Exploring the Use of Death Certificates as a Component Of an Occupational Health Surveillance System

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Abstract: An effort has been made to explore a case-finding surveillance system for occupationally-related disease using death records. A sentinel health event, here lung cancer in young males, was selected to seek unusual associations with occupations as listed on the death records. Fishermen appeared to be over-represented and population studies cited suggest lung cancer in this occupation deserves further exploration. Further efforts of this type could test the usefulness of an occupational health surveillance system based on the death certificate. (*Am J Public Health* 69:718–720, 1979.)

Introduction

Efforts to reduce the mortality and morbidity associated with occupational disease are impaired by a number of problems including an insufficient data base.[1-3] While it is not yet clear what mix of information components would comprise a sufficient data base, there seems to be agreement that a part of the solution could come from increased use of existing data in the building of an occupational disease surveillance system. This pilot study was designed to investigate the feasibility of a death certificate surveillance component.

Many states and localities have made use of special mortality review committees to identify and study selected deaths with the aim of reducing the risk of death from certain causes. Studies of maternal deaths, deaths during the perinatal period, and deaths related to anesthesia are examples.[4-6] These committees, often jointly sponsored by state or local public health agencies and medical societies, routinely screen death certificates and select a small number for more intensive investigation. Peer review of the findings from hospital records and autopsy reports assess the extent to which certain events (e.g., prenatal and perinatal conditions, medical management, etc.) played a role in the deaths. Reports from such study committees have provided the impetus for intervention programs and for the improvement of health services.

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In the approach to case-finding presented here, we have coupled this identification system to the idea of sentinel health events, as proposed by Rutstein.[7] For our first exploration we selected males in the age group 20–44 years and one of the causes of death* thought to be related in part to occupational exposure, malignant neoplasm of trachea, bronchus, and lung (ICDA code 162).[8] The relatively young age range was selected to increase the likelihood that the deaths might be related to some concentrated environmental exposure. Tabulations of deaths of Massachusetts' males by this cause and for this age group, by city or town and health service area, were obtained for the years 1974–76.

Analysis

The age distribution of the 137 cancer of trachea, bronchus, and lung deaths (only two of which were due to cancer of the trachea 162.0) is shown in Table 1. No particular pattern is revealed except the predictable increase with age. There was no pattern of total or age-specific lung cancer deaths by Health Service Areas.

The death certificates of the 137 cancer deaths were obtained so that occupation and employer data could be abstracted. Occupation as recorded on the death certificate has been previously shown to be a reasonable statement of lifetime occupation in 75 per cent of male death certificates.[9] Four death certificates listed the same occupation, commercial fisherman. All four were in the age group 35-39 years, accounting for 12 per cent of the 32 lung cancers in that age range. The first of these four deaths (August 1974) was a 38-year-old self-employed "commercial-shell fishman" from a Cape Cod town (the word "fishman" does not describe the exact nature of the deceased's occupation). The second (January 1975) was a 36-year-old "fisherman" working in the "fishing industry" in the New Bedford-Fall River area. The third (October 1975) was a 37-year-old Boston fisherman employed by a shrimp company. The fourth (June 1976) was a 38-year-old fisherman from the New Bedford-Fall River area, with an entry for industry suggesting the name of a fishing vessel.

Of the total employed males (16 years and over) in the state's labor force in 1970, 1.3 per cent were listed in the census as being in agriculture, forestry, and fisheries. With four of 32 age-and-cause-specific deaths listed as fisherman, there was, in our view, reason to consider this finding as a lead for further investigation.

Discussion

Four general population studies correlate cause-specific mortality (or in one case, morbidity) with the occupation of

*See reference 7, Table A (Figure 1)

TABLE 1—Age at Death Due to Cancer of Trachea, Bronchus, or Lung (162) among Males, 20–44 Years, Massachusetts 1974–76

Age	Number of Deaths
(years)	
20–24	2
25–29	1
30–34	12
35–39	32
40–44	90
TOTAL	137

fisherman. Guralnick,[10] in 1950, found for fishermen and oystermen a standardized mortality ratio of 127 for all cancer and a ratio of 144 for lung cancer (ICD 162). Milham,[11] in the State of Washington for the period 1950–1971, reported for fishermen and oystermen proportional mortality ratios (PMR) of 103 for all cancer and 115 for bronchus and lung (ICD 162–3). Proportional morbidity ratios from the Public Health Service/Social Security Administration collaborative disability study[12] for the years 1959–1962 showed for fishermen and oystermen a ratio of 159 for all malignant neoplasm of the respiratory system (ICD 160–165).

The only one of the population studies in which trend can be examined is the Decennial Report of the Registrar General for England and Wales.[13] Standardized Mortality Ratio (SMRs) are available for 1951, 1961, and 1971 in fishermen. These show an increasing trend which might suggest a relatively recent introduction of a new cancer risk into the fisherman's work environment (Table 2).

It is interesting to note that recently Pfeiffer and Threlfall[14] described a possible relationship between gastric cancer mortality and exposure of humans to specific seabird populations. Their correlation study is also supported by the population studies referred to earlier. The Registrar General's 1961 mortality table reports an SMR for stomach cancer of 193[13] and Milham reports a PMR for stomach cancer of 150.[11] The other two studies had too few stomach cancers to calculate meaningful ratios.

Using respiratory tract cancer deaths in young males as a sentinel event to identify hazardous occupations, we have been able to single out one occupational group, commercial fisherman, that calls for further investigation. To this end, we are examining more closely 20 years of death records in a major fishing community in Massachusetts. Separately, we are attempting further evaluation of a death certificate surveillance scheme by exploring another cause of death rubric as a sentinel event.

The results reported here, lead us to suggest that additional exploratory studies should be carried out, using Rutstein's[7] listing or some other appropriate list. Should our further exploratory study show promise, we would recommend that states consider including death certificate review as one component in an occupational health surveillance system.

In such a system, annual summary tables and lists of deaths from selected causes would be prepared. Data would include age, sex, date of death, residence and death certificate numbers. Case-by-case review of death certificates for occupation and employer would follow when indicated. Such review may, as was the case in this report, suggest associations with an occupation or type of employment. It may require comparison with employment statistics, however, before a suspect association is identifiable. In either event, further investigation would be triggered independently of whether the cause of death-occupation association had been previously hypothesized. The surveillance scheme would provide the possibility for both the discovery of new associations or the documentation of continuing ones.

Such a program might be strengthened (if indicated) by follow-up assistance from the National Institute for Occupational Safety and Health's Educational Resource Centers. Faculty-supervised students could become involved in actual work-related problems. A program of this nature would be an example of an activity recommended in 1977 in a Report to the U.S. National Committee on Vital and Health Statistics[15] and an opportunity for collaboration among state as well as federal agencies.

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TABLE 2—Lung Cancer Mortality in Fishermen from England and Wales

Year	Observed	Expected	SMR
1951	48	37	130
1961	96	51	160
1971	45	22	235

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ACKNOWLEDGMENTS

This research was supported in part by the Occupational and Environmental Health Center Grant ES00002 (NIEHS).

Cholera and Poverty—1832

"It may be said, no doubt, that the cholera epidemic of 1832, coming as it did after a long period during which there was every reason to believe that such plagues had vanished forever, was an exceptional disaster. 'Very severe mortality has become rare,' the municipal statistician wrote, somewhat prematurely, in introducing the second volume of the Recherches statistiques concernant Paris *in 1823. Yet should we not rather regard this abnormal mortality simply as an aggravated form of the normal one, a solemn and monstrous experience on the ordinary mortality in a more visible and incontrovertible shape? The real cause of both was the same. It was not the infection gradually creeping up from the Ganges delta, but the age-old accumulation of poverty, the ancient foundation of malnutrition, fatigue, and exhaustion, breeding ground at all times for the heaviest mortality among the poorest of the poor. It fostered the epidemic, it is true, but only as an accessory and subsidiary factor; and it is noteworthy that the epidemic took no hold on the areas of France, even urban areas, where poverty and concurrently the normal mortality were least severe."*

Chevalier, Louis: *Laboring Classes and Dangerous Classes* In: Paris During the First Half of the Nineteenth Century.

Translated from the French by Frank Jellinek, New York, Howard Fertig, 1973. p. 13.

(contributed by Dr. Wm M Schmidt)