THE IMPACT OF CAUSE-OF-DEATH QUERYING
Although the industrialized countries have achieved virtually complete registration of deaths, the need remains to improve the quality of reporting on death certificates, particularly in reported information on causes of death. Good information on causes of death is considered essential as much of our knowledge on mortality patterns in these countries is based on the causes of death reported on death certificates.

One technique for improving causes of death data is by querying, which means going back to the certifying physician for additional information regarding the medical certification of death. This Technical Paper looks at the impact of querying. The paper was originally prepared for the Workshop on Improving Cause-of-Death Statistics, October 15-17, 1989, in Virginia Beach, Virginia, U.S.A. The paper includes results of a State survey conducted by the Association for Vital Records and Health Statistics and compiled by the Registration Methods Branch, National Center for Health Statistics (NCHS), U.S.A.

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THE IMPACT OF CAUSE-OF-DEATH QUERYING

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Cause-of-death querying can be one of the more effective means for improving the quality of cause-of-death information on the death certificate, as indicated in the study by Hopkins and others (1,2). Querying means going back to the certifying physician for additional information regarding the medical certification of death. Why would one go back to the physician after a death certificate has been filed? There are several reasons: (1) illegible entries, (2) imprecise or non-specific entries, (3) entries that have serious public health implications, and (4) quality control. Examples of imprecise entries are a cause of death attributed to "natural causes" or respiratory arrest. A non-specific entry is, for example, a death attributed to cancer without indication of primary site. An entry of sufficient public health concern to be immediately queried is a communicable disease such as cholera, or a radiation death.

The rationale for querying cause of death from the death certificate is described in the National Center for Health Statistics' (NCHS) instruction manual for cause-of-death querying (3) as follows:

"For many years, vital statistics offices have utilized programs to query death certificates as a means of improving the completeness and accuracy of mortality statistics. It has long been recognized that querying is a necessary part of the registration process and that particular attention must be paid to the correctness of the medical certification portion of the death record.

The purpose of querying should be two-fold: (1) to obtain the information needed to properly classify the cause of death, and (2) to educate the certifier about the proper method of completing future medical certifications."

Query procedures are also important to ensure that the information on the death certificate is adequate for administrative and legal uses. For example, in medico-legal cases involving trauma, it is important to have accurate information on the time, place, and manner of death.

It is very important that all physicians, medical examiners, or coroners who may be certifying deaths be properly oriented to the principles of medical certification and the importance of accuracy and to recognize that cause-of-death certification constitutes "a medical-legal opinion, not necessarily an absolute fact, since it is not always possible to make a precise determination of interacting diseases or conditions. Thus, "to the best of my knowledge" is included in the certification statement of the death certificate; since the certifier is considered to be in a better position than anyone else to make a judgement as to the chain of events leading to death, but he/she cannot always be presumed to have a clear cut "absolute answer"(3)."

Levels of Querying

Under the vital statistics agreement between NCHS and the States, all vital statistics registration areas are encouraged to operate cause-of-death query programs effective with deaths occurring in 1989. Guidelines for Cause-of-death querying are made available by NCHS to the States in the form of an NCHS instruction manual(3). Several levels of querying have been developed, in recognition that State resources for this activity vary widely. The six priority levels range from Levels 1 and 2, which should always be queried as a minimum, to Level 6, which is an optional category. Some States have expanded the range of conditions covered by their querying programs including, for example, cause-of-death entries suggestive of AIDS when HIV infection or terms synonymous with AIDS are not explicitly reported as the cause of death.
Priority Level 1 includes "pending cases," that is a death certificate with an incomplete or unknown cause pending the results of an autopsy or other investigation. If a complete medical certification is not furnished by the physician, medical examiner/coroner within a reasonable period (usually about 30 days), the record should be queried. Also included are "rare" causes, which are mainly infectious diseases, rare in this country, that constitute public health threats including leprosy, plague, and smallpox. Also included are querying neoplasms for primary site and/or histological type when not reported. There are also a large number of conditions that would rarely, if ever, cause death by themselves; and when symptoms, signs, and ill-defined conditions are reported without a specific cause (coma, shock, cardiac failure, natural causes, old age, senility). Also at Level 1 are included queries for the reason for surgery if not clearly reported, and when only the nature of injury is reported without mention an external cause such as a motor vehicle accident. Finally, this level of query includes questionable formats making selection of underlying cause of death difficult. An implausible sequence of conditions is an example.

Level 2 includes conditions not usually considered as the underlying cause of death, such as peritonitis, which is usually caused by another condition such as a ruptured organ (appendix, peptic ulcer, etc.). Level 3 provides more detailed information that enables a more precise classification of cause of death; for example, chronic liver disease should be specified as alcoholic cirrhosis, biliary cirrhosis, chronic hepatitis, etc. Both Level 4 and Level 5 are for providing more detailed information regarding the site or location of a stated condition, such as specifying for an embolism whether it occurred in the brain, lung, or coronary arteries. Level 6, which is the most thorough level recommended, again emphasizes the need for obtaining more explicit statements in order to minimize the use of certain assumptions that are made for classification such as assuming that tuberculosis is of the lung unless otherwise specified.

Impact of Querying

The impact of querying on reported cause of death can be substantial, as indicated in a recent report of the Oregon cause-of-death querying program(1). There, about one of ten records are queried annually. To these queries, physician response rates are very high, about 95 percent. As a result of querying, about half of the cause-of-death entries are changed, mainly to increase specificity, but sometimes to modify the cause of death much more substantially, resulting in some cases in a major change in cause-of-death classification.

The benefits of querying can be several: (1) improving the quality of the reported data, such as greater specificity and accuracy, (2) providing feedback to the certifying physician by letting him or her know that the reported information is being scrutinized and will be used for health and research purpose, and (3) by giving guidance to the physician on properly completing the cause-of-death certification.

An important lesson from the Oregon experience is the training impact of querying. Over time, it was noted that smaller percentages of the records need to be queried, suggesting that physicians learn what information is sought on the death certificate, and are providing it.

Survey on State Querying Practices

So that attendees at the Workshop for Improving Cause-of-Death Statistics would be better informed of the activities States are currently engaged in and how the death registration process may differ from State to State, the Association for Vital Records and Health Statistics (AVRHS) sent out a survey in April 1989 to the State vital registration and statistics executives in 54 registration areas (the 50 States, the District of Columbia, New York City, Puerto Rico and the Virgin Islands). The respondents were asked to provide information about the death registration process in their area, especially with regard to those activities that relate to improving the quality of cause-of-death data. The following information on querying cause of death is from the responses for 46 of the areas.

Results of the survey indicate that while many States have query programs, there is wide variation in the percent of records queried. Some States query very few records; others a substantial proportion of the death records. Almost one-third of the 38 areas responding to the question queried less than three percent of the death records. About half the areas queried fewer than 10 percent; and nine of ten areas queried less than 15 percent of the records. About one-fourth of the areas queried between 10 and 14 percent. Two States reported querying about one-third of the death certificates.
It can be expected that the more timely the query, that is, the briefer the interval between
the physician's report of cause of death on the death certificate and the follow-up query, the more
likely a timely and accurate reply. A long delay can result in recall difficulty or in problems of
locating medical records relevant to the death. Information on the time interval between the date
of death and date of query was reported for 38 registration areas. The interval varied greatly
among the areas. About ten percent of the areas queried within ten days; about half within about a
month, and 90 percent within three months. For three areas, the interval was four months; and for
one, over six months. The most frequent interval, about a month, characterized nine registration
areas.

Most of the States obtain additional information on cause of death as a result of the query,
according to information from the 37 areas. About half the States received additional information
on 80 percent or more of their queries. About eight of ten States received additional information
for at least half of the inquiries. The yield on querying was low for only a few areas; only six of
the 37 received additional information on less that 10 percent of queries.

Queries can be carried out by telephone or mail. The most common method is by mail. About
nine of ten States used mail. Only three areas relied mainly on the telephone; these areas include
a city and two sparsely-settled Southwestern States.

The information from queries resulting in changes in cause of death can be added to the death
certificate, as an amendment. The Survey shows this happens about two-thirds of the time; for
the remaining deaths, the additional cause-of-death information is only used for statistical pur-
poses, and does not appear on an amended death certificate filed with the State.

The survey reveals that querying is an essential process for obtaining additional information
on the death certificate; physicians rarely provide additional information on a voluntary basis.
For over one-third of the areas, there were no cases of additional information being supplied
voluntarily by physicians, without being queried. For another one-third, there were rare instances
of voluntary changes. The remaining States reported some experience with voluntary submissions,
but this was the exception rather than the rule.

Obtaining additional cause-of-death information was more difficult in some settings and from
some types of physicians than others. From the survey, responses were received on this question
from 32 areas. The most frequent concerns were in dealing with coroners; four out of ten areas
identified coroners as a problem in getting responses to cause-of-death queries. Nursing homes were
identified almost as frequently. Also singled out separately by about 15 percent of the areas were
VA hospitals, facilities serving Native Americans (including hospitals of the Indian Health Service),
and military facilities. In addition, three respondents to the survey stated that querying was diffi-
cult when certifiers were student doctors and interns at teaching hospitals who move when there is
no attending physician. Others who were identified as difficult to query were emergency room doc-
tors, neurologists, and physicians who "moonlight" at several hospitals.

A total of 43 areas responded to a question on ways of spotting problems with cause-of-death
information. About three-quarters of the areas found problems through editing procedures; half
through feedback from NCHS quality control programs; about one-quarter from user feedback; and half
from the statistical staff of the State. Six States reported that nosologists normally identified
problems. One State reported using autopsy findings to identify problems with cause-of-death data.

Directed Querying and Random Querying

Cause-of-death querying may be either directed or random. The approach recommended as a mini-
umum to the States by NCHS is a directed one, with the goal of correcting records that are likely to
require modification. Many other records with possible problems cannot be identified through a
directed approach, since their entries fall outside the querying guidelines. While their entries
may appear to be acceptable for further processing, an inquiry to the medical certifier could result
in an improved or a changed statement of cause of death. The need for such changes can only be
identified through a random querying program. Such a program was operated by NCHS some twenty years
ago, but was discontinued because of resource considerations. Improvements in the quality of cause-
of-death reporting on the death certificate can be enhanced by a combination of directed and random
cause-of-death querying.
While querying is of the more effective tools for improving the quality of cause-of-death information, it is costly; it entails selecting death records on either a directed or random basis, or both; writing to the certifying physicians; following up initial mailings with additional mailings or telephone calls; receiving the additional information; and processing the additional information through changes in the filed death record and through statistical reporting to NCHS. NCHS shares in the cost of querying at Priority Level 2. Better cause-of-death reporting would result from high levels of querying as practiced in a number of States; but implementing higher levels of querying would entail higher costs.

Current Extent of Querying

A 1987 survey revealed wide variation in the extent and nature of cause-of-death querying among the States (4). About half the States did not query at the minimum priority level; about 20 percent queried at Level 1; about the same proportion at Levels 2 and 3, and the remainder at higher levels. The more recent AVRHS survey, carried out in 1989, suggests the beginnings of a broader and more uniform application of querying. In the 1989 Survey, a total of 41 areas provided examples of information queried; the examples indicate that Level 2 querying is now being broadly implemented as encouraged under the new Vital statistics Cooperative Agreement.

As part of their survey response, several States also provided detailed lists of queried conditions used by nosologists, or used as computer flags for automated inquiries of physicians for additional information. Many States carry out intensive querying on the circumstances of death associated with trauma, such as the nature and means of poisoning, how trauma was sustained, and whether the person involved in a motor vehicle death was a driver, passenger, pedestrian. Examples of lists of queried conditions for two States are shown in Appendix I. Some States add conditions not listed by NCHS (Appendix II), as well as terms suggestive of AIDS when AIDS is not mentioned on the death certificate (Appendix III).

Is Querying Sufficient?

Is querying a sufficient way to obtain complete and accurate information on death certificates? And is it a sufficient way to train medical certifiers on proper cause-of-death certification? In response to the first question, querying is not sufficient if only a directed approach is used, since directed querying detects only probable errors that constitute a relative small proportion of all death certificates. A random approach is a useful complement to the directed approach; but it too is likely to affect only a fraction of the records that need to be changed. Nevertheless, querying is essential to addressing the most serious problems of quality and completeness in reports of cause of death.

As an educational mechanism, querying can be very useful; but, again, it is not sufficient to ensure that many physicians are reached, and that those who are are reached most effectively. The limitations of querying as a training tool is described well by one of the survey respondents:

"The query system is very limited for training, because only a small percentage of all certificates can be queried. The 75-100 queries our Division sends out each month is actually only a small fraction of the certificates that could "use" more complete information. There are two other limitations with using queries for training; they are sent after the certificate has been completed and submitted, and they are only sent for detectable errors.

Invitations to speak in front of certifiers can be helpful but are often accompanied by short, strict time limits that preclude any detailed instructions or answering many questions. Also, attendance at the two coroners' meetings I was invited to was not mandatory, and less than a fourth of the States's coroners were present at either meeting.

Submitting articles to coroners' newsletters or local medical journals can be useful, not only because more certifiers can be reached, but also because they take information more seriously when published in their own profession publications."
Summary and Conclusions

Almost all States query medical certifiers when a death certificate is filed with questionable or incomplete cause-of-death certification. This practice serves to improve the quality of the death certificate and also serves as a training tool as to what is a proper cause-of-death certification.

Records to be queried are normally identified by State nosology staff as they are coding or during initial computer processing. Level 2 querying, which is now encouraged as a minimum, calls for querying such entries as cancer without indication of primary site, symptoms and ill-defined conditions, incomplete injury and surgery information, rare conditions, and improbable sequences.

The percent of records queried by States varies widely from less than five percent to 30 percent. If States move toward Level 2 querying, then it can be expected that the percent queried will move toward 10-20 percent of all records. Almost all queries are sent through the mail, although a few are handled by telephone. Queries are most frequently sent within 30 days of the date of death.

While a few States indicated that the queries resulted in few changes to the cause of death, most States indicated that a very high percent of the queries resulted in information being received to either change or supplement the cause of death originally reported. The majority of the States indicated that the additional information obtained through the query is made part of the death certificate; but for about one-third it is only incorporated into the statistical file.

All States allow certifiers to provide additional information without being queried; however, it appears that few certifiers are aware of this option or choose to exercise it.

As States gain experience with cause-of-death querying programs and as they implement higher levels of querying, there should be observable benefits in the form of better trained medical certifiers and improved cause-of-death statistics.

References


APPENDIX 1. Examples of Conditions Queried in Two States

State 1

1. All neoplasms when unspecified as to nature (malignant, benign, etc.)
2. II1 defined conditions, usually, and especially gangrene
3. Seizures
4. Traumas—when not specified as to how injury occurred
5. Women of childbearing age with conditions that could be cause by pregnancy
6. Hematoma—when not specified as traumatic or nontraumatic and "natural"
   is not enters in #3a and other rules do not apply
7. One term entity—when the condition is of an unspecified nature
8. Other—any other certificate per the coder's judgement including:
   Aspiration
   Cardiac arrest, respiratory arrest, etc.
   Hemorrhage NOS (not otherwise specified)
   GI Hemorrhage
   Pulmonary embolism
   Surgery and therapy when the underlying disease is not specified
   Renal failure
   Hepatic failure
   Patty liver
   Hepatitis NOS (viral or other cause?)
   Hydrocephaly (congenital or other cause)
   Paraplegia/quadriplegia (what disease or trauma?)

Four Main Areas Most Often Questioned:

Seizures/convulsions
Hypo or hyper themia
Cardiac arrest/pulmonary embolism
Neoplasm—not specified benign or malignant
Senility, old age—too many birthdays

State 2 (from query letter forms sent to physicians)

In order to be sure that we assign this death to the disease or condition which you believe to be the underlying cause, please supply the information, if known, indicated in the paragraph(s) marked with red pencil. Please record this information in the space provided below or in the appropriate boxes (item 27) on the copy of the death certificate duplicated above. Please sign (item 22a, below) and mail the reply to the local health department in the county in which the death occurred. A prompt reply will be appreciated.

1. / / CARCINOMA, SARCOMA, MELANOMA, RHABDOSARCOMA, OSTEOGENIC, SARCOMA, etc.—State primary site.
2. / / CELLULITIS, GANGRENE, PERITONITIS, SEPTIC ENDOCARDITIS, SEPTICEMIA, LUNG ABCESS, UREMIC, etc. — State the underlying disease or condition.
3. / / ECLAMPSIA, BACTERIAL OR SEPTIC ENDOCARDITIS, ENDOMETRITIS, NEPHRITIS, PERITONITIS, SEPTICEMIA, UREMIC, etc. — State whether due to pregnancy or childbirth, or to what other cause the condition could be attributed.
4. / / HEART FAILURE, EDEMA OF LUNGS, CONVULSIONS, UREMIC, etc. — Alone, these terms are insufficient. Please state the underlying cause.
5. / / INTESTINAL OBSTRUCTION — Specify the cause of the obstruction and, if due to malignancy, the exact site or specify organ involved.
6. / / OPERATION — What initial disease, condition, or injury necessitated the operation?
7. / / COMPLICATION FROM ANESTHESIA, INFUSION OR TRANSFUSION, X-RAY AND RADIOACTIVE SUBSTANCES, DRUGS AND BIOLOGICALS — What disease or condition necessitated the procedure, use, or prescription?
8. / / TUMOR OR NEOPLASM — Specify organ or part affected. Was it malignant?
9. / / NEPHRITIS, PYELONEPHRITIS — Was the disease acute or chronic?
10. / / HEPATITIS — Viral? Other than viral (specify other condition)? Contracted through infusion, transfusion, injection, etc.? Explain circumstances as fully as possible.
APPENDIX 1 (continued)

PERFORATION, RUPTURE, STRICTURE - State underlying cause.

MENINGITIS - State type: meningococcal, H. Influenzae, Pneumococcal, other

ANEURYSM - State type, location (if aorta-abdominal or thoracic) and underlying cause.

PNEUMONIA - Was it viral, lobar, broncho, bacterial (state type), other?
To what was the ________ due? If of gonorrheal, syphilitic puerperal or traumatic origin, please state the facts as fully as possible.

ENCEPHALITIS - Was it infectious? arthropod-borne? (please state type--Eastern, Western, St. Louis, etc.)

HYDROCEPHALUS - Was it congenital?

SEIZURE - Was it an epileptic seizure?

PLEURAL EFFUSION, PLEURISY WITH EFFUSION - Tuberculous? Non-tuberculous (give cause)?

CEREBRAL PALSY - Was it infantile, traumatic (state facts as fully as possible), other?

UNDERLYING CAUSE OF
(if traumatic, please complete item 27 above.)

ASPHYXIA, SUFOCATION - State if by illuminating gas, etc., or by bed clothes, overlying, etc. If cause by inhalation or ingestion of an object such as food, foreign body, vomitus, etc., so state and name the object.

MOTOR VEHICLE ACCIDENT - State whether the deceased was a pedestrian, driver, passenger, motorcyclist, etc. Name the kind of accident such as motor vehicle in collision with another motor vehicle, bridge, tree, railroad train, or ran off roadway, overturned, etc. The place and municipality where the accident occurred should be given.

BURNS - State whether due to conflagration in private dwelling or other building, or ignition of clothing or of highly inflammable material (benzine, gasoline, matches, etc.). If caused by an explosion of a pressure vessel, explosive material, or a hot substance or electric current, so state.

DROWNING - If accidental, state whether swimming, fishing, skin/skuba diving, etc., or an accident involving a boat.

FALL - State whether a fall on stairs, ladder, from chair, tree, from stumbling, etc. If aboard ship, describe fully.

POISONING - Name the drug or substance ingested or inhaled which caused death.

OTHER
APPENDIX II. Causes of Death Queried by the Oregon Center for Health Statistics in Addition to Priority Level 4

<table>
<thead>
<tr>
<th>Cause</th>
<th>ICD Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septicemia</td>
<td>038</td>
</tr>
<tr>
<td>Serum hepatitis</td>
<td>70.2-.3</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>263</td>
</tr>
<tr>
<td>Dehydration and electrolyte disorders</td>
<td>276.5-.7-.9</td>
</tr>
<tr>
<td>Aplastic anemia</td>
<td>284</td>
</tr>
<tr>
<td>Hydrocephalus not specified as congenital (or with a duration since birth)</td>
<td>331.3-.4</td>
</tr>
<tr>
<td>Pulmonary embolism among persons under age 65 years</td>
<td>415.1</td>
</tr>
<tr>
<td>Pulmonary heart diseases (except Kaposieliotic heart disease)</td>
<td>416.9</td>
</tr>
<tr>
<td>Varicose veins of esophagus</td>
<td>456.0-.1</td>
</tr>
<tr>
<td>Pneumonia in categories 481, 482, 485 or 486 with mention in Part II of carcinoma</td>
<td>481, 482, 485, 486, 507.0</td>
</tr>
<tr>
<td>Any pneumonia stated to be terminal</td>
<td>480-486,507.0</td>
</tr>
<tr>
<td>Rupture of the esophagus</td>
<td>530.4</td>
</tr>
<tr>
<td>Intestinal obstruction with or without mention of adhesions</td>
<td>560.8-.9</td>
</tr>
<tr>
<td>Aspiration not indicated as accidental or due to a disease condition</td>
<td>911,912</td>
</tr>
<tr>
<td>Liver disease not specified as alcoholic when not selected as the underlying cause of death</td>
<td>571.5-.7-.9</td>
</tr>
<tr>
<td>Type of gun used in intentional and unintentional deaths</td>
<td>922.9, 955.4, 985.4</td>
</tr>
<tr>
<td>Passenger status in selected transportation accidents</td>
<td>800-839, .9s only</td>
</tr>
<tr>
<td>Hemorrhage of any site except cerebral or related to childbirth</td>
<td></td>
</tr>
<tr>
<td>Any external cause of death with items 36a-36f not completed</td>
<td></td>
</tr>
<tr>
<td>Females in the following age and cause of death categories for maternal deaths</td>
<td>Ages 17-35</td>
</tr>
<tr>
<td></td>
<td>303</td>
</tr>
<tr>
<td></td>
<td>571.0-571.3</td>
</tr>
<tr>
<td></td>
<td>Ages 17-39</td>
</tr>
<tr>
<td></td>
<td>001.0-139.9</td>
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<tr>
<td></td>
<td>240.0-302.9</td>
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<tr>
<td></td>
<td>304.0-337.9</td>
</tr>
<tr>
<td></td>
<td>341.0-358.9</td>
</tr>
<tr>
<td></td>
<td>360.0-429.9</td>
</tr>
</tbody>
</table>
APPENDIX III: Causes of Death Suggestive of AIDS and Queried when HIV Infection and AIDS are not Mentioned on the Death Certificate

Atypical mycobacteria (Mycobacterium avium or intracellulare)
bronchial, pulmonary or esophageal candidiasis
Chronic lymphoid interstitial pneumonitis
Coccidioidomycosis
Cryptococcal meningitis
Cryptosporidiosis
Cytomegalovirus infection
Disseminated histoplasmosis
Hemophilia
Herpes virus infection
Immune deficiency
Immunoblastic sarcoma or lymphoma
Isosporiasis
Kaposi's sarcoma
Lymphoma limited to the brain
Non-Hodgkin's lymphoma in a person under age 60
Pneumocystic pneumonia
Pneumonia in a person between the ages of 1 to 50 and no clear alternative to AIDS as an explanation for the person's unusual susceptibility to pneumonia (i.e., leukemia, splenectomy)
Progressive multifocal leukoencephalopathy
Salmonella (non-typhoid)
Small non-cleaved lymphoma (Burkitt's tumor or Burkitt-like lymphoma)
Strongyloidosis
Toxoplasmosis
Tuberculosis in a person under age 60
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