

# An Evaluation of the Use of Medical Examiner Data for Epidemiologic Surveillance

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**Abstract:** To assess the value of medical examiner (ME) data bases for use in epidemiologic surveillance, we compared data from non-injury deaths that became ME cases to all non-injury deaths occurring in 1984 among Fulton County, Georgia residents. The decedents in the ME series were younger and included a large proportion of Black males. Although not representative of all deaths in a community, ME data bases include demographic and medical information that is often difficult to collect in community studies and in other surveillance systems. (*Am J Public Health* 1987; 77:1212-1214.)

## Introduction

In many jurisdictions, deaths that occur suddenly or unexpectedly are referred to the medical examiner (ME). ME data bases are uniquely suited for use in epidemiologic investigations for at least four reasons:

- autopsies are often performed,
- toxicologic data are frequently analyzed,
- police reports are available, and
- virtually all deaths resulting from injuries—whether intentional or unintentional—are included.

ME data bases have been successfully used in epidemiologic studies of sudden or unanticipated death such as alcohol- and drug-related fatal injuries,<sup>1,2</sup> homicides,<sup>3,4</sup> suicides,<sup>5</sup> sudden and unexpected deaths,<sup>6</sup> and environmental health effects such as deaths resulting from heat waves and from protracted cold weather.<sup>7,8</sup>

To assess the value of ME data bases for epidemiologic surveillance, we compared cause of death, age, sex, and race distributions in the ME series with the same distributions found in the vital statistics (VS) data series, a series that included all deaths of residents in Fulton County.

## Background

Fulton County, Georgia, is primarily urban comprising most of Atlanta as well as populous suburban communities. The 1980 population was 589,904 of which 53 per cent was female; over half (52.5 per cent) of the population was Black.

The average age of residents was 32 years, with 1.4 per cent of the population being under one year of age and nearly 11 per cent older than 65 years of age.

Vital statistics data contain all resident deaths, and the cause of death is coded according to a protocol developed by the National Center for Health Statistics (NCHS), using the Ninth Revision of the International Classification of Diseases (ICD-9-CM).<sup>9</sup>

In Fulton County, all deaths occurring in the county considered to be unnatural or intentional are required by law to

be reported to the ME. Fulton County is one of the three counties in Georgia that require that the ME be a licensed physician with training in pathology. The ME may either decline jurisdiction (DJ deaths) or accept jurisdiction based on considerations including circumstances associated with the death, age of decedent, and previous medical conditions. If the ME declines jurisdiction in the case, no further investigation is conducted. For the remaining deaths, cause of death is determined by the ME based on historical evidence, an external examination in which blood or body fluid samples may be taken (postmortem examination), or an autopsy.

## Methods

We compared the non-injury-related deaths reported to the ME with all of the non-injury related deaths that occurred in Fulton County in 1984. Deaths caused by injuries and by intentional means are virtually always reported to the ME and were excluded from this analysis.

## Results

In 1984, 5,528 deaths occurred in Fulton County residents. Of this total, 545 (9.9 per cent) were due to injuries or intentional means. Of the remaining 5,063 deaths, 987 (19.5 per cent) were ME cases, and 717 (14.2 per cent) were cases in which the ME declined jurisdiction (DJ).

Of VS deaths in Fulton County, 45.0 per cent were caused by diseases of the circulatory system, 26.0 per cent by neoplasms, and 8.1 per cent by diseases of the respiratory system. In contrast, of the ME cases, 52.7 per cent were attributed to diseases of the circulatory system, 6.0 per cent to neoplasms, 14.2 per cent to nonspecific or ill-defined causes such as senility, and 8.9 per cent to mental disorders, including alcohol dependence syndrome (Table 1).

For all Fulton County deaths, White males, White females, Black males, and Black females accounted for 25.0 per cent, 32.2 per cent, 19.6 per cent, and 23.2 per cent, respectively, of the natural deaths. In the ME series, Black males represented 39.0 per cent of the deaths, and White females 9.4 per cent (Table 2). For the DJ deaths, White males, White females, Black males, and Black females each represented about 25 per cent of the cases. For each diagnosis in the ME case series, Black males consistently accounted for a greater proportion of deaths.

The average age for decedents was lower in the ME series (60.3 years vs 65.4 years). In each age group, regardless of the disease category, the average age was lower for the ME series (Table 2).

## Discussion

Both selection and information biases affect the distribution of cases in the ME data base. A death is referred to the ME not only because of the immediate circumstances surrounding it, but also because of other factors such as the decedent's access to medical care and socioeconomic level. If the death is preceded by an extended illness, such as that caused by a neoplasm, the death is unlikely to become an ME

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**TABLE 1—Deaths by Disease Category (excluding external causes) and Case Series, Fulton County, Georgia Residents, 1984**

ICD-9-CM	Disease Category	% Vital Statistics (N = 4076)	% Medical Examiner (N = 987)	% Total Deaths (N = 5063)
001-139	Infectious and Parasitic Diseases	3.1	0.2	2.6
140-239	Neoplasms	25.5	6.0	22.1
240-279	Endocrine System	3.8	2.0	3.5
280-289	Blood, Blood Forming Diseases	0.5	0.4	0.5
290-319	Mental Disorders	0.8	8.9	2.4
320-389	Nervous Systems, Sense Organs	0.7	7.5	2.1
390-459	Circulatory System	44.2	52.7	46.4
460-519	Respiratory System	7.9	5.5	7.6
520-579	Digestive System	5.2	0.6	4.4
580-629	Genitourinary System	3.3	0.5	2.8
630-676	Complications: Pregnancy, Childbirth	0.0	0.0	0.0
680-709	Skin Diseases	1.2	0.0	1.0
710-739	Musculoskeletal System	0.6	0.2	0.5
740-759	Congenital Anomalies	0.5	0.8	0.6
760-770	Perinatal Period	2.1	0.5	1.8
780-789	Symptoms, Signs, Ill-defined	0.4	0.0	0.3
790-799	Nonspecific	0.0	14.2	1.3
Total		100.0	100.0	100.0

**TABLE 2—Distribution of Natural Deaths by Age, Race, and Sex: Vital Statistics and Medical Examiner Case Series, Fulton County, Georgia Residents, 1984**

Race and Sex Group	Age Group					
	0-5 Years		6-39 Years		40+ Years	
	VS <sup>a</sup> % (N = 125)	ME <sup>b</sup> % (N = 46)	VS % (N = 137)	ME % (N = 74)	VE % (N = 3808)	ME % (N = 864)
White Male	9.6	13.0	23.4	17.6	25.6	21.9
White Female	15.2	8.7	10.9	4.1	33.5	10.0
Black Male	45.6	43.5	29.2	51.4	18.4	37.7
Black Female	29.6	34.8	36.5	27.0	22.5	30.4
Total	3.1	4.6	3.4	7.5	93.5	87.8

<sup>a</sup>VS = Vital Statistics Series<sup>b</sup>ME = Medical Examiner Series

case. Deaths that occur without a physician in attendance or in decedents without a regular source of medical care are apt to become ME cases.

In our study, ME cases occurred in Black males more frequently than in other race-sex groups. We hypothesize that race is a surrogate for socioeconomic status, educational level, and employment status and that these conditions influence a person's ability to obtain medical care. Deaths that occur in individuals who as a result of their socioeconomic status are less likely to have medical care are more likely to die unattended and become a ME case.

Informational bias also affects the recorded cause of death. For example, causes of death that have emotional overtones such as alcohol dependence syndrome are more likely to be attributed by an ME to a death than by an attending physician who may have to discuss this diagnosis with relatives of the decedent. In this analysis, it was not possible to determine how many deaths in the vital statistics series attributed to other causes were actually cases of alcohol dependence.

ME data are sensitive and representative for the surveillance of sudden and unexpected conditions, but for other deaths, the ME case series is not useful for epidemiologic surveillance. Because of the increased diagnostic accuracy afforded by autopsy, ME reports may be more specific than

clinical diagnoses. Finally, ME surveillance data can also be timely. Approximately 90 per cent of the ME cases in Fulton County that do not require toxicological analysis are completed within 48 hours after notification.

Because selection bias is based on socioeconomic, educational, and employment factors, ME case series are not useful for the routine surveillance of most non-injury conditions. In most deaths due to non-injuries, the patient is attended by a physician and the death is not reported to the ME. Similarly, the ME data base would not be useful for surveillance if death occurred after an extended period of illness during which the patient is attended by a physician.

ME data have been used for epidemiologic surveillance of intentional and unintentional injuries and have played an important role in descriptive and analytical studies. Although ME data contain important medical and demographic data that can be used to measure the impact of certain conditions on health, their usefulness for the surveillance of other conditions is limited.

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REFERENCES

1. Berkelman RL, Herndon JL, Callaway JL, Howard LB, Sikes RK: Fatal injuries and alcohol. *Am J Prev Med* 1985; 1:21-28.
2. Mason JP, McBay AJ: Ethanol, marijuana, and other drug use in 600 drivers killed in single vehicle crashes in North Carolina, 1978-81. *J Forens Sci* 1984; 29:987-1026.
3. Blaser MJ, Jason JM, Weninger BG, *et al*: Epidemiologic analysis of a cluster of homicides in children in Atlanta. *JAMA* 1984; 251:3255-3258.
4. Goodman RA, Mercy JA, Loya F, *et al*: Alcohol use and interpersonal violence: alcohol detected in homicide victims. *Am J Public Health* 1986; 76:144-149.
5. Atkinson MW, Kessel N, Dalgaard JB: The comparability of suicide rates. *Br J Psychiatry* 1975; 127:247-56.
6. Kuller L, Lillienfeld A, Fisher R: An epidemiologic study of sudden and unexpected deaths in adults. *Medicine* 1967; 46:341-361.
7. Jones TS, Liang AP, Kilbourne AP, *et al*: Morbidity and mortality associated with the July 1980 heat wave in St. Louis and Kansas City, MO. *JAMA* 1982; 247:3327-3331.
8. Centers for Disease Control: Exposure-related hypothermia deaths—District of Columbia, 1972-1982. *MMWR* 1982; 31:669-671.
9. World Health Organization: Manual of international statistical classification of diseases, injuries, and causes of deaths (based on recommendations of the Ninth Revision Conference, 1975). Geneva: WHO, 1977.

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