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Validation of Sentinel Data

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Summary

The Dutch Sentinel Practice Network, "de Peilstations" started in 1970. The purpose of this network is to gain a better insight into the epidemiology of a number of illnesses and conditions as they are presented to the general practitioner. The network is sponsored by the Ministry of Welfare, Public Health and Culture. Value was attached to the distribution of the spotter physicians over the country and by degree of urbanisation. The presence of 1% of the population of the four provinces groups and the three urbanisation groups has been observed in the practices of the spotter physicians. The completeness of the registration, the internal and the external validity of the data collected by the physicians are discussed.

Zur Validierung von Sentinel-Daten

Das niederländische Sentinel-Netzwerk "de Peilstations" besteht seit 1970. Sein Ziel ist es, Informationen zur Epidemiologie verschiedener Krankheiten und Beschwerden zu gewinnen, mit denen der Allgemeinmediziner in seiner Praxis konfrontiert wird. Das Netzwerk wird gefördert durch das niederländische Ministerium für Soziales, Gesundheit und Kultur. Besondere Beachtung wird der gleichmäßigen Verteilung der Beobachtungspraxen auf städtische und ländliche Regionen gewidmet. Von den vier ländlichen und den drei städtischen Provinzen der Niederlande ist derzeit 1% der Bevölkerung im Netzwerk repräsentiert. Im folgenden werden die Vollständigkeit der Erfassung sowie die interne und externe Validität der Arztbeobachtungen dargestellt und diskutiert.

Introduction

The Netherlands is known as the flat country behind the dikes and coastal sand dunes, partly below sea level. People from abroad know the windmills, the bulb-fields, the polders, Gullit, van Basten and Cruyff, the most famous Dutch football players, and the museums with the paintings of the great Dutch painters Rembrandt, Vermeer and van Gogh. Using other criteria than the tourist does, you can see the Netherlands not only as a country, but as one of the greater metropolitan areas of the world, comparable with Greater London, Tokyo or Los Angeles (Fig. 1). On a square of 130 by 130 kilometres, about half of the area including the water of the country, live a population of roughly 12 million persons.

The other 3 million of the Dutch population live in the green areas of this megalopolis, that is to say in the north, the east and the south of the Netherlands. These green areas form the boundaries between the Greater Holland metropolis and the Rhine-Ruhr metropolis in Germany and the Brussels-Antwerp region in Belgium. The North Sea is the boundary between Greater London and Greater Holland. In this country, more urban than rural, the life expectancy at birth in 1988 was 73.7 years for men and 80.2 for women. This ranks among the top of the developed world. So does the rate for infant mortality, one of the lowest in the world.

Health care is well organized and people have good access to it. A general practitioner is available for everyone in the Netherlands. In almost all illness episodes the general



Fig. 1 Greater London/The Netherlands.

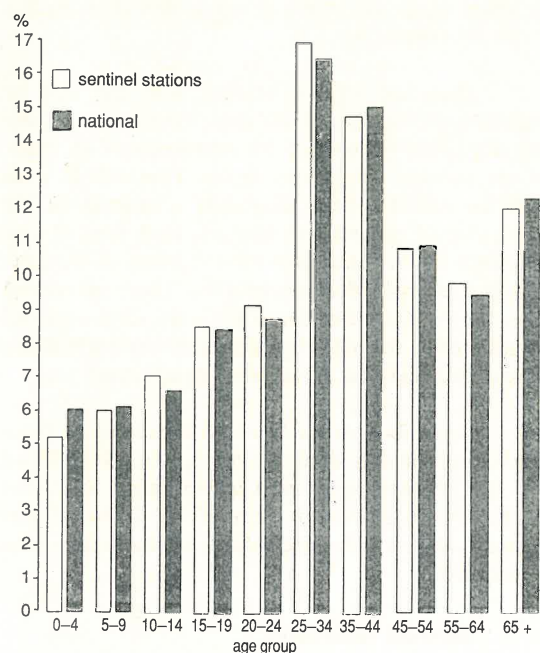


Fig. 5 Age distribution in percentages of the total population and the practice population of the sentinel stations in the Netherlands 1987.

of all the practice populations is taken to check on this 1% objective. Let me show you the age distribution of the practice population of the sentinel stations and the total population of the Netherlands in 1970, the first year of registration, and in 1987 (Figs. 4 and 5).

The aim of the national network is to gain insight into the morbidity pattern of the Dutch population, insofar as that could be determined as part of the care given by general practitioners. It should be realized that this aim is not a purely epidemiological one.

Method

Every week the sentinel physicians keep a tally on the registration form, the weekly return, of the numbers of those topics for which registration has been requested. Every year the weekly return contains a number of topics on which further data are requested by means of a supplementary questionnaire. The weekly return and the supplementary questionnaires are sent in to Nivel, where they are checked and processed. If necessary, contact is made with the general practitioner to correct or to complete the data. The topics for which registration is requested change every year. A list of some of the topics on the weekly return since the beginning of registration is shown in Figure 6.

General remarks on the validity of sentinel data

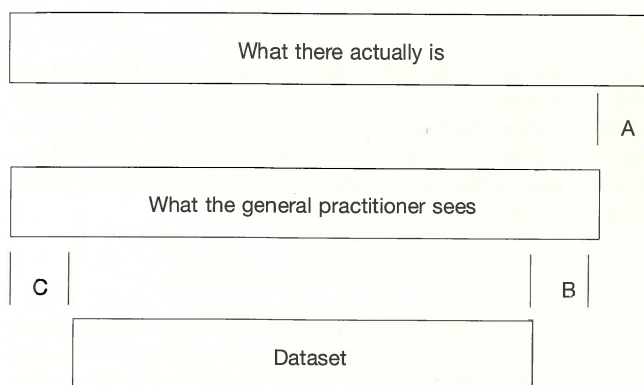
Completeness of the registration (Fig. 7).

If things go the right way, all sentinel stations should pass on all the information on all the cases for which registration is requested. Secondly, all this information should

influenza(-like illness)	1970-1992
aids (concern about)	1988-1992
cerebrovascular accident	1986-1987
burns	1988-1989
cervical smear	1976-1992
diabetes mellitus	1980-1983 and 1990-1992
Parkinson's disease	1980-1985
sterilisation of the man performed	1972-1992
sterilisation of the woman performed	1974-1992
suicide (attempted)	1970-1972 and 1979-1992
otitis media (acute)	1971 and 1986
prescription of flunitrazepam	1987-1988
sport traumas	1979-1983 and 1992

Fig. 6 Subjects on the weekly returns 1970-1992 (selection out of 60).

clinical spectrum of a topic



Patients may not reach the dataset because:
 A: they do not consult a general practitioner,
 B: the diagnosis is missed,
 C: the general practitioner fails to record.

Fig. 7 Registration bias in sentinel networks.

be processed correctly by the staff of the project in the central office in Utrecht (Nivel). This processing of data collection ought to be checked, but given the budget of the project it is impossible to check at the level of the practices. Cases have been lost and will be lost.

At the central office, however, it is possible to compare the performance of the practices in relation to the age and sex distribution of the population of the practices and to detect the low and high recorders. Nevertheless, this will not bring the solution, because an intermediate recorder too can forget to register a case that he should have recorded. A general practitioner is only human.

To tackle the problem of underreporting, the project manager has to take different kinds of action to motivate the participating general practitioners. The most effective one is to give feedback to the participating physicians on how they perform and to be very selective in choosing the topics for

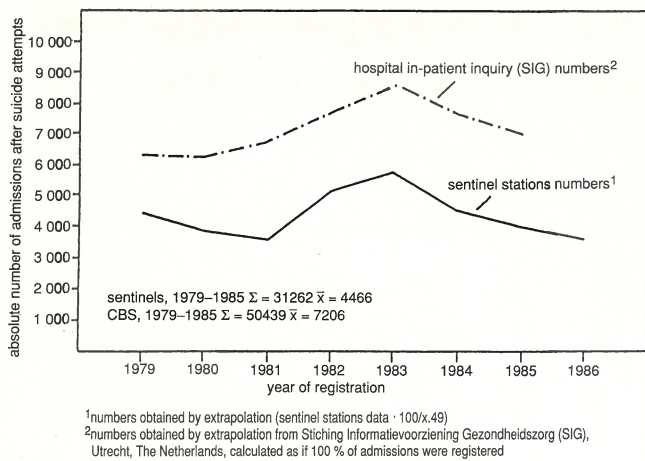


Fig. 9 Suicide attempts leading to general hospital admission in the Netherlands 1979-1986: Absolute numbers from two sources compared.

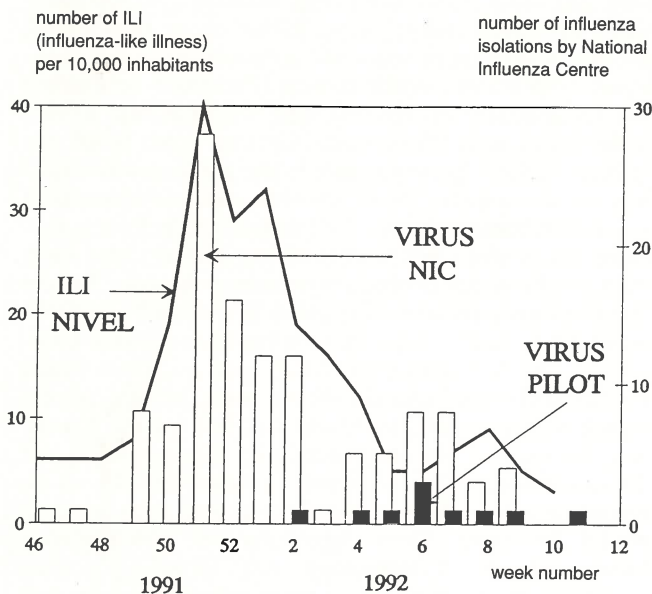


Fig. 10 Influenza in the Netherlands 1991/1992.

Less reporting than the possible comparable source happens in the case of attempted suicide. The figure shows the data of the sentinel network and the hospital in-patient inquiry (Fig. 9). The numbers differ again. But it is of importance to note that the graphs based on the two data sources are very similar. Concerning attempted suicide there are reasons to assume that the general practitioner does not become aware of all the cases of attempted suicide. To end my presentation here is a final example of external validation of sentinel data. It concerns in some respect the validation of a clinical diagnosis of an infectious disease (Fig. 10).

In December of 1991 the incidence of influenza-like illness reported by the sentinel stations rose above the normal level for that time of the year. Such a situation always poses the question: are we dealing with influenza or one of the

other viruses that can cause an acute respiratory tract infection? Confirmation of the clinical diagnosis is desirable and, even more so, the course of the epidemic should also be confirmed. As is shown again the graph of the number of reported cases per 10,000 per week is very similar to the graph of the isolated influenza strains collected from all over the country by the National Influenza Centre. These isolations do not come from patients belonging to one of the sentinel practices and therefore form another source. As such this source confirms the results of the sentinel data.

The validation of diagnosis in sentinel network recording is under criticism⁵. We have to take that criticism seriously. When and where possible, precise definitions for diagnostic terms employed by working general practitioners in everyday practice should be used. Sometimes it will be possible to obtain that high precision of diagnostic criteria. One should, however, realize that the reality of clinical practice in the front line of health systems all over the world is that it is not at present always possible to make precise definitions that will work in primary medical care. In that case the fact remains that sentinel data are the best data available.

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