The incidence of chickenpox in the community
Lessons for disease surveillance in sentinel practice networks

D.M. Fleming¹, F.G. Schellevis², I. Falcao³, T.V. Alonso⁴ & M.L. Padilla⁵
¹Birmingham Research Unit of the Royal College of General Practitioners, Harborne, Birmingham, England; ²NIVEL PO Box 1568, Utrecht AIM Bartelds, The Netherlands; ³Instituto Nacional de Saúde, Dr Ricardo Jorge, Lisboa, Portugal; ⁴Servicio de Epidemiología, Consejera de Sanidad y Bienestar Social, Valladolid, Spain; ⁵Servicio de Epidemiología, Delegacion Territorial de Sanidad de Guipuzcoa, Spain

Accepted in revised form 16 May 2002

Abstract. Sentinel practice networks have been established in many European countries to monitor disease incidence in the community. To demonstrate the value of sentinel networks an international study on the incidence of chicken pox has been undertaken. Chickenpox was chosen as an acute condition for which incidence data are important to the determination of health policy on vaccine use. The project examined the incidence of chickenpox reported in sentinel networks in England and Wales, the Netherlands, Portugal and Spain (two regional networks) in January–June 2000 and the potential underestimate from patients who did not consult. An investigation of secondary household contact cases was undertaken. Reported incidence of chickenpox (all ages) in England and Wales was 25 per 10,000, in the Netherlands 13 per 10,000, in Portugal 21 per 10,000, in Spain Castilla y Leon 27 per 10,000 and in Spain Basque 55 per 10,000. Analysis of secondary contact cases suggested underestimation of incidence between 2.4% in Spain Castilla y Leon and 32.2% in The Netherlands. There was a trend towards incidence at an earlier age in England and Wales and in the Netherlands compared with Portugal and Spain. Whilst there was little problem in reliably identifying the number of incident cases in the recording networks and relating the non-consulting contact cases to them, the security of the denominator remains a problem where networks are comprised of differing categories of health care provider. It is essential that numerator and denominator information are made available specifically for each category.

Key words: Chickenpox, Health indicators, Sentinel practices, Surveillance

Introduction

The health monitoring programme of the European commission [1], sponsored by the directorate-general, health and consumer protection (formerly DG V), is particularly concerned with the use of data for providing information at a European level on a set of health indicators some of which require data on conditions managed almost exclusively in primary care. However there are no routine data extraction facilities from primary care in most countries of western Europe, though some computer companies and some health departments have used selected practices to provide databases for use in epidemiological and pharmacological research. Sentinel practice networks focussing on the surveillance of disease in the community have been established in many countries [2] and are an obvious potential source of data on selected health indicators.

Sentinel networks in primary care mainly measure disease incidence as it presents to general practitioners or other primary health care workers. In limited circumstances they can also be used to measure prevalence. The comparability of data from such networks depends on the reliability of the recorder; the accuracy of the denominator; the degree to which the condition is managed outside primary care (self-management, direct access to specialist management); and on the selection of cases for inclusion, in particular by the use of diagnostic criteria. This study is particularly concerned with self-management but it raises issues in all these areas.

Chickenpox is generally managed in primary care in most countries. Some studies of incidence based on the presence of antibodies in serum suggest that 90% or more of adults have at some time had chickenpox even if only sub-clinically [3]. Estimates of the burden of illness due to chickenpox are important to assess the need for vaccination and, if substantiated, the population to be targeted. They are also needed to...

provide a baseline against which to measure the effects of vaccination and to warn persons at known risk of complications. Vulnerable groups include the foetus [4], infants before the immune system has developed [5], the immuno-compromised [6] and the frail elderly in whom immune senescence may occur as has been shown in relation to influenza [7]. A reducing age of first incidence of chickenpox has been reported [8–11]. Universal vaccination at an early age is not necessarily desirable because protection may be time limited and later incidence in adulthood would be undesirable. Furthermore the potential impact of such a policy on the incidence of herpes zoster in later life remains uncertain. This study examines the incidence of chickenpox unrecognised by health care provision, i.e. the gap between community incidence and incidence reported in primary care, providing insight into the value of information from primary care as delivered by sentinel networks, and into apparent national differences in incidence.

Methods

Sentinel primary care networks in four European countries co-operated (England and Wales, The Netherlands, Portugal, Spain): two separate regional networks (Castilla y Leon, Basque) contributed data from Spain. Brief information on the networks including the methods for estimating the monitored population are summarised here.

**England and Wales – monitored population for this study 611,000**

The population is derived weekly in age and gender specific groups on the basis of patient registration inherent in the payment system for general practitioners. The total population of the network is representative of the national population by age and gender and has a wide national coverage in England and Wales. There is no independent access to paediatricians and therefore incident rates reported in general practice truly reflect the incidence presenting to health care. Doctors in the network report the problems encountered at every consultation recording their assessment diagnosis.

**The Netherlands – monitored population for this study 142,000**

The population is estimated annually from counts of records held in the practices. Adjustments are made to take account of any temporary disturbance in practice reporting arrangements, (such as doctor on holiday). The population is representative of the national population and well distributed geographically. Independent access to medical care for a condition such as chickenpox is extremely unlikely. Recording is limited to selected diseases among which, chickenpox was included during the year 2000.

**Portugal – monitored population for this study 66,000**

Patients are registered with specific practices with known age and gender composition. Practices participating in the network provide annual summaries of patient registrations. The denominator for calculating weekly incidence is the registered population in those practices participating in that week. The network is reasonably representative of the national population by age and gender.

**Spain – monitored population for this study Basque 109,000, Castilla y Leon 110,000**

The Spanish sentinel networks include both general practitioners and community based paediatricians. The general practitioner population is derived from the list of individual health record cards held by the general practitioner at the beginning of the year. In some parts of Spain there is independent access to community based paediatricians and children aged less than 15 years may be assigned to them as an alternative to a general practitioner but not as an addition. The denominator in these paediatrician networks is available in age groups 0–1, 2–4, 5–9 and 10–14 years. Because of biased coverage of young children in these networks, incidence data were standardised to the regional population using the age bands 0–4, 5–14 and 15 years and over.

Though diagnostic criteria were not specified for this study, most sentinel physicians are familiar with the definition published in The International Classification of Primary Care ‘a vesicular exanthem which appears in successive crops with the lesions evolving rapidly from superficial papules to vesicles and eventually into scabs’ [12]. Most cases of chickenpox involve only one consultation and sentinel physicians diagnose using all the information available at the time of presentation. The study was based on incident cases reported to the sentinel networks over a 26-week period between January and July 2000: (limited flexibility of start date in January was available to each network). Cases reported by telephone or diagnosed by the practice nurse were included as incident cases. Practices made contact with each incident case (or parent of children) approximately 3 weeks after presentation to establish whether any other household member had experienced this illness in the 3 weeks before or after the incident case. Age and gender details were collected together with information about medical advice sought. These secondary cases were added to those consulting to estimate total incidence. (Data on adult secondary cases were not obtained in The Netherlands and Spain.)