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Adverse medical complications: an under-reported contributory cause of death in New York City

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ABSTRACT

Objectives: The current death certification system in the USA fails to accurately track deaths due to adverse medical events. The aim of this study was to demonstrate the under-reporting of deaths due to adverse medical events due to limitations in the current death certification/reporting system, and the benefits of using the term ‘therapeutic complication’ as the manner of death.

Study design: Retrospective review and comparison of death certificates and vital statistical coding.

Methods: The manner of death is certified as a therapeutic complication when death is caused by predictable complications of appropriate therapy, and would not have occurred but for the medical intervention. Based on medical examiner records, complications that caused or contributed to deaths over a five-year period were examined retrospectively. These fatalities were compared with deaths coded as medical and surgical complications by the New York City Bureau of Vital Statistics.

Results: The Medical Examiner’s Office certified 2471 deaths as therapeutic complications and 312 deaths as accidents occurring in healthcare facilities. In contrast, the New York City Bureau of Vital Statistics reported 188 deaths due to complications of medical and surgical care.

Conclusions: Use of the term ‘therapeutic complication’ as the manner of death identified nearly 14 times more deaths than were reported by the New York City Bureau of Vital Statistics. If these therapeutic complications and medical accidents were considered as a ‘disease’, they would rank as the 10th leading cause of death in New York City, surpassing homicides and suicides in some years. Nationwide policy shifts that use the term ‘therapeutic complication’ would improve the capture and reporting of these deaths, thus allowing better identification of fatal adverse medical events in order to focus on and assess preventative strategies.

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Introduction

Adverse medical events account for a substantial number of deaths each year in the USA.^{1,2} A report by the Institute of Medicine of the National Academy of Sciences in 1999 estimated that up to 98,000 patients die due to preventable medical errors in US hospitals each year.³ Strategies have been employed to decrease their occurrence,^{4,5} but in order to develop effective prevention strategies, one must first identify and categorize the specific adverse events.^{2–6} Adverse events have been defined as unfavourable and unintended signs, symptoms or diseases temporally associated with the use of a medical treatment or procedure; untoward medical occurrences; and harm/injury caused by medical management.^{1–7} Some adverse events include predictable complications of appropriate treatment that result in death. Alternatively, some are due to the inadvertent administration of medication, equipment problems or inappropriate therapy (Fig. 1).

Accurate identification and classification of these complications would allow public health agencies to track them, gauge whether or not certain interventions are effective, and potentially identify patterns in specific treatment centres. Using the population-based information from death certificate statistics, researchers could use epidemiological methods to explore patterns of these deaths. Determinations made by objective forensic pathologists during death investigation would address the issues of validity often raised when studies use physician implicit reviews to estimate deaths due to medical errors.^{8,9} However, the current death certification procedures and classification system in the USA do not estimate many of these fatalities accurately.^{10–14}

Vital statistics mortality data are compiled from information (cause/manner of death and how injury occurred sections) written on death certificates, completed by treating physicians and medical examiners in the jurisdiction where the death occurred. It is the responsibility of the state vital registration offices, in conjunction with the National Center for Health Statistics of the Centers for Disease Control and Prevention to correctly code and report all deaths due to medical and surgical procedures according to the rules and guidelines of the World Health Organization's (WHO) International Classification of Diseases (ICD).¹⁵ In New York City, the medical examiners use a distinct manner of death, the 'therapeutic complication' for fatalities due to predictable complications of appropriate medical therapy; this term for the manner of death is not available to medical examiners and coroners in the majority of jurisdictions nationwide.¹⁶ As such, this study examined whether or not use of the term 'therapeutic complication' allows for identification and accurate tracking of more of these deaths than reported by the New York City Bureau of Vital Statistics. A five-year review of such fatalities has been presented to examine the extent of these deaths, their immediate causes and their lack of recognition by vital statistics bureaus.

Methods

The New York City Office of Chief Medical Examiner (NYC OCME) investigates all unexpected, violent and suspicious deaths in New York City. By statute, these deaths must be reported to the NYC OCME. All deaths that occur during diagnostic or therapeutic procedures or from complications of such procedures are reportable to the NYC OCME. The medical examiner death certificate electronic database, which contains the text of the data fields of the actual death certificates, was used to identify all deaths reported to the NYC OCME due to accidents that occurred in healthcare facilities and all medical complications between 1 January 2006 and 31 December 2010. The medical complications were identified by searching for all deaths certified as 'therapeutic complications'. The medical accidents were identified by searching for all deaths certified as an accident in which the listed place of injury was a medical facility. The extracted death certificate data were analysed in a Microsoft Excel spreadsheet with categories that included cause and manner of death, contributing conditions, location of injury, place of death, how injury occurred, age and gender. Individual record reviews were performed for instances in which the cause of death statement did not list the specific complication.

The reported deaths due to complications of medical and surgical care were obtained from the City of New York summary of vital statistics for 2006–2010.¹⁷ A vital statistics dataset was requested from the Bureau of Vital Statistics of the New York City Department of Health and Mental Hygiene using their SharePoint electronic request (ID#: 201303080437) for multiple causes of death (MCD) ICD-10 codes Y40–Y84, Y88, T80–T88 and T98.3, and underlying causes of death (UCD) ICD-10 codes Y40–Y84 and Y88 by year for 2006–2010.

To avoid bias, the causes of death were classified by two reviewers (JRG and AT) into two categories: complications (e.g.

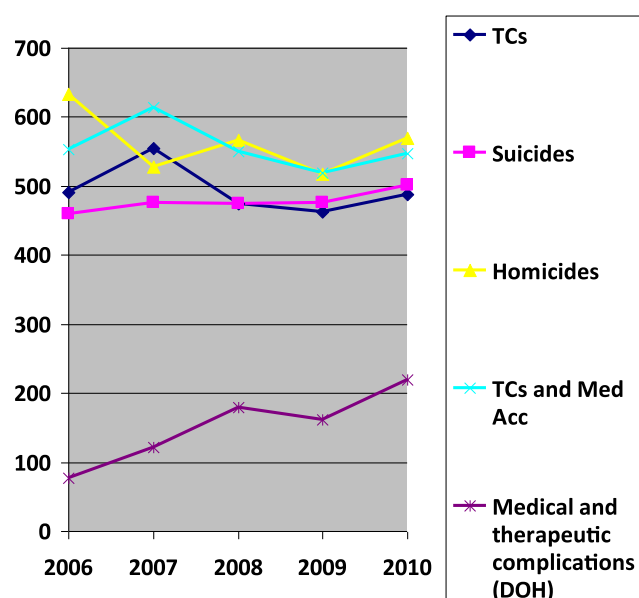


Fig. 1 – Number of therapeutic complications (TCs), suicides, homicides and therapeutic complications plus medical accidents (Med Acc) by year certified by the New York City Office of Chief Medical Examiner compared to medical and therapeutic complications (DOH) reported by the DOH, Department of Health and Mental Hygiene.

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