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The incidence of molluscum contagiosum, scabies and lichen planus

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SUMMARY

We aimed to describe the incidence of new episodes of molluscum contagiosum, scabies and lichen planus presenting to general practitioners in England and Wales. We examined data collected in a sentinel practice network (the Weekly Returns Service of the Royal College of General Practitioners) in which about half a million persons were observed each year over the period 1994–2003. The incidence of molluscum contagiosum in males was 243/100 000 person-years and in females 231; of scabies, males 351, females 437; of lichen planus, males 32, females 37. Incidence varied by year and age. Ninety per cent of molluscum contagiosum episodes were reported in children aged 0–14 years, where incidence in 2000 (midpoint of a 6-year period of stable incidence) was 1265/100 000 (95% CI 1240–1290). Scabies affected all ages and annual incidence ranged between 233 (95% CI 220–246) in 2003 and 470 (95% CI 452–488) in 2000. Lichen planus occurred chiefly in persons aged over 45 years: incidence (all ages) ranged between 27 (95% CI 23–31) in 2003 and 43 (95% CI 37–49) in 1998. The relative risk of female to male incidence (all ages) of molluscum contagiosum was 0·95 (95% CI 0·91–0·99); of scabies 1·25 (95% CI 1·21–1·28); and of lichen planus 1·19 (95% CI 1·08–1·13).

INTRODUCTION

Molluscum contagiosum (MC), scabies and lichen planus (LP) are fairly common conditions predominantly diagnosed and managed within general practice. We aim to describe the incidence of these conditions as reported to the Weekly Returns Service (WRS) of the Royal College of General Practitioners. A literature review identified several publications concerning the pathology and treatment of these conditions, but very few containing information on disease incidence.

The WRS is an information system based on sentinel general practices in England and Wales (E&W). It is funded by the Department of Health and has existed since 1964. It is best known for the routine surveillance of respiratory illnesses, although since 1995 data have been collected from every consultation in a practice population averaging ~600 000 persons per year [1]. Sentinel practitioners record the diagnoses or problems encountered using menu-driven software and these are stored as Read codes. The consultation or episode type is assigned to each problem label thus distinguishing new episodes of illness from ongoing consultations. The practice computer record is examined weekly and Read-coded diagnostic information is extracted as numbers of persons within age- and gender-specific groups together with the underlying registered populations. Weekly incidence rates are calculated per 100 000 population and annual incidence estimates are based on accumulated weekly data (52 weeks).

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Molluscum contagiosum (MC)

In immune-competent persons MC is a benign skin infection caused by a poxvirus of the *Molluscipoxvirus* genus [2]. Especially in the immune compromised, there is a likelihood of more serious illness and complication by eczematization or ulceration [3, 4]. The clinical manifestation is of single or multiple clusters of wart-like pearlescent lesions which can appear anywhere on the body [2]. Transmission is by direct skin contact or by fomites and has been described in groups of athletes and swimmers [5, 6]. Sexual transmission also occurs. Estimates of the incubation period vary widely, from 2–7 days [7] to between 14 and 50 days [3, 8, 9]. The lesions can be surgically removed but the benefits of excision probably do not outweigh the disadvantages [9, 10].

Reports on the incidence of MC show considerable variation depending on where and how it was measured. From a study in The Netherlands, based on a combined general practice population of 332 300, Koning estimated the cumulative incidence up to age 14 years at 16·8% [11]. An Australian study reported 23% seropositivity in the representative population sampled, whilst a Japanese study reported only 6% [12, 13]. Most population-based studies report maximum incidence in children [2, 3, 11, 14]. However, studies based on diagnosis in genitourinary medicine (GUM) clinics sometimes distort the impression of this as a childhood disease [4, 15, 16]. Few studies comment on trends, although an American study by Becker and colleagues detected an increase in adult private consultations for MC between 1966 and 1983. For patients attending sexually transmitted disease clinics, the highest consultation rates were in the age group 15–24 years [15].

Scabies

Scabies is caused by infestation with the mite *Sarcoptes scabei*, which burrows into the epidermis in order to lay its eggs [16]. Clinically it presents as a highly irritating skin rash, which may be confined to flexures and folds of the skin but commonly spreads widely over the trunk if untreated [10]. The irritation is produced by an allergic reaction to the mite but may be exacerbated by secondary bacterial infection due to scratching [17]. Transmission is by personal contact and there have been particular problems for the staff of geriatric and other chronic health-care institutions where patients have been admitted with this condition [17–20]. In the immune compromised the condition can be more severe and may give rise to what has been called 'Norwegian scabies' [16]. Treatment with appropriate pesticides has to be carefully applied if eradication is to be achieved [21, 22].

We have previously reported data from the WRS on the incidence of scabies between 1967 and 1991 [23]. From a peak in 1971 (annual incidence all ages 350/100 000) incidence gradually decreased to a trough in 1989 (150/100 000). Barrett and Morse also used the WRS database to report a sharp increase between 1989 and 1993 when incidence reached 340/100 000 [17]. Incidence is generally considered to be highest in age and person groups where levels of personal contact (including sexual contact) are high. The incubation period is usually within 4 weeks of the initial infestation although it may be shorter where re-infestation occurs [16].

Lichen planus (LP)

The cause of LP is not known, but it has been described in association with a variety of infectious diseases and impaired immune response may influence its occurrence [24]. The condition is characterized by violaceous flat-topped papules usually on the wrists and legs though sometimes extending over the entire body. Small white lesions are commonly found on the buccal mucosa and genitalia. Wickham's striae are pathognomonic of the condition [24, 25]. Lesions tend to appear suddenly, may cause pruritus and the condition generally lasts 6–12 months. There is no specific treatment although antihistamines and steroid creams have been used to alleviate pruritus.

There are few studies of incidence. In a Nigerian study LP constituted 5% of all skin cases [26]. In contrast, an Indian study reported 0·38% of the total dermatology outpatients diagnosed were due to LP with the majority in the 20–49 years age range [27].

METHODS

Weekly practice reports on new episodes of illness for MC, scabies and LP over the years 1994–2003 were studied in gender- and age-specific groups (<1, 1–4, 5–14, 15–24, 25–44, 45–64, 65–74 and $\geqslant 75$ years). Data were examined by week and aggregated to provide annual incidence data in each of the age and gender groups. Incidence rates were also consolidated in broader age groups (children 0–14 years; adults $\geqslant 15$ years) and 95% confidence intervals calculated

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Table 1. *Population surveyed* (*person-years*) *1994–2003: new episodes of disease* (*n*) *and incidence rates per 100 000 person-years by age and gender*

Age band (years)	Population		Molluscum contagiosum				Scabies				Lichen planus			
			Male		Female		Male		Female		Male		Female	
	Male	Female	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate	*n*	Rate
<1	25 420	24 233	46	181	100	413	100	393	103	425	1	4	0	0
1–4	119 920	113 682	1804	1504	1733	1524	704	587	732	644	6	5	8	7
5–14	321 624	306 015	3455	1074	3207	1048	2102	654	2405	786	27	8	34	11
15–24	293 365	286 372	181	62	240	84	2066	704	2679	935	29	10	46	16
25–44	228 683	719 641	229	31	281	39	2002	275	2872	399	222	30	215	30
45–64	584 373	577 074	47	8	69	12	953	163	1154	200	301	52	387	67
65–74	182 773	207 071	7	4	12	6	206	113	233	113	130	71	161	78
>75	120 602	215 641	1	1	5	2	208	172	536	249	50	41	89	41
All ages	2 376 740	2 449 730	5770	243	5647	231	8341	351	10 714	437	766	32	940	38

where appropriate. Rates are presented per 100 000 age-specific person-years.

Seasonal trends were examined by averaging weekly data over the 10 years and presented as 3-weekly moving averages to minimize the variation in health-care utilization due to limited access over bank holiday periods. Gender differences were investigated in the combined 10-year dataset and the relative risk of female to male incidence calculated together with the 95% confidence interval as described elsewhere [28].

RESULTS

This analysis is based on 11 417 incident cases of MC, 19 055 of scabies and 1706 of LP referable to almost 5 million person-years observation of which 49·3% were male, 5·6% aged <5 years and 15·0% aged ⩾65 years (Table 1). Age- and gender-specific incident rates per 100 000 person-years are given in the table for each of the three conditions. These are further examined below in relation to the variation over time, between age groups and between males and females.

The annual incidence of MC (all persons) varied between 175/100 000 (95% CI 164–189) in 1994 and 261 (95% CI 248–274) in 2000. There was very little variation between the rates from 1998 to 2003 so that the 2000 rate (midpoint of these 6 stable years) is a reliable estimate of the annual incidence. Maximum incidence occurred in pre-schoolchildren aged 1–4 years and was 43% greater than that in schoolchildren aged 5–14 years; the latter group accounted for more than half the total episodes. The incidence rate for children aged 0–14 years in 2000 was 1265/100 000 (95% CI 1240–1290). Ninety per cent of all episodes occurred in children up to and including 14 years, and assuming the condition does not recur in childhood the estimate of cumulative incidence over this age range was 16·9% in males and 17·0% in females.

The annual incidence of scabies (all persons) varied between 233/100 000 (95% CI 220–246) in 2003 and 470 (95% CI 452–488) in 2000. The annual incidence rates for both adults and children did not stabilize as in the case of MC. For each sex the maximum mean annual rate occurred in young adults aged 15–24 years followed closely by the rate for schoolchildren, and then by the rate for those aged 1–4 years.

The annual incidence of LP (all persons) varied between 27/100 000 (95% CI 23–31) in 2003 and 43 (95% CI 37–49) in 1998. The rate for 2000 was virtually the same as the 1998 rate. Incidence was maximal in the 65–74 years age group followed by the rate for the 45–64 years age group. Less than 5% of episodes were reported in children aged 0–14 years during the 10-year study period.

There was no gender difference in the all-age incidence of MC and none in children aged 1–14 years: significant female excesses were seen in adults, age range 15–64 years (Table 2). For scabies there was a higher incidence in females and the difference was evident in each of the age groups examined except for the <5 and 65–74 years age groups. For LP there was a statistically significant excess in females in

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Table 2. *Molluscum contagiosum, scabies and lichen planus 1994–2003: relative risk female/male (RR) and 95% confidence interval (CI)*

Age band (years)	Molluscum contagiosum		Scabies		Lichen planus	
	RR	CI	RR	CI	RR	CI
<1	2·28	1·61–3·23	1·08	0·82–1·42	n.c.	n.c.
1–4	1·01	0·95–1·08	1·10	0·99–1·22	1·41	0·49–4·05
5–14	0·98	0·93–1·02	1·20	1·13–1·28	1·32	0·80–2·19
15–24	1·36	1·12–1·65	1·33	1·25–1·41	1·62	1·02–2·59
25–44	1·24	1·04–1·48	1·45	1·37–1·54	0·98	0·81–1·18
45–64	1·49	1·03–2·15	1·23	1·12–1·34	1·30	1·12–1·51
65–74	1·51	0·60–3·84	1·00	0·89–1·20	1·09	0·87–1·38
>75	2·80	0·33–2·94	1·44	1·23–1·69	1·00	0·74–1·41
Total	0·95	0·91–0·99	1·25	1·21–1·28	1·19	1·08–1·31

n.c., Not calculated.

the 45–64 and 15–24 years age groups, although in the latter age group the excess was of borderline significance and there were very few cases.

Annual incidence of each condition in children is contrasted with that in adults (Fig. 1, note scale difference on *y* axis for LP). The incidence of MC in adults was about one twentieth of that in children; for scabies adult rates were about half those in children whereas for LP, rates were fourfold those in children. There were no clear seasonal patterns of incidence for MC and LP (note scale difference on *y* axis) but scabies peaked during winter in both children and adults (Fig. 2).

DISCUSSION

We report incidence data on three skin conditions commonly seen in general practice. These are based on larger numbers of incident cases than published so far and on defined population denominators. The results of this study also illustrate the use of electronic medical records, which have been generated from systematic disciplined recording of diagnoses to provide consistent data on disease incidence. The surveyed population was representative of the national population by age and gender and monitored continuously over many years (exceeding 5 million person-years observation). It has been conducted in general practice in E&W where it is usual for whole families to register with the same practice. Accordingly, the analysis provides a comprehensive perspective of disease incidence in all ages and not, as in most reported studies, incidence in selected communities such as persons consulting in GUM clinics.

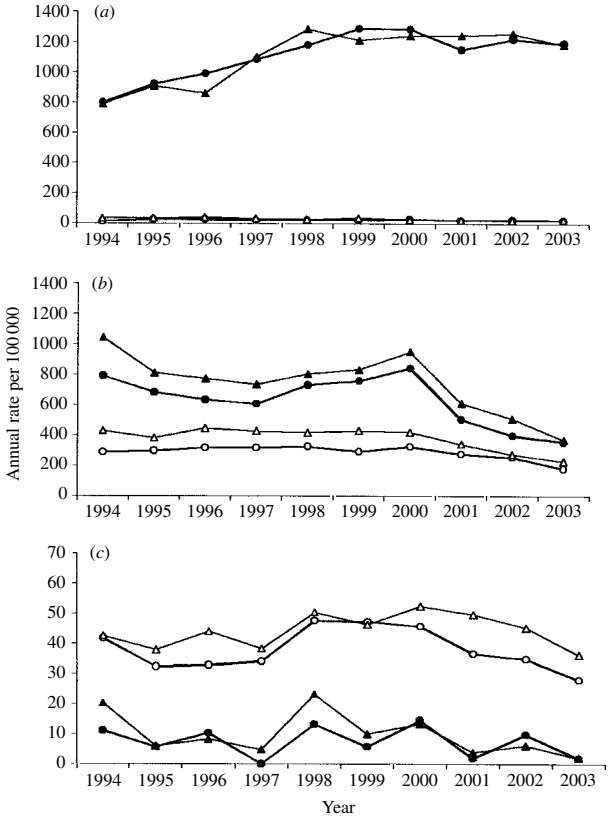

Fig. 1. Annual incidence of (*a*) molluscum contagiosum, (*b*) scabies and (*c*) lichen planus per 100 000 persons by age (0–14 and ⩾15 years) and gender over years 1994–2003. –●–, Male (0–14 years); –○–, male (⩾15 years); –▲–, female (0–14 years); –△–, female (⩾5 years).

From these rates we can estimate that in a population of 10 000 persons (the size of a large English group practice with six general practitioner partners),

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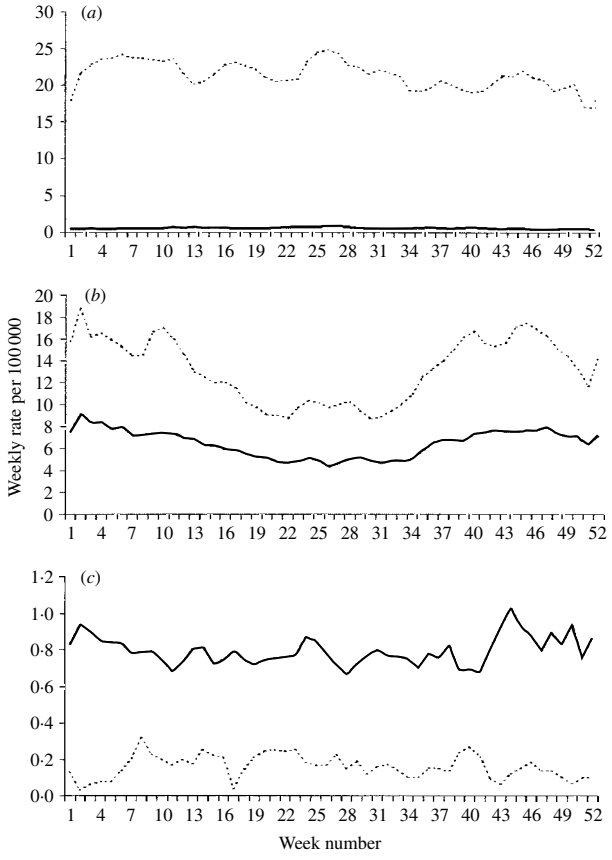

Fig. 2. Mean weekly incidence of (*a*) molluscum contagiosum, (*b*) scabies and (*c*) lichen planus per 100 000 persons by week (3-week moving average) over years 1994–2003. ·····, 0–14 years; ——, ⩾5 years.

about 24 new cases of MC, 40 cases of scabies and four of LP might be diagnosed per year.

Diagnosis and reporting

Most of these reported diagnoses were probably made solely on clinical observation. Although the diagnoses of MC and LP can be confirmed by biopsy, and of scabies by identifying the mite, further investigation is not usual in general practice and is not always used in specialist dermatology practice. It is possible that some cases of MC were misdiagnosed as simple viral warts and vice versa. For scabies, there is sometimes confusion with eczema but nocturnal pruritus is a particularly suggestive clinical feature helping to distinguish it. Being much less frequent, LP can be missed although it can be diagnosed reasonably precisely from its appearance. The consistency of the findings from year-to-year with regard to differences by age group and gender encourages us to think that the quality of diagnosis of these conditions in WRS general practices is good.

General practitioners in the WRS are asked to report their working diagnosis and not vague terms such as non-specific skin rash or pruritus, unless they remain very uncertain. They are also required to distinguish new episodes from ongoing consultations, and thus, this paper reports new incidence and not consultation rates (which are higher). The study is based on health-care utilization: there will always be additional persons with these conditions who do not consult. Nevertheless the decision to consult is a useful marker for the severity of the disease and provides a good indication of trend.

Findings in relation to other literature

The age-specific distribution of all three conditions is generally known. The age and gender differences in incidence rates which we report are new and likely to be reliable because they were obtained from a large well-established general practice network observing consistent recording routines over several years. From this database we have previously described gender differences in the incidence of chicken pox (no difference), shingles (small female excess) and herpes simplex (large female excess) [28]. Although there were no gender differences in the incidence of MC in children, the female excess in adults may be explained by increased personal contact between adult females and children and the tendency of adult females to consult more frequently than males. The estimate of cumulative annual incidence of MC up to and including age 14 years reported here (17%) is the same as that reported from the Dutch study [11].

Gender differences in the incidence of scabies were evident in children as much as in adults, and this is similar to our findings for herpes simplex [28]. The difference was evident in each annual dataset and separately in the age groups 1–4 and 5–14 years (Fig. 1). Gender difference in the incidence of disease in children is not explained by gender-specific consultation bias. For LP there was a suggestion of slightly increased incidence in females, most evident in the 45–64 years age group, where consultations for hormone replacement therapy (HRT) and attendance at well-woman clinics might more readily lead to diagnosis in mild cases.

The increased incidence of scabies in the ⩾75 years age group compared with the 65–74 years age

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group is noteworthy and may reflect the spread of scabies in residential institutions [17–20]. The incidence of LP in this age group did not exceed that in the 65–74 years age group suggesting either a different mode of disease transmission, or alternatively, the possibility that relatively minor asymptomatic skin lesions are readily overlooked in persons >75 years. Impaired immune response has been suggested as an important factor in the aetiology of LP [24].

The WRS has collected data on scabies since 1967 and we have previously reported a steadily decreasing trend between 1970 and 1990 [23]. Between 1990 and 1995 there was a sharp increase, which continued at a reduced rate until 1999 since when incidence has reduced dramatically. Incidence in 2000 (470/100 000) was higher than that in 1971 (380/100 000). The pattern of incidence observed in the WRS rekindles the controversy surrounding a 30-year epidemic cycle for scabies [17, 29].

This paper describes current incidence rates in a very large nationally representative consulting population for three important dermatological conditions. It demonstrates the value of consistent data capture from general practice to inform on the incidence of diseases which affect many people and for which there are few reliable sources of data. Such information is useful in the context of measuring the burden of disease, for defining the training needs of general practitioners and for alerting epidemiologists and health-care planners to emerging health threats.

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