

44099

CHAPTER 8

Compilation and Analysis of Mortality Data¹

Robert J. Armstrong

It has been estimated that the certification of perhaps one-fifth of all deaths comes within the jurisdiction of the medical-legal officers of the United States. In many jurisdictions the medical-legal officer is elected to office; he may or may not be a physician. The proper completion of death certificates by the medical-legal officer is necessary for proper functioning of his office. The responsibility for the proper certification lies in the hands of the medical-legal officer of the given territorial jurisdiction. This person is usually the coroner, less frequently the medical examiner or medical examiner-coroner, depending upon the laws of that particular jurisdiction. Statutes spell out the responsibilities of the medical-legal officer as to the types of deaths he must investigate. Because these laws vary markedly, a given death may be subject to medical-legal investigation in one jurisdiction, but in another area a similar death might properly be certified by an authorized physician or other practitioner. Despite the variation in case selection from one jurisdiction to another, each death must be properly certified.

Not all of the deaths investigated by the medical-legal officer are due to violence, that is, from homicide, suicide, or accident. Probably the majority are due to natural disease processes where the fatal disease has struck without warning or where the victim was unknown to a physician. The certification of deaths thus occupies a significant percentage of the professional time of the medical-legal officer.

¹Pages 65-68 of this chapter have been taken from the *Medical Examiners' and Coroners' Handbook on Death and Fetal Death Registration*, PHS Pub. No. 593D. National Center for Health Statistics. Washington: U.S. Government Printing Office, 1971, pp. 1-10.

THE STANDARD CERTIFICATES OF DEATH

Each State is responsible for the content and format of its own death certificate. For the purpose of developing uniform national statistics, the National Center for Health Statistics, Public Health Service, United States Department of Health, Education, and Welfare, prepared Standard Certificates, which serve as models for the use of the States.² These Standard Certificates are revised periodically in consultation with State health officers and registrars, Federal agencies concerned with vital statistics, national, State, and county medical societies, and other groups working in the fields of public health, social welfare, demography, and insurance. The revision procedure assures careful evaluation of each item in terms of its current and future usefulness for registration, identification, legal, medical, and research purposes.

Because of the differences in State forms, the National Center for Health Statistics has prepared three different model death certificates to serve as guides for the different jurisdictions and their varying established systems for the investigation of deaths in the public interest. Two of these certificates are designed as a pair to be used in any jurisdiction where medical practitioners will use one and medical-legal officers will use the other. These certificates are designated as "Physician's" form and "Medical Examiner or Coroner's" form respectively. A third death certificate type designated "Physician, Medical Examiner or Coroner's" form is designed for use by those jurisdictions where only one death certificate form is used both for those deaths that a

²See appendix F.

physician may certify and for deaths falling into the medical-legal investigative system.

THE IMPORTANCE OF DEATH CERTIFICATION

The proper completion of death certificates is essential to the efficient working of a medical-legal investigative system. Basically the death certificate, in addition to its legal uses, is designed to provide pertinent vital statistical information. The statistical uses to which the death certificate can be placed are numerous. These include the surveillance of the causes of death, and the efforts to relate these to occupation, environmental hazard, etc. Other facets of the epidemiology of disease are also monitored by death certificate review.

There is an increasing use of the death certificate in the proper processing and settlement of insurance claims. In addition, the death certificate is not infrequently accepted as a point of departure for the entry of the prosecuting attorney's office in cases demanding public investigation and also by the Workmen's Compensation Courts or Commissions for the proper handling of claims. Further, the death certificate serves as a method of control over the orderly disposal of dead bodies.

All of these reasons are basic to the proper handling of cases investigated for the overall interest of the public. Thus, it may be seen that modern public health activities, the day-to-day activities of the public prosecutor, establishment or termination of certain benefits to relatives of the deceased, and the conduct of the ever-enlarging insurance industry, all depend upon the proper certification of death by medical-legal officers.

THE MEDICAL EXAMINER OR CORONER'S RESPONSIBILITY IN DEATH REGISTRATION

The medical examiner or coroner's principal responsibility in death registration is to complete the medical part of the death certificate. Before delivering the death certificate to the funeral director he may add some personal items for proper identification, such as name, residence, race, and sex. Under certain cir-

cumstances and in some jurisdictions, he may provide all the information, medical and personal, required on the certificate.

The funeral director, or other person in charge of interment, will otherwise complete those parts of the death certificate that call for personal information about the deceased. He is also responsible for filing the certificate with the local registrar of the district in which the death occurred. Each State prescribes the time within which the death certificate must be filed with the local registrar. In general, the duties of the medical examiner or coroner are to:

1. Complete and sign the medical certification section of the death certificate and enter the date of death.
2. Deliver the signed death certificate to the funeral director promptly so that the funeral director can file it with the local registrar within the prescribed time.
 - a. When the cause of death cannot be determined within the statutory time limit, a death certificate should be filed with the notation that the report of the cause of death is "deferred pending further investigation." A permit to authorize disposal or removal of the body can then be issued by the registrar.
 - b. If there are other reasons for a delay in completing the medical portion of the certificate, the local registrar should be given written notice of the reason for the delay.
 - c. As soon as the cause of death is determined, the medical-legal officer should file a supplemental report with the local registrar, or correct or amend the death certificate, according to State and local regulations regarding this procedure.
3. Cooperate with the local or State registrar by replying promptly to his queries concerning any entries on the medical certification.

THE CONFIDENTIAL NATURE OF VITAL RECORDS

Because of the many legal, public health, research, and social welfare uses of vital records, each certificate should be prepared as

completely and accurately as possible. Some items of information are personal and may be embarrassing or stigmatizing to the individual or others. Vital statistics registration officials, the legal custodians of these records, are aware of this fact and provide a number of safeguards to protect this information from unwarranted or indiscriminate disclosure. State law and supporting regulations specify who may obtain copies of individual records and the uses that may be made of them.

Hospitals, physicians, and medical-legal officers are assured that every legal and administrative measure possible is employed to protect individuals from unwarranted disclosure of personal information. However, by their very nature, death certificates prepared by medical-legal officers lose much of their confidential nature when introduced as evidence in a court of law or when used for law enforcement purposes.

MEDICAL CERTIFICATION

Certifying the Cause of Death

As noted earlier, the primary responsibility of the medical-legal officer in death registration is to complete the medical part of the death certificate. The medical certification includes information on the cause of death and related factors; the place of death; and the date and time of the legal pronouncement of death.

The proper completion of this section of the certificate is of utmost importance to the efficient working of a medical-legal investigative system. In addition, this system provides the necessary facts for the construction of mortality tabulations. Much health research and many programs designed to reduce environmental hazards are based upon such tabulations.

The medical certification form follows the international form of the medical certificate recommended by the World Health Assembly and adopted for use in the United States.

An important feature of this certificate form is its emphasis on the underlying cause of death as determined by the certifying officer. The World Health Organization recommended in 1949 that its signatory

nations use the underlying cause of death in their basic mortality tabulations. In accordance with this concept, the certifier has both the responsibility and the opportunity to make mortality statistics reflect the best medical opinion concerning causes of death.

Methods of Certification

The form of the medical certification on the Standard Certificate of Death is designed to facilitate reporting of the underlying cause of death and to obtain the necessary information on the pathological sequence of events leading to death. It consists of two parts, the first relating to the sequence of events leading to death and the second to other significant conditions that contributed to the death. In addition, there are questions relating to autopsy, accident, and injury.

In certifying causes of death, the disease or condition should be reported in specific terms. It is recommended that the terms listed in the *Standard Nomenclature of Diseases and Operations* (American Medical Association 1952) be used. It should also be noted that causes of death are coded for statistical purposes in vital statistics offices according to the Eighth Revision of the *International Classification of Diseases, Adapted* (ICDA) for use in the United States (National Center for Health Statistics 1967).

Cause of Death

A cause of death is a disease, abnormality, injury, or poisoning that contributed directly or indirectly to death. A death often results from the combined effect of two or more diseases. These diseases may be completely unrelated, arising independently of each other; or they may be causally related to each other, that is, one disease may lead to another which in turn leads to a third condition, etc. The medical certification portion of the Standard Certificate of Death is designed to elicit the opinion of the certifying medical-legal officer as to the immediate cause, the antecedent causes, and the contributing causes of death.

The cause of death section for a medical-legal case requires careful consideration by the medical-legal officer because special problems may be involved. The medical-legal case

may depend upon toxicologic examination for certification of the ultimate cause of death, a situation not often encountered in ordinary medical practice. The medical-legal officer occasionally must deal with death certifications where the cause of death is not clear, even after autopsy and toxicologic examination. Despite special problems which the medical-legal officer may encounter in dealing with cause of death, it is important that the medical certification be as accurate and complete as circumstances will allow. Therefore the cause of death statement should be filled in as completely and as accurately as possible, and the pertinent diseases or conditions antecedent to the immediate cause of death should be fully reported. This will be particularly important for the tabulation of multiple diagnoses based on all conditions reported on the death certificate. Also, information on the causal and pathological sequence of events leading to death is useful for epidemiologic and other studies.

The Certifying Statement

The medical-legal officer certifies that "on the basis of the examination of the body and/or the investigation, in my opinion, death occurred on the date and due to the cause(s) stated." The term, "in my opinion," is included because it is recognized that in medical-legal cases it is not always possible to make precise determination of the date and the cause(s) of death. The date may be obscure in the case of bodies found some time after death occurred, and there will be cases in which the relationship between the existing diseases or the sequence in which diseases or injuries occurred is not clear.

However, except in unusual circumstances the medical-legal officer is in a better position than any other individual to make a judgment as to which of the conditions led directly to death and to state the antecedent conditions, if any, which gave rise to this cause. Qualifying phrases may be used to reflect uncertainty in case of real doubt as to which of these conditions led directly to death. Occasionally, the knowledge of the case will be so meager that no better alternative is possible except to specify "unknown."

SOURCE OF DATA

All mortality data, including data on drug-related deaths, are compiled from death certificates that are filed by law with State and city health departments. Until very recently all of these reporting areas forwarded copies of all death certificates filed in their jurisdiction to the National Center for Health Statistics (NCHS). There is a growing, although still small, number of States that send some mortality data to NCHS on magnetic tape. The source of the data on the tapes is the same, however—death certificates. Since all national data on drug-induced and drug-related deaths are based on information provided by medical examiners, coroners, physicians, and funeral directors on death certificates, the type of information available and its quality can be no better than that recorded on the certificates.

CODING OF DATA AND THEIR AVAILABILITY

Once received, data are coded according to the Eighth Revision of the ICDA using rules provided by the World Health Organization and supplementary rules developed by NCHS. This list of diseases, injuries, and causes of death, and the associated coding rules, are revised every 10 years. The Eighth Revision went into effect in 1968 and the Ninth is expected to supersede it in 1978. Regardless of what revision has been in effect, the usual method of coding deaths has resulted in the assignment of each death to a single cause called the underlying cause of death. This cause could be a natural one or an external one such as accident, suicide, or homicide. This method worked well through the first half of this century when many deaths were due to infectious diseases. With the advent of antibiotics during and immediately after World War II the number of deaths caused by infectious diseases fell rapidly, and there was a concomitant increase in deaths caused by chronic conditions, especially combinations of chronic conditions. Assigning these deaths to a single cause became more difficult and less meaningful. The NCHS has developed

coding rules and tabulations that are based on all medical information reported on the certificate rather than on just one.

Drug-induced and drug-related deaths fall into many different categories of the Eighth Revision of the ICDA depending on the circumstances of the death, the drug involved, and the amount of detail concerning the death that is reported on the death certificate. The categories most frequently equated with drug-induced and drug-related deaths are shown in appendix E. Underlying cause data are available for these categories for the years 1968-1972, inclusive.

LIMITATIONS OF DATA

To be of statistical value, it is important that all deaths be registered. While the completeness of death registration has never been tested, it is assumed to be at least as complete as birth registration. The latest test of the completion of birth registration showed that they are slightly above 99 percent completely reported.

It is also important that all items on the certificate be as completely filled out as possible. Missing data are difficult to handle statistically and may completely invalidate the data if the percentage becomes too large. Item completeness is generally quite high; but for small groups of deaths, such as drug-related ones, the amount of missing data is unknown. Since the total number of drug-related deaths is small, any missing data constitute a relatively large percentage of the total and are therefore more serious than missing data in the leading causes of death.

Accuracy of the data reported is also important. Inaccurate data have the same effect on statistics as completely missing data, and therefore as much care needs to be exercised to avoid inaccurate reporting. Care should also be taken to ensure that the age and sex information are consistent with other data.

Each death should be stated to be due to one of the following causes:

1. Natural
2. Accidental
3. Suicide

4. Homicide
5. Undetermined
6. Unknown
7. Pending (later to be changed to one of the above six)

When the exact cause of death is undetermined, as much information should be provided as possible. For example, the uncertainty may be of the following types:

1. Accident-suicide
2. Accident-homicide
3. Suicide-homicide
4. Known to be violent but not known whether accident-suicide-homicide

Indications such as those shown above provide much more information than merely "undetermined."

All data on drug-induced and drug-related deaths must be carefully scrutinized to determine the definitions being used. Direct drug deaths may be limited to those of addicts who have overdosed or may include nonaddicts who die from accidental overdoses while experimenting with the drug.

Deaths that are indirectly related to drug abuse are much harder to identify in death statistics. Some natural deaths, such as those from serum hepatitis, may be drug related. Some accidents, automobile and other, may result because the decedent was under the influence of drugs at the time of the accident. A person under the influence of drugs may accidentally kill persons who have never used drugs. He may also kill such persons while committing a crime, and the death may be recorded as a homicide. The addict may himself be killed while committing a crime. This would also be recorded as a homicide. Finally, while under the influence of drugs an addict may kill himself, and the death may be called a suicide.

Some of these deaths that are indirectly related to drug abuse are easier to determine than others. Some are impossible for the medical examiner to determine—for example, whether the unapprehended killer of a homicide victim was under the influence of drugs. In any case, regardless of the circumstances, mortality statistics will never be any better than the information reported on death certificates.

REFERENCES

American Medical Association. 1952. *Standard Nomenclature of Diseases and Operations*, 4th ed. R.J. Plunkett and A.C. Hayden, eds. New York: Blakiston.

National Center for Health Statistics. 1967. *Eighth Revision International Classification of Diseases, Adapted for Use in the United States*, Vols. I, II. PHS Pub. No. 1693. Public Health Service. Washington: U.S. Government Printing Office.

~~11/1/2011~~

CHAPTER 9

The Medical Examiner as an Expert Witness

Joseph H. Davis, M.D.

Litigation arising from a drug-related death is relatively infrequent in proportion to arrests and court actions for possession or sale of illicit drugs. However, drug-related death litigation may involve one or more of the following questions as central or ancillary issues:

1. Was the death due to the physiological action of the drug upon the central nervous system or were postural, alcoholic, or natural disease factors interrelated?
2. Was the drug a judgment-altering factor which resulted in an automobile crash, other accident, or homicidal assault?
3. Was the death suicidal or accidental in nature? Are there insurance problems which hinge upon this question?
4. Did the drug usage play a role in competency to sign contracts, declare a will, or otherwise affect responsibility?

A medical examiner investigation consists of two components: correlation and anticipation. Correlation of circumstantial, witness, autopsy, and laboratory evidence is necessary as the case unfolds. Equally important is to anticipate what future questions, litigation or otherwise, may logically arise. Answers to these questions should be prepared long before the questions are posed. The initial step for the medical examiner as an expert witness is to prepare for the future while investigating the present; this is the difference between an excellent and a poor medical death investigative system.

The medical examiner is not expected to be an advocate. However, he should know in advance what legal problems have arisen and be prepared to assist the defendant and the plaintiff or prosecutor on an equal basis. Accordingly, there are three levels of interaction between advocates and the medical

expert witness: conference, deposition, and trial.

Some medical examiners, perhaps suffering from subconscious feelings of insecurity or inadequacy, promulgate the belief that the work product records are sacrosanct and may be seen only by a limited few and then only after a subpoena has been legally served. Fortunately this erroneous concept is being swept away by public record laws which would put such an official in jeopardy of a misdemeanor charge should he choose to ignore a request for review of a record by any citizen.¹ Therefore the medical examiner should arrange his file in a logical manner with appropriate grouping of autopsy, laboratory, and historical data so as to be able to open the file for review during pretrial informal conferences or pretrial deposition. In the former there is usually an advocate from only one side of the issue. The witness is not under oath and may volunteer information, freely discuss alternative interpretations, and point the way for further investigation by the advocate. The medical examiner may lay out the favorable and then the unfavorable aspects of the case for the advocate. Should the opposing counsel desire an informal conference, the same approach prevails. Appropriate excerpts from recent medical literature may

¹Chapter 119, Florida Statutes, Public Records, provides that all governmental records, unless specifically excepted by statute, must be made available for review by any citizen. In the Office of the Medical Examiner of Dade County, Miami, Florida, all records are considered public except for homicides which are still within the investigative phase. Once the accusatory phase is reached, the record reverts to being public. This procedure has been in effect for approximately 2 years. There has not been an influx of curiosity seekers and no apparent abuses. Quite obviously there is nothing to fear from such a policy.

be made available to the advocate, and, in some instances, the medical examiner may profit by the literature research carried out by the attorney. During these conferences the medical examiner should become intimately familiar with the issues and may assist both sides in the preparation of hypothetical questions which could be posed in formal deposition or trial.

The deposition, if such takes place, should be more formal in the tone of questions and replies, for often the transcription is read into the record as a substitute for the personal appearance of the medical examiner at the final trial. If the medical examiner participates in the trial phase, there is the added factor that his demeanor, appearance of candor, and competence are being displayed to the judge and jury. Hopefully by now the advocates would be sufficiently prepared to ask proper questions within the competence of the witness to answer, and, when answered, would furnish a solid building block of evidence.

There may arise a problem for the medical witness at the trial phase. The courts vary widely in what is allowed the expert witness even within a single State jurisdiction. In one circuit the medical examiner witness, in an insurance case, may not proffer his opinion as to suicide or accidental classification of death. Yet another circuit in the same State may extend this prerogative to the expert witness. In the former, such an expression would be considered an invasion of the province of the jury and subject the proceedings to mistrial or reversal. In the latter, not so. It is fallacious to assume that the law is universal in application as far as specifics are concerned. Accordingly a witness needs to inquire in advance as to what is considered proper opinion that may be expressed within the particular jurisdiction.

There are certain mechanical steps which may assist the medical examiner to become a better expert witness:

1. Arrange the case file in logical groupings so that data may be quickly reviewed.
2. Bring together the other witnesses from the same medical examiner's office, toxicologists, and investigators, and decide who should interpret what evidence. Otherwise, there may be confusion over records, or worse, a physician's opinion may be misconstrued as that of a chemist or vice versa. Make sure that all participants are fully apprised of the issues and have access to pertinent scientific review and review of similar local experience.
3. At pretrial depositions where the advocates may desire copies of the entire file, arrange for the court reporter to make the copies and return the original to the medical examiner. Large firms of attorneys have been known to lose subpoenaed records in whole or in part but court reporters rarely are lax in this regard.
4. Bring appropriate true copies of work records and photographs to court along with the file to be introduced in lieu of the original. Otherwise, one may never see the original again despite assurances that the evidence will be returned by the court.

By being thus prepared in advance, the medical witness is in the best position to assist the cause of truth and justice. If the witness is to be qualified as an expert and capable therefore of expressing opinion, this witness should enter the court with full knowledge of the case at hand. Full knowledge implies that he should be assured that his evidence shall not be used to prevent a complete and accurate interpretation of the facts. Nor should the witness knowingly allow his evidence to be used to misconstrue the whole truth of the case. It may be legally correct, in the eyes of attorneys, for his evidence to be used to confuse the issues. Such unethical games are not proper for the ethical expert medical witness.

END