prenatal diagnosis may improve prognosis because of the opportunity to plan surgery or other intervention. For severe anomalies, the most common result is termination of pregnancy, depending on the legal situation and gestational age limit in each country.11 The prevalence of terminations 1998–2002 ranged from 0 to 1.1% of births in the rest of Europe.910 This concurred with numerous surveys earlier, and no overall decline in prevalence was observed in continuation of a much stronger decline in the 1980s and 1990s.12 Such data allow the estimation of the preventive potential, only a shallow decline in total prevalence over the last 15 years has been the very small impact of periconceptional folic acid supplementation on the prevalence of neural tube defects.910Despite more than a decade since randomised controlled trials results in 1991 confirmed the preventive potential, only a shallow decline in total prevalence occurred in Britain and Ireland by 2001 (a continuation of a much stronger decline in the 1980s and earlier), and no overall decline in prevalence was observed in the rest of Europe.1314 This concurred with numerous surveys showing that a minority of women take supplements starting preconceptionally. The existence and coordination of population based registries is vital for the monitoring of future policy developments. Surveillance in North America has been able to show the impact of folic acid fortification of flour in reducing the prevalence of neural tube defects.15 Moreover from 2005 births, socioeconomic variables included in the EUROCAT dataset will allow examination of the impact of different policies on socioeconomic inequalities in neural tube defect prevalence, as surveys have shown that supplementation uptake is higher among women of higher social class, and inequalities are therefore likely to widen under current policies.

There is ongoing discussion as to the role of congenital anomaly surveillance in preventing another thalidomide-type tragedy. Statistical monitoring may pick up a change in
frequency, the surveillance system can provide a rapid population based response to the observations of the “alert clinician”, or it can be used to assess how well the use of known teratogenic drugs is avoided in pregnancy.\(^16\) We are fortunate not to have experienced any further event of the scale of thalidomide, but it is likely that drugs remain on the market with less dramatic population effects, where the drug is less widely used and the teratogenic risks are lower, or restricted to smaller genetically or otherwise susceptible subpopulations. This is an area on the borderline between surveillance and research where we need to graft on to ongoing surveillance a variety of methods, including case-control approaches with accurate data on women’s medica-
tion histories during pregnancy, linking between congenital anomaly registries and clinical databases of women with specific diseases (epilepsy, diabetes) or having undergone specific treatments (assisted conception), and linkages between registers and prescription databases. Only a subset of EUROCAT registries are resourced to do this\(^17\) or can overcome the confidentiality restrictions placed on such research.

The potential for environmental pollution to cause congenital anomalies is the issue most likely to hit the headlines. On the one hand, we are faced with the problem of congenital anomaly clusters identified in the community. Is this a random cluster, an unusual aggregation of cases but not one that is inevitably thrown up by random processes, or a cluster due to a localised environmental cause? EUROCAT’s Cluster Advisory Service\(^18\) collects together experience as to how to assess such clusters, how to investigate them, and how to communicate with concerned communities. Surveillance data can be used to assess whether such clustering is occurring near “similar” sources of pollution to that suspected of causing the cluster, although the definition of “similar” is often problematic. On the other hand, we can address environmental concerns more directly, whether acute or chronic pollution from sources such as landfill sites.\(^19\)\(^20\) We are still a long way from achieving an adequate scientific assessment of risks related to environmental pollution. Progress in this area is a particular challenge for a health surveillance network because of the need for interdisciplinary collaboration, in particular with regard to the measurement of exposure, which is so much less readily defined than drug exposure. One of the challenges for risk communication with patients and the public is to discuss the degree of, reasons for, and implications of current scientific uncertainty.

The involvement of registries in research is essential to maintain their dynamism and quality. Every two years, a European Symposium on the Prevention of Congenital Anomalies is hosted by a member registry to provide an opportunity to present and discuss local and collaborative research.\(^21\) EUROCAT also values links with European researchers and clinicians to exploit the unique central database of over 300,000 case records, or to use the collaborative infrastructure of population based registries for additional data collection—for example, on occupational exposure.\(^22\)

Each registry follows national practice in terms of their supervision by ethics and steering committee and representa-
tion on those committees. Registers in some countries are currently in a difficult position because of national inter-
pretations of the European directive regarding patient consent. Although a reasonable requirement in theory, experience shows that, although refusals are very rare, obtaining parental consent for registration is logistically difficult and requires resources much greater than those usually made available. Moreover, the duty not to register without consent seems to have eclipsed the duty to ask consent and give parents an opportunity to contribute to continuing surveillance and research to improve the health of children.

ACKNOWLEDGEMENTS

EUROCAT is funded by the European Commission Directorate General Health Public Health Programme. This paper is written on behalf of all EUROCAT Registry Leaders (Lenore Abramsky, North Thames, UK; Marie-Claude Adjod, Vaud, Switzerland; Ingeborg Barisic, Zagreb, Croatia; Sebastiano Bianca, Sicily, Italy; Fabrizio Bianchi, Tuscany, Italy; Patricia Boyd, Oxford, UK; Rosa Caballin, El Valles, Spain; Elisa Calzolari, Emilia Romagna, Italy; Catherine de Vigan, Paris, France; Hermien de Walle, North Netherlands; Elizabeth Draper, Trent, UK; Maria Feijoo, South Portugal; Christine Franckowiak, Auvergne, France; Ester Garne, Odense, Denmark; Miriam Gatt, Malta; Yves Gillerot, Hainaut-Namur, Belgium; Martin Haecslery, Styria, Austria; Maria Howard, Merseyside, UK; Lorentz Irgens, Norway; Anna Latos-Bielenska, Poland; David Lillis, Galway, Ireland; Marie-Luisa Martinez-Frias, Madrid, Spain; Ismael Menendez-Pulecio, Asturias, Spain; Maria Gonzalez, Andalucia, Spain; and Gregor Suter, Zurich, Switzerland). EUROCAT Working Group on Genetic Epidemiology (Elke Wiestler, Baden-Württemberg, Germany; Istvan Barisic, Hungary; Gioacchino Scarano, Campania, Italy; Volker Steinbicker, Saxony-Anhalt, Germany; Claude Stoll, Strasbourg, France; David Stone, Glasgow, UK; Romano Tenconi, Northern Italy; Radka Tintcheva, Sofia, Bulgaria; David Tucker, Wales, UK; Martin Ward Platt, Northern Region, UK; Diana Wellesley, Wessex, UK), EU-PHARE (Mireille Chappard, Orsay, France; Yves Gillerot, Hainaut-Namur, Belgium), EuropeCollab (Alan Bell, Edinburgh, Scotland; Marie-Lisa Martinez-Frias, Madrid, Spain; Rocio Caule, El Progreso, Spain; and Volker Steinbicker, Saxony-Anhalt, Germany) and the EUROCAT Central Registry collaboration (Alan Bell, Edinburgh, Scotland; Marie-Lisa Martinez-Frias, Madrid, Spain; Rocio Caule, El Progreso, Spain; and Volker Steinbicker, Saxony-Anhalt, Germany).

Competing interests: none declared

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A full list of EUROCAT publications can be found on www.eurocat.ulster.ac.uk/pubdata

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19 www.eurocat.ulster.ac.uk/clusteradvservice.html.

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