CME Activity Inside and Online
Valid Until October 31, 2009

City Health Information

October 2008 The New York City Department of Health and Mental Hygiene Vol. 27(9):71-78

Improving Cause of Death Reporting

- **Physicians are responsible for correct completion of death certificates, which provide important mortality data for disease tracking and public health research.**
- **Cause of death is documented by accurately listing the sequence of events leading to the death.**
- **Electronic death registration, now replacing paper certificates in New York City, facilitates more accurate and timely reporting for physicians, hospital staff, and funeral directors.**

Death certificates are both important legal documents and essential public health tools. The New York City (NYC) Health Department and other government agencies, as well as hospitals, researchers, and community-based organizations, use statistics based on official causes of death recorded on death certificates. These data describe the health of a community, identify priority public health needs, allocate resources, and evaluate interventions. Incomplete or nonspecific reporting can lead to under- or overcounting of causes of death, which can incorrectly affect interventions, policy, and funding. For example, reporting cardiopulmonary arrest as the cause of death without recording its etiology (e.g., renal disease or metastatic breast cancer) may underestimate mortality due to the true underlying illness while overstating the impact of heart disease.[1-3]

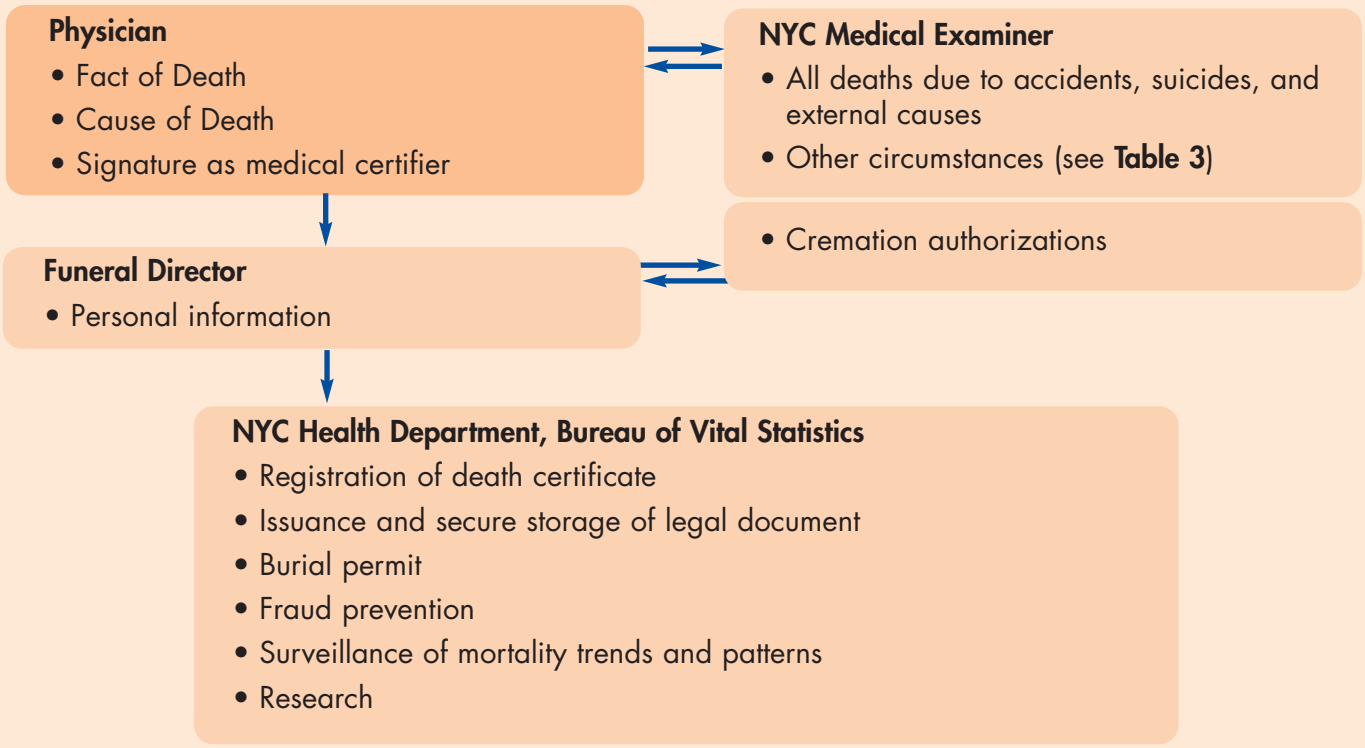
NYC law requires that all deaths be reported within 72 hours. Death certificates provide prompt, accurate information to local and state health departments and, if necessary, the Centers for Disease Control and Prevention (CDC) to identify outbreaks and emergencies, such as pandemic flu or deaths due to excessive natural heat (heat wave deaths).

Rapid reporting also enables families to settle estates quickly and helps government agencies prevent the fraudulent use of birth certificates, driver's licenses, Social Security, and other entitlements.

Because swift and accurate documentation of cause of death (and other significant conditions and events related to that cause) is crucial to public health reporting and surveillance, **it is important that physicians have a thorough understanding of how to complete the cause of death section correctly**.

TAKE CARE NEW YORK

FIGURE 1. THE DEATH REGISTRATION PROCESS: PAPER DEATH CERTIFICATE OR ELECTRONIC DEATH REGISTRATION SYSTEM (EDRS)



THE DEATH REGISTRATION PROCESS

The death registration process, whether on paper or using the new Electronic Death Registration System (EDRS), involves physicians and hospital staff, funeral directors, the NYC Medical Examiner's Office, and the Health Department's Bureau of Vital Statistics (**Figure 1**).

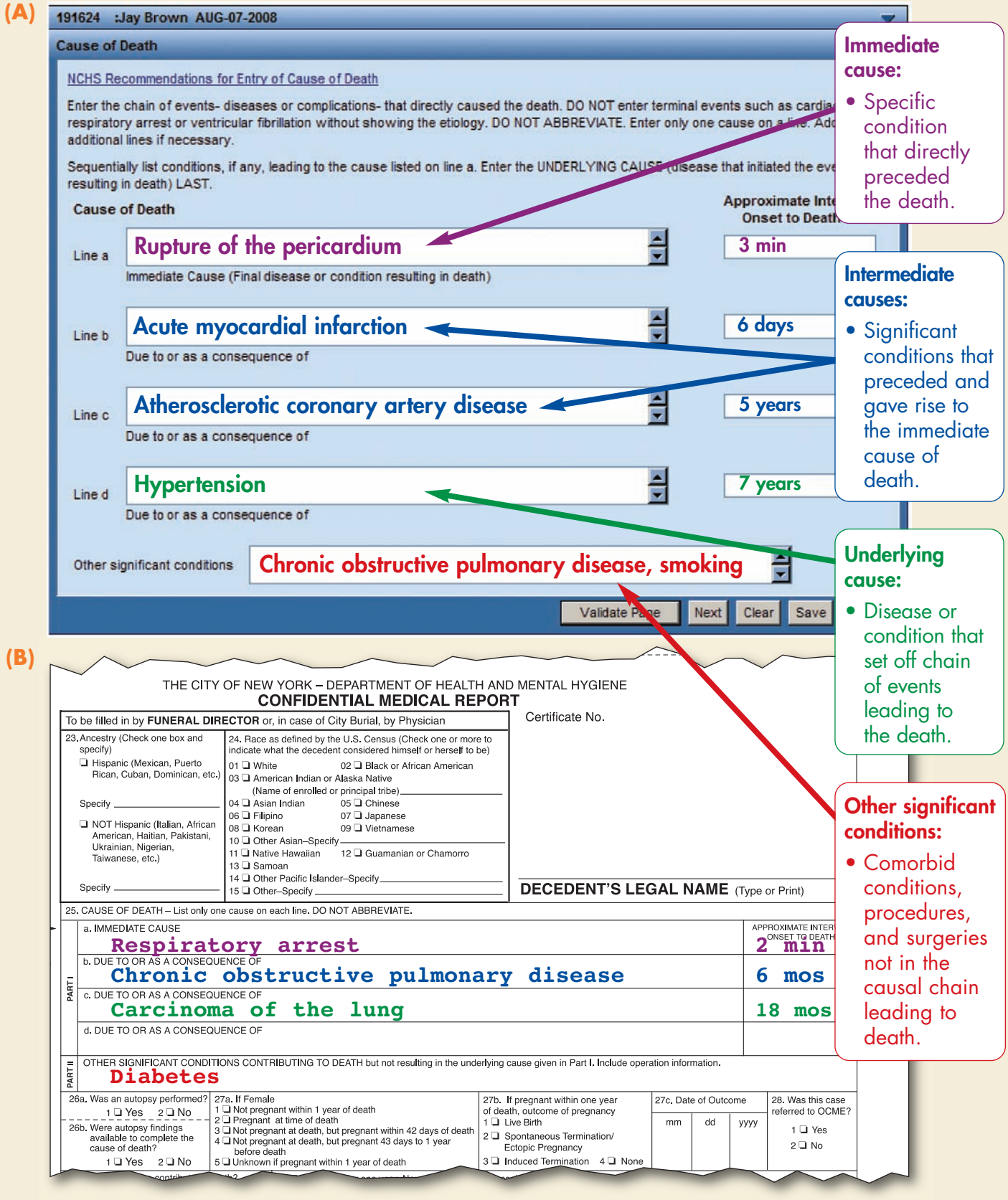
The physician's role is to describe the chain of medical events or conditions leading to the death, determine the underlying cause of death, and certify the death event. Hospital administrative staff generally prepares the certificate (either paper or EDRS) and ensures that it is completed in a timely manner. The funeral director supplies personal and demographic information and is responsible for filing the death certificate with the NYC Health Department within 72 hours of the death. The NYC Health Department registers, processes, and issues certified copies of death certificates. The NYC Health Department also analyzes and reports mortality statistics, and conducts local surveillance activities and research.

The need for more rapid, accurate, efficient, and secure processing led to the development of the EDRS, which is replacing the paper death certificate and becoming the norm in NYC. Paper and electronic forms collect identical information, but the EDRS provides Internet access with built-in editing capability for more accurate and rapid reporting. The NYC Health Department reviews and approves EDRS certificates electronically, allowing for faster generation of legal documents and mortality data.

CAUSE OF DEATH

Cause of death information must come from your best medical judgment. Correct completion requires an understanding of the terms *immediate, intermediate,* and *underlying*, which describe the causal sequence of conditions or events that led to the death.

FIGURE 2. CAUSE OF DEATH IN (A) ELECTRONIC DEATH REGISTRATION SYSTEM (EDRS) AND (B) PAPER CERTIFICATES



- *Immediate* cause: specific condition that directly preceded the death.
- *Intermediate* cause(s): significant condition(s) that preceded and gave rise to the *immediate* cause of death.
- *Underlying* cause: disease or condition that set off the chain of events leading to the death.

On both the paper and EDRS forms, the immediate cause of death is recorded on line **a**, and intermediate and underlying causes on lines **b** through **d** (**Figure 2**).

To complete the sequence leading to death, work backward from line **a**. On line **b**, enter the condition, if any, which gave rise to the immediate cause of death. For example, if an organ system failure (e.g., congestive heart failure, hepatic failure, or respiratory failure) is the immediate cause of death listed on line **a**, you must report the etiology of that condition (e.g., hypertensive cardiovascular disease) on line **b**. If the condition on line **b** was due to or a consequence of another condition or event, enter that on line **c**. Document the entire sequence, adding more lines if necessary. The underlying cause of death should be entered last, since it is the disease or condition that triggered the chain of events leading to the death and without which death would not have occurred. (Note: Abbreviations for diseases or conditions cannot be used on a death certificate.)

Include the best estimate of the time interval between each entry and the date of death; the terms "unknown" and "approximately" may be used. For instance, in **Figure 2A**, rupture of the pericardium was the immediate cause and resulted in death within minutes. It occurred due to or as a consequence of an acute myocardial infarction approximately 6 days prior to the rupture. The acute myocardial infarction was due to or a consequence of atherosclerotic coronary artery disease 5 years earlier, which in turn was due to or a consequence of hypertension, which occurred 7 years prior to the death and is therefore documented as the underlying cause of death. In **Figure 2B**, respiratory arrest was the immediate cause of death, and may have been due to or a consequence of chronic obstructive pulmonary disease, which occurred 6 months earlier. The chronic obstructive pulmonary disease may have been due to or a consequence of lung cancer, which occurred 18 months prior to the death. In this case, lung cancer is listed as the underlying cause.

OTHER SIGNIFICANT CONDITIONS

Immediately below the cause of death section (on the bottom of the EDRS cause of death screen and in Part II of the paper certificate) is a section for recording other significant conditions and events that were not in the causal chain leading to death. This space is used for recording comorbid conditions, operations, and procedures related to conditions listed on lines **a** through **d**. In **Figure 2A**, chronic obstructive pulmonary disease and smoking are documented as other significant conditions; they were not in the causal chain starting with hypertension, the underlying cause, and ending with the rupture of the pericardium, the immediate cause. Similarly, in **Figure 2B**, the other significant condition, diabetes, is not in the causal chain starting with carcinoma of the lung and ending with respiratory arrest.

COMMON ERRORS

Reporting the mechanism as the cause

The most common error in the completion of death certificates is listing the mechanism of death, such as cardiopulmonary arrest, as the underlying cause of death.[4] While cardiopulmonary arrest can be documented as an immediate cause of death, it was triggered by or was a consequence of a prior condition or event, for example, a gastric hemorrhage. The gastric hemorrhage may have been due to or a consequence of another prior condition, such as a gastric ulcer, making the ulcer the underlying cause of death. See box below for a list of common mechanisms of death that should *not* be reported as the underlying cause of death.

Mechanisms that can be used as the immediate cause of death but NOT as underlying causes:

- Cardiopulmonary arrest
- Cardiac arrest
- Respiratory arrest
- Asystole

TABLE 1. INCORRECT AND CORRECT COMPLETION OF A DEATH CERTIFICATE

INCORRECT

Cause of Death	Approximate Interval to Onset of Death
a Septicemia	5 days
b **WRONG:** Insufficient information; underlying cause needed	
c	

CORRECT

Cause of Death	Approximate Interval to Onset of Death
a Septicemia, type undetermined	5 days
b Peripheral vascular disease	7 years
c Insulin-dependent diabetes mellitus	46 years

INCORRECT

Cause of Death	Approximate Interval to Onset of Death
a Congestive heart failure	7 months
b Atherosclerotic heart disease	4 years
c Cancer of the breast	
WRONG: Incorrect sequence: **b** does not arise from **c**. Either **b** or **c** belongs in "Other Significant Conditions"	

CORRECT

Cause of Death	Approximate Interval to Onset of Death
a Congestive heart failure	7 months
b Atherosclerotic heart disease	4 years
c	
Other Significant Conditions: Cancer of the breast	

Reporting a nonspecific cause

Nonspecific causes, such as sepsis, paraplegia, and hypotension, are not underlying causes of death and should not be entered as the underlying causes. Examples of specific conditions that *can* be reported as underlying causes of death and nonspecific conditions that *should not* be reported as underlying causes are listed in the box at right. Examples of correct and incorrect death certificates are shown in **Table 1**.

MISSING OR LIMITED INFORMATION

Any condition written in the cause of death section should be stated as specifically as possible—regardless of whether it is an immediate, intermediate, or underlying cause. Specificity may be most challenging when a person is pronounced dead on arrival and you have very little information. In this case, use other records such as reports from EMS personnel attending the decedent and available medical records. The attending physician and the family are other resources; make every attempt to

Specific conditions that CAN be used as underlying causes of death:

- Atherosclerotic coronary artery disease
- Calcific aortic stenosis
- Diabetes mellitus, insulin-dependent
- Adenocarcinoma of the prostate
- Meningococcal meningitis
- Alzheimer's dementia

Nonspecific conditions that SHOULD NOT be used as underlying causes of death:

- Acute myocardial infarction
- Seizures
- Pulmonary edema
- Hepatic failure
- Renal failure
- Sepsis
- Hypotension
- Paraplegia

TABLE 2. ACCEPTABLE REPORTING WHEN CAUSE OF DEATH INFORMATION IS MISSING OR LIMITED

Cause of Death	Approximate Interval to Onset of Death
a Upper gastrointestinal hemorrhage	1 day
b Specific cause unknown	
c	

Cause of Death	Approximate Interval to Onset of Death
a Upper gastrointestinal hemorrhage	1 day
b Presumed peptic ulcer	
c	

Cause of Death	Approximate Interval to Onset of Death
a Aspiration pneumonia	3 days
b Probable metastatic lung cancer	
c	

contact them if you need information. If you cannot get specific information, you may use terms such as "probable," "presumed," "unspecified," or "undetermined" (**Table 2**).

Consult the medical examiner in cases of unclear or apparently nonspecific causes of death (see **Resources**).

ADDITIONAL ITEMS THE PHYSICIAN MUST COMPLETE

The physician is also responsible for providing information concerning infant and maternal deaths, as well as information concerning autopsies, tobacco use, and whether the medical examiner was consulted. These items must all be documented below the cause of death if they are pertinent.

- **Infant deaths**: If an infant is born alive and dies, both a birth certificate and a death certificate must be filed, regardless of viability, birth weight, gestational development, or duration of life. The name and address of the birthing facility are also required.

  In NYC, a live birth is defined as the "complete expulsion or extraction from its mother of a product of conception, regardless of the duration of pregnancy, which after expulsion or extraction shows evidence of life, such as breathing, beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached."[5] If there is an unplanned, spontaneous termination of pregnancy, you must file a Spontaneous Termination of Pregnancy certificate (call 212-788-4585 for information).

- **Maternal deaths**: The death of a woman who was pregnant at the time of death or within 1 year of her death may have been associated with the pregnancy. Consequently, you must assess a woman of childbearing age for recent (within 1 year of death) or current pregnancy, and record pregnancy status, outcome and date of pregnancy outcome on the death certificate in the section following the cause of death.

- **Other items**: The physician must also indicate on the death certificate whether: a) tobacco use contributed to a death; b) an autopsy was performed; c) autopsy results were available at the time the certificate was completed; and d) the medical examiner was consulted.

ROLE OF THE MEDICAL EXAMINER

Most deaths are due to natural causes and will not involve the medical examiner; however, you *must* contact the medical examiner in cases of:

- Missing or limited information on the cause of death (see page 75).
- Deaths not due to natural causes.
- Circumstances specified in **Table 3**.

TABLE 3. CONTACTING THE NYC MEDICAL EXAMINER

When:

- Criminal neglect and violence
- Drug and chemical overdose and poisoning
- Exposure to excessive heat or cold
- Physical, chemical, biological, and radiological injuries
- Workplace-related injuries
- Injury contributing to death, regardless of when it occurred
- Deaths during diagnostic or therapeutic procedures or due to complications from these procedures
- Sudden death when the individual is in apparent good health
- Individual was unattended by a physician in the past 31 days
- Unidentified individuals
- Individuals in legal detention, jails, or police custody
- Fetus born dead in the absence of a physician or midwife
- Neonatal death when premature delivery was due to maternal trauma or drug abuse
- Missing or limited information

How:

- **Chief Medical Examiner: 212-447-2030**

ENSURING THE QUALITY OF CAUSE OF DEATH REPORTING

The quality of cause of death reporting depends on your ability to document the causal sequence of events leading to the death with accuracy and specificity. The NYC Health Department reviews death certificates for incomplete, nonspecific, or inaccurate information, and queries any provider who may have completed a certificate incorrectly. If cause of death information changes after the query, the physician will be contacted and given instructions for filing an amendment. To minimize this possibility, please complete death certificates correctly.

SUMMARY

A death certificate is an important legal document and an essential public health surveillance and research tool. You must complete it accurately, thoroughly, and promptly using your best medical judgment. Be sure to record the entire chain of events leading to the death, taking care to correctly identify the underlying cause of death.

The new EDRS allows more rapid and accurate cause of death reporting. An instructional e-learning module, "Improving Cause of Death Reporting," explains correct cause of death reporting using the EDRS (see box below). ◆

To learn more about how to complete the Cause of Death, visit www.nyc.gov/html/doh/media/video/icdr/index.html for an online tutorial, which offers 3 CME credits in addition to those provided by this CHI.

RESOURCES

NYC Department of Health and Mental Hygiene

- **Vital Events Registration System**: www.nyc.gov/html/doh/html/vr/vr-evers.shtml. 212-788-4575; e-mail: EDRS@health.nyc.gov.
- **Office of Vital Statistics**: www.nyc.gov/html/doh/html/vs/vs.shtml.
- **Office of Chief Medical Examiner**: www.nyc.gov/html/ocme/html/dirmedex.html. 212-447-2030

Centers for Disease Control and Prevention

- **National Center for Health Statistics (NCHS)**: www.cdc.gov/nchs.
- **NCHS Mortality Data from the National Vital Statistics System**: www.cdc.gov/nchs/deaths.htm.
- **Handbooks for Cause of Death Reporting**: www.cdc.gov/nchs/about/major/dvs/handbk.htm.

Other Resources

- **The National Association of Medical Examiners Tutorial**: www.THENAME.org.

REFERENCES

1. Coady SA, Sorlie PD, Cooper LS, et al. Validation of death certificate diagnosis for coronary heart disease: the Atherosclerosis Risk in Communities (ARIC) Study. *J Clin Epidemiol*. 2001;54(1):40-50.

2. Jemal A, Ward E, Hao Y, Thun M. Trends in the leading causes of death in the United States, 1970-2002. *JAMA*. 2005;294(10):1255-1259.

3. Lloyd-Jones DM, Martin DO, Larson MD, Levy D. Accuracy of death certificates for coding coronary heart disease as the cause of death. *Ann Intern Med*. 1998;129(12):1020-1026.

4. Villar J, Perez-Mendez L. Evaluating an educational intervention to improve the accuracy of death certification among trainees from various specialties. *BMC Health Serv Res*. 2007;7:183.

5. Kowaleski J. *State definitions and reporting requirements for live births, fetal deaths, and induced terminations of pregnancy (1997 revision)*. Hyattsville, MD: National Center for Health Statistics; 1997. www.cdc.gov/nchs/data/misc/itop97.pdf. Accessed September 19, 2008.

RECEIVE CHI BY E-MAIL Each time **City Health Information** is published, you will receive a link to the issue in PDF format. To subscribe, visit www.nyc.gov/html/doh/html/chi/chi.shtml.

DOHMH JOB OPENINGS: We seek doctors, nurses, administrators, social workers, and other public health professionals. Visit www.nyc.gov/health/careers to view openings.

City Health Information

NYC Health

October 2008 The New York City Department of Health and Mental Hygiene Vol. 27(9):71-78

2 Lafayette Street, 20th Floor, CN-65, New York, NY 10007 (212) 676-2188

PRST STD
U.S. POSTAGE
PAID
NEW YORK, N.Y.
PERMIT NO. 6174

E-mail *City Health Information* at: nycdohrp@health.nyc.gov
Suggested citation: Zimmerman R, Schwartz S. Improving cause of death reporting. *City Health Information*. 2008;27(9):71-78.

Continuing Education Activity

Improving Cause of Death Reporting

SPONSORED BY
THE NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE (DOHMH)
CITY HEALTH INFORMATION
OCTOBER 2008 VOL 27(9):71-78

Objectives

At the conclusion of this activity, participants should:

1. Understand the importance of death certificates and of accuracy in reporting cause of death.
2. Know how to complete a death certificate correctly with an accurate cause of death.
3. Know when to refer a case to the medical examiner.
4. Understand the role of the death certificate in identifying citywide emergencies.

CME Accreditation Statement

The New York City Department of Health and Mental Hygiene is accredited by the Medical Society of the State of New York to sponsor continuing medical education for physicians. The New York City Department of Health and Mental Hygiene designates this continuing medical education activity for a maximum of 2.0 AMA PRA Category 1 credit(s).™ Each physician should only claim credit commensurate with the extent of their participation in the activity.

Participants are required to submit name, address, and professional degree. This information will be maintained in the Department's CME program database. If you request, the CME Program will verify your participation and whether you passed the exam.

We will *not* share information with other organizations without your permission, except in certain emergencies when communication with health care providers is deemed by the public health agencies to be essential or when required by law. Participants who provide e-mail addresses may receive electronic announcements from the Department about future CME activities as well as other public health information.

Participants must submit the accompanying exam by October 31, 2009.

CME Faculty:
Regina Zimmerman, PhD, MPH
Steven Schwartz, PhD

All faculty are affiliated with New York City DOHMH Bureau of Vital Statistics. The faculty does not have any financial arrangements or affiliations with any commercial entities whose products, research, or services may be discussed in these materials.

1. You, the physician, are responsible for completing the following sections of the death certificate:

- ☐ A. Decedent Demographics, Fact of Death, and Cause of Death.
- ☐ B. Cause of Death and Fact of Death.
- ☐ C. Fact of Death and Decedent Demographics.
- ☐ D. Cause of Death only.

2. In NYC the words written on the cause of death section of the death certificate can be certified by:

- ☐ A. Hospital admissions personnel.
- ☐ B. Physicians only.
- ☐ C. Physicians, physician assistants, and nurse practitioners.
- ☐ D. All of the above.

3. Which of the following conditions is an appropriate underlying cause of death?

- ☐ A. Pulmonary edema.
- ☐ B. Alzheimer's dementia.
- ☐ C. Sepsis.
- ☐ D. Renal failure.

4. Pregnancy status section is to be completed:

- ☐ A. Only for those female decedents who are known to be pregnant at the time of death.
- ☐ B. For female decedents who were pregnant within 1 year or at the time of death.
- ☐ C. For female decedents of childbearing age (15 to 44).
- ☐ D. For female decedents who were pregnant within 43 days of death or pregnant at the time of death.

5. Which of the following does <u>not</u> need to go to the medical examiner?

- ☐ A. Deaths of unidentified individuals.
- ☐ B. An injury contributing to death, regardless of when it occurred.
- ☐ C. Drug and chemical overdose and poisoning.
- ☐ D. Sudden death when the individual is in apparent good health.
- ☐ E. All of the above.
- ☐ F. None of the above.

6. How well did this continuing education activity achieve its educational objectives?

☐ A. Very well. ☐ B. Adequately. ☐ C. Poorly.

PLEASE PRINT LEGIBLY.

Name _____ Degree _____

Address _____

City _____ State _____ Zip _____

Date _____ Telephone _____

E-mail address _____

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO.2379 NEW YORK NY

POSTAGE WILL BE PAID BY ADDRESSEE

CME ADMINISTRATOR
NYC DEPARTMENT OF HEALTH
AND MENTAL HYGIENE
2 LAFAYETTE ST, CN - 65
NEW YORK, NY 10277-1632

Continuing Education Activity

This issue of *City Health Information*, including the continuing education activity, can be downloaded at www.nyc.gov/html/doh/html/chi/chi.shtml.

Instructions

Read this issue of *City Health Information* for the correct answers to questions. To receive continuing education credit, you must answer 4 of the first 5 questions correctly.

To Submit by Mail

1. Complete all information on the response card, including your name, degree, mailing address, telephone number, and e-mail address. PLEASE PRINT LEGIBLY.

2. Select your answers to the questions and check the corresponding boxes on the response card.

3. Return the response card (or a photocopy) postmarked **no later than October 31, 2009**. Mail to:

CME Administrator, NYC Dept. of Health and Mental Hygiene,
2 Lafayette Street, CN-65, New York, NY 10277-1632.

To Submit Online

Visit www.nyc.gov/html/doh/html/chi/chi.shtml to submit a continuing education test online. Once logged into NYC MED, use the navigation menu in the left column to access this issue of *City Health Information*. Your responses will be graded immediately, and you can print out your certificate.