

U. S. ATLAS OF MORTALITY
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Since early in this century the Division of Vital Statistics (DVS) of the National Center for Health Statistics (NCHS), or its predecessor offices, has chronicled deaths in this country by publishing annual volumes on United States mortality. In the 1950's, NCHS was formed by combining DVS with the national health surveys which were begun at that time to systematically assess morbidity levels as well. In the 20-year history over 20 national data systems have now evolved to measure various aspects of national health including population trends, health services and facilities, illness, and death.

NCHS is legislatively mandated to "collect and analyze" data in these diverse areas. In fulfilling this mandate the Center has earned an international reputation for collecting, tabulating, and disseminating quality data. However, two major criticisms have been directed to NCHS from various sources in recent years. One is that data release could be more timely. Paradoxically, the other has stressed the need for more in-depth analyses.

One of the more specific and pointed examples of this occurs in a widely circulated 1977 report.¹ One of the major recommendations of this report is that NCHS should provide data in such format, detail, and timeliness that epidemiologic analyses can focus on environmental health problems. This includes analysis of variations in morbidity and mortality by age, race, sex, economic status, time of year, and geographic area in order to detect or obtain evidence pointing toward

environmental effects.

Congress has also become more specific about this matter. Public Law 95-623, enacted November 9 of last year, requests NCHS to produce a plan "for the collection and coordination of statistical and epidemiological data on the effects of the environment on health."

The Center is attempting to respond to these recommendations and mandates to become more active in the field of environmental epidemiology. We are making efforts to better utilize our national health data systems for assessing environmental effects on health.

One of the most promising or exciting such activities is our plan to better "automate" national health monitoring for the United States. It is exciting because although, to our knowledge, no national health statistics reporting system has yet led to the discovery of a disease cause or contributing factors, there have been some tantalizingly close calls.

In England, in the early 1960's, an annual dramatic rise in deaths due to childhood asthma over a period of years was eventually attributed to the use of a type of pressurized bronchodilator. The bronchodilator was banned and, fortunately, the death rate declined. A more rapid "on-line" display and analysis of time trends might well have spotted this trend before clinicians and epidemiologists noted and verified this association.

In this country, the Environmental Epidemiology Branch of the National Cancer Institute has led the way in demonstrating how innovative geographic displays can generate epidemiologic leads in the search for new contributors to mortality, particularly environmental factors. As Tom Mason from that group has noted, these atlases have led to many field studies which have considerable promise to add to our knowledge about environmentally induced cancer.

This important new epidemiologic activity has prompted NCHS to take steps to begin developing methods which would, in a similar manner using computer produced maps, display age-adjusted and age-specific death rates for major diseases. Simple dot maps of cases (not rates) are contemplated for rarer diseases. There is

no technological reason why we can't develop such a system so that, shortly after the annual mortality data tape is produced by DVS, such a display can be generated. In addition, time-trends by region would be examined. Unusually young deaths should also be noted. Hopefully, a system can be constructed which would detect unusual patterns or leads for field study follow-up by epidemiologists in appropriate Federal agencies. One must be careful, of course, not to unduly alarm the public during this process.

As a first step, we are in the process of producing a mortality atlas for all major diseases which should be published later this year. As might be expected, we have already received criticisms for producing such a display.

Aren't there too many errors in the recording of primary cause on death certificates? Also, couldn't regional "fashions" in listed causes be a major contributor to regional differences, thus obscuring environmental factors? Our view is that this is undoubtedly true for some diseases. However, since the data are collected and made public anyway, a clearer presentation would be helpful in assessment of this and other "quality control" types of problems in the data. The cancer atlases have already shown that interesting patterns may still be revealed amongst such noise. It should be noted that NCHS has used the Automated Classification of Medical Entities (ACME) system since 1968. This technique of handling multiple or secondary listed causes "corrects," in a nationally uniform manner, any illogically written causal sequences.

Other well known issues which must always be resolved in such mappings relate to years covered, size of geographic unit, choice of disease classifications and groupings. A major question is what constitutes a reliable rate, and should unreliable rates (those based on small numbers) be displayed at all?

The first three variables epidemiologists would ordinarily "control for" in such mapping projects are age, race, and sex. Our approach is the same as Cancer's, to construct separate maps for the four groups--white males, white females, non-white males, and non-white females--and, as stated, account for age by standard adjustment procedures using census values

for each county. Due to the relationship between poverty level and health, it might seem reasonable to similarly adjust for this factor. However, such an adjustment could well reduce the apparent geographic discrepancies which are due to direct environmental causes. This would certainly be the case for many variables correlated with income level. Thus, no such adjustment has been made. The important association between income and illness will continue to be investigated, of course, and the atlas should be of assistance to researchers in this particular activity. In fact, one important set of studies resulting from such maps may be of geographic associations between certain diseases and medical care availability.

These data relate only to primary cause of death. Of significant monitoring potential is the use of underlying causes, something DVS does code but as yet has not been tapped on a national basis.

I will present a few selected slides of maps from the forthcoming atlas. The diseases covered, which display rather marked geographic differentials, are: Tuberculosis of the respiratory system, enteritis and diarrheal diseases, septicemia, and malignant neoplasms of the digestive organs.

The quality of these computer produced maps, displaying gradations of mortality rates in the 510 State Economic Areas for the United States, are such that further development of this technique for use with Center data seems inevitable. We welcome and appreciate criticisms as we attempt to intelligently utilize the technology. We believe the improved potential to establish a routine "quality control" display of health problems mandates such an effort.

¹United States. National Committee on Vital and Health Statistics. Statistics needed to ascertain the effects of the environment on health. Vital and health statistics: Series 4, Documents & committee reports; no. 20 (DHEW publication; no. (HRA) 77-1457). U.S. Government Printing Office, July, 1977.