

# Comparison between the weekly returns service and the Oxford regional sentinel practice scheme for monitoring communicable diseases

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**SUMMARY.** Weekly data for seven conditions reported to the weekly returns service of the Royal College of General Practitioners' Birmingham research unit over a 52-week period have been compared with those reported to the Oxford regional sentinel practice scheme. The mean weekly recorded rates for otitis media, asthma and intestinal infectious disease were similar in both systems; in the weekly returns service, mean weekly rates for common cold, acute bronchitis and influenza/influenza-like illness were approximately twice and for sore throat/tonsillitis slightly higher than rates in the Oxford scheme.

In the weekly returns service no recommendations are made about criteria for diagnosis but in the Oxford scheme diagnostic criteria agreed by the participants are used. Where rates in both monitoring systems are the same, agreed criteria are likely to be conventional clinical practice and therefore superfluous. Where rates are different, the use of criteria enhances specificity of the information content but results in an underestimation of the total incidence of respiratory disease presented to general practitioners.

For common cold, acute bronchitis, otitis media and influenza/influenza-like illness the associations between the rates in the two systems were high ( $R > 0.79$ ), as might be expected, but these high values cross validate both recording systems in their monitoring of trends. For the remaining (non-epidemic) conditions the associations were low. There were no significant associations between the rates for asthma and the upper respiratory infectious diseases in either recording system, which suggests there was effective discrimination of asthma.

## Introduction

IN most countries of western Europe,<sup>1</sup> and also in North America,<sup>2</sup> the incidence of infectious diseases is monitored by government supported agencies or by academic institutions. For some conditions, notably influenza, monitoring is essential for early warning of epidemics and for the recognition of change in the characteristics of viruses. The need for improved monitoring led to an international effort by the World Health Organization and by 1954 it coordinated virus isolate data from 42 coun-

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tries.<sup>3</sup> For other conditions monitoring is necessary to recognize change in incidence and virulence. In the World Health Organization's programme of 'health for all by the year 2000',<sup>4</sup> the monitoring of diseases is implicit in many of the targets adopted.

There are several ways in which individual diseases can be monitored. Virological data are used extensively for monitoring influenza, although it can be difficult to relate the results to precise populations because doctors are more likely to investigate a patient for influenza after the arrival of an epidemic than before. Statutory notification procedures, which have been adopted in several countries, are essential for rare and serious disorders, and for conditions where public safety requires the patient to be properly followed up. Statutory notification has worked well for more serious conditions, but is inadequate for the less serious, such as gastroenteritis.<sup>5</sup>

Regular surveillance in general practice may involve routine recording in a diagnostic index<sup>6</sup> or it may be a simple count of cases as they occur. Both methods require the aggregation of data at agreed intervals by a centralized coordinating agency. In the system recently introduced in France,<sup>7</sup> a network of general practitioners return data to the coordinating centre using computers linked by telephone. The number of common conditions covered by practice based surveillance systems is generally greater than that covered by statutory notifications.

Death certificates and absences from work or school have also been used to monitor morbidity but these are only available after the event and cannot serve as a warning of an impending epidemic. If a warning function is required, data collection, transfer and analysis must not be delayed.

The study reported here is a comparison of two monitoring systems which differ in their recording methods and use of diagnostic criteria. The comparison is particularly concerned with the information the systems provide about trends, with the merits or otherwise of using diagnostic criteria in disease monitoring systems and with cross validation.

## Monitoring systems

There are several networks of general practices monitoring disease in the UK but the oldest is the weekly returns service of the Royal College of General Practitioners which has functioned since 1967.<sup>8</sup> The network of practices is chiefly distributed throughout England and Wales but includes one practice in Scotland and one in Northern Ireland. The scheme involves the maintenance of a diagnostic index in the practice in which all new episodes of illness are recorded by patient's name, date of birth and sex using the College's classification of disease.<sup>9</sup> No diagnostic criteria are recommended. Relevant data are aggregated within the practice and counts of new episodes in appropriate age and sex groups are forwarded to the College's Birmingham research unit each week. The age and sex compositions of the practices are aggregated and provide the denominator for the calculation of new incidence rates.

The Oxford regional sentinel practice scheme was established in 1979 and provides weekly data about 26 conditions. The system is simpler than the weekly returns service in that no separate indexing system is maintained within the practices and

hence patients are not subsequently identifiable. It also differs in having diagnostic criteria which were formulated by discussion between all the participants.

During 1986, the weekly returns service had a network of 38 practices, including 124 principals, and recorded all new episodes of illness for a mean weekly population of approximately 210 000 people of whom 48.4% were male and 18.9% aged less than 15 years. Comparative statistics for the Oxford scheme were 24 practices, 46 principals, a population of 85 000, 49.4% males and 19.7% aged less than 15 years.

## Method

Table 1 lists the conditions studied in this paper. Subject to the diagnostic criteria of the Oxford scheme there is a rough equivalence between the two recording systems for common cold,

**Table 1.** Equivalent diagnostic terms used by the weekly returns service and the Oxford scheme with the latter's diagnostic criteria in parentheses.

Weekly return service <sup>a</sup>	Oxford scheme (diagnostic criteria)
Common cold	Common cold (minor afebrile respiratory tract infection with a runny nose; exclude hay fever)
Sore throat/tonsillitis	Tonsillitis (inflamed and enlarged tonsils with cervical lymphadenopathy and pain worse on swallowing; not simply a sore throat)
Acute bronchitis	Acute bronchitis (production of purulent sputum with wheezing or other evidence of airways obstruction; includes acute exacerbation of chronic bronchitis)
Otitis media	Otitis media (red painful ear drum with or without other respiratory symptoms)
Asthma	Acute asthmatic episodes (episodes of dyspnoea with inspiratory and expiratory airways obstruction)
Influenza/influenza-like illness <sup>b</sup>	Influenza (acute respiratory illness with fever and myalgia)
Intestinal infectious disease	Acute gastroenteritis (acute diarrhoea and/or vomiting, usually with abdominal pain, with or without fever and other cases in the family)

<sup>a</sup>The weekly return service terms are used in this study. <sup>b</sup>The weekly return service data for these two conditions have been aggregated in this study.

acute bronchitis, otitis media, asthma and intestinal infectious disease. However, in the Oxford scheme sore throat without signs of pharyngitis is specifically excluded and there is no distinction between influenza and influenza-like illness.

The weekly incidence of each illness as reported to the two schemes was compared over the 52 weeks commencing 30 September 1985. Incidence per 100 000 population was calculated for each illness and the association between the weekly data in each recording system was examined using Spearman's correlation coefficient (*R*). In a subsidiary analysis reported incidences were examined by patients' sex and age (less than 15 years or 15 years and over) to assess possible recording bias. Finally, the association between the rates for specific pairs of illnesses were compared for each system individually (Spearman coefficient). The analyses were carried out using the minitab computer package.

## Results

The mean weekly incidence data for the seven conditions are presented in Table 2. For common cold, sore throat/tonsillitis, acute bronchitis and influenza/influenza-like illness the incidence reported by the weekly returns service was substantially greater than that reported by the Oxford scheme. For these conditions, the weekly incidence during each quarter was more variable in the Oxford scheme than in the weekly returns service. For otitis media, asthma and intestinal infectious disease, the rates reported by the two systems were similar. The degree of association between rates in the two systems varied between high values for common cold, acute bronchitis, otitis media and influenza/influenza-like illness ( $R \geq 0.79$ ) and comparatively low values for asthma ( $R=0.32$ ) and intestinal infectious diseases ( $R=0.29$ ).

The percentage of males and of cases aged less than 15 years among the episodes reported are shown in Table 3. For most conditions there were fewer males than females but the proportion of males reported by the Oxford scheme was in general higher than reported by the weekly returns service and the difference was greater than the 1% excess of male population covered by the Oxford scheme as compared with the weekly returns service. The proportion of children reported by the weekly returns service exceeded that reported by the Oxford scheme for acute bronchitis and influenza/influenza-like illness, while for the remaining conditions the opposite applied.

The association between mean weekly rates for each set of paired conditions in each of the recording systems is given in Table 4. There were strong associations between the rates for

**Table 2.** Mean incidence per week per 100 000 persons of the seven conditions as reported by the weekly returns service (WRS) and the Oxford scheme (OS).

	Common cold		Sore throat/ tonsillitis		Acute bronchitis		Otitis media		Asthma		Influenza/ influenza-like illness		Intestinal infectious disease	
	WRS	OS	WRS	OS	WRS	OS	WRS	OS	WRS	OS	WRS	OS	WRS	OS
Oct-Dec 1985	208	114	93	84	125	77	77	81	24	25	63	25	47	39
Jan-Mar 1986	132	110	105	80	133	73	86	83	20	18	117	76	49	41
April-June 1986	111	55	92	77	86	38	57	60	19	16	47	14	39	29
July-Sept 1986	164	41	76	62	74	34	43	47	21	28	34	8	42	43
Overall	165	80	91	76	105	55	66	68	21	22	55	31	44	38
	$R=0.89^{***}$		$R=0.43^{***}$		$R=0.84^{***}$		$R=0.79^{***}$		$R=0.32^{**}$		$R=0.85^{***}$		$R=0.29^*$	

\* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

**Table 3.** Percentage distribution of total number of episodes in males and children age 0–14 years reported by the weekly returns service (WRS) and the Oxford scheme (OS) by illness category.

	Common cold		Sore throat/ tonsillitis		Acute bronchitis		Otitis media		Asthma		Influenza/ influenza-like illness		Intestinal infectious disease	
	WRS	OS	WRS	OS	WRS	OS	WRS	OS	WRS	OS	WRS	OS	WRS	OS
Total no. of episodes reported	17 816	3559	9960	3269	11 340	2439	7098	2964	2284	926	7025	1401	4846	1650
Percentage male	44.0	48.3	43.2	46.6	45.9	47.8	48.7	53.3	53.2	56.9	46.0	49.1	46.6	49.0
Percentage aged less than 15 years	48.3	61.4	45.5	52.7	25.6	22.1	78.2	85.9	43.4	49.8	35.8	17.3	46.3	49.8

**Table 4.** Association between mean weekly incidence rates for paired conditions in the weekly returns service (WRS) and the Oxford scheme (OS).

		Common cold	Sore throat/ tonsillitis	Acute bronchitis	Otitis media	Asthma	Influenza/ influenza-like illness
Sore throat/tonsillitis	WRS	0.63***					
	OS	0.44***					
Acute bronchitis	WRS	0.96***	0.62***				
	OS	0.90***	0.39***				
Otitis media	WRS	0.87***	0.73***	0.85***			
	OS	0.70***	0.47***	0.71***			
Asthma	WRS	0.22	0.08	0.21	0.11		
	OS	0.03	-0.08	0.02	-0.11		
Influenza/influenza-like illness	WRS	0.84***	0.70***	0.83***	0.80***	0.02	
	OS	0.73***	0.43***	0.76***	0.65***	-0.26	
Intestinal infectious disease	WRS	0.57***	0.40**	0.55***	0.45***	0.40**	0.52***
	OS	0.33**	0.29*	0.32**	0.21	0.26*	0.16

\* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

all pairs of respiratory conditions in both systems with the exception of those which included asthma. Associations between paired conditions were marginally stronger in the weekly returns service than the Oxford scheme. The associations involving intestinal infectious disease were weaker than those involving paired upper respiratory conditions, except asthma.

## Discussion

Neither of these recording systems measures the complete incidence of illness in the population, only those episodes when the patient consults the general practitioner. It is possible, therefore, that the differences between the systems reflect different consulting behaviour. However, the variable relationship between the systems for each disease reported makes this suggestion implausible. Geographical factors may also influence incidence and lead to differences between local and national rates. If the differences reported here were geographically determined, some conditions with increased rates and others with decreased rates would be expected in any comparison. The lower incidence in the Oxford scheme for all conditions makes a geographical explanation unlikely.

In the weekly returns service recorders are not obliged to define every episode in diagnostic terms, a symptom is sufficient if the doctor is unable to specify a diagnosis. There is, however, no option to exclude an episode of illness. The Oxford scheme aims to collect only 'typical cases', deliberately excluding the doubtful ones and to achieve this the participants established appropriate diagnostic criteria.

*Common cold, acute bronchitis and influenza/influenza-like illness.* These conditions are considered together because of the strong associations between the weekly rates within each recor-

ding system, which suggests some degree of common aetiology and concurrent epidemicity. Viruses affecting the upper respiratory tract can be associated with a variety of clinical expression<sup>10</sup> depending on the severity of the infection, whether infection occurs early or late in an epidemic, resistance to infection within the host and so on. Symptoms and signs change during the course of an illness and conformity with a set of criteria depends on the timing of the consultation. Patients who do not fulfil established criteria are excluded by the Oxford scheme and hence, recognition would be less than that in the weekly returns service. The extent of this reduction reflects the specificity of the criteria and natural history of the condition. The two-fold difference in mean weekly rates between the schemes for each of these conditions does not indicate a two-fold difference in incidence. The use of diagnostic criteria might also lead to a relative transfer from the more serious to less serious conditions and this may account for the lower proportion of children with influenza/influenza-like illness in the Oxford scheme compared with the weekly returns service and the higher proportion with common cold. However, it must be remembered that the weekly returns service data are an aggregation of influenza and influenza-like illness whereas the Oxford scheme definition is confined to influenza. The aetiological basis of such a distinction is questionable though the weekly returns service has found the distinction useful in separating the regular annual epidemic of 'influenza-like illness' from the more severe and occasional epidemic of 'influenza'.<sup>11</sup>

*Sore throat/tonsillitis.* The difference in mean weekly rates is less than might be expected given that patients with a sore throat only were excluded in the Oxford scheme. Doctors sometimes assign a diagnostic label to justify a course of action such as

prescribing an antibiotic<sup>12</sup> and this may be relevant here.

**Otitis media.** The mean weekly rates were similar in both systems, suggesting that the diagnostic criteria adopted by the Oxford scheme were precisely those in common clinical practice and the symptoms could generally be found at the time of consultation.

**Asthma.** The mean weekly rates were similar in both systems. Although diagnostic criteria are not used in the weekly returns service, only new episodes of asthma are included and in both systems there was a notable lack of association between weekly rates for asthma and rates for upper respiratory tract infections suggesting that doctors were discriminating effectively between exacerbations of asthma and other respiratory disease.

**Infectious intestinal disease.** The mean weekly rate in the Oxford scheme was only marginally less than that of the weekly returns service, suggesting again that the Oxford criteria are similar to conventional practice.

A second issue which differentiates the two systems is the recording of patient names. In the Oxford scheme patients are scored as they present, whereas in the weekly returns service they are indexed by name. The advantages of indexing include the ability to link patient data from one week with another and from one condition to another. Although this linkage is essential to the annual morbidity surveys<sup>13</sup> to which many of the general practitioners involved in the weekly returns service also contribute, it is not part of the weekly returns service and is thus underused. Another advantage of naming patients is the ability to identify them for further study and this has been used by the weekly returns service in a study of the complications of mumps.<sup>14</sup> Finally, identification is needed for validation but validation studies do not require the continuous identification of every patient and they have been conducted by the Oxford scheme on a sample basis.

Monitoring systems exist to observe trends and this requires consistent recording. The incidence of pertussis recorded by the weekly returns service during 1982 was similar to that recorded in 1967 but statutory notifications during 1982 suggested an incidence which was twice that in 1967. Regular recording is less subject to pressure from public or professional awareness about a specific condition. In the comparisons presented here, the associations between the systems for common cold, acute bronchitis and influenza/influenza-like illness were especially strong ( $R \geq 0.84$ ) and for otitis media almost as strong ( $R = 0.79$ ). Strong associations are to be expected in conditions which are seasonally epidemic but these high values nevertheless cross validate both recording systems in their monitoring of trends. The much weaker associations for sore throat/tonsillitis, asthma and intestinal infectious disease are as expected for non-epidemic conditions.

For routine surveillance of common infections, there will always be a need for a national system of detailed recording with patient linkage, but the costs and detail are unnecessarily extravagant for local systems. The expansion of local systems in the style of the Oxford scheme is to be encouraged, providing recording methods are compatible.

Further research is needed in the area of diagnostic criteria and must be undertaken against a background of clearly stated objectives for the monitoring system.

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