

S. J. Kunitz,¹ M.D., Ph.D. and J. F. Edland,² M.D.

The Epidemiology of Autopsies in Monroe County, New York

Death certificates provide one of the most useful sources of information for epidemiologists concerned with the incidence and prevalence of a variety of diseases. As with other sources of official statistics, however, there are numerous problems of interpretation. Indeed, it has been claimed by some that official statistics tell us more about the producers of such statistics than about the reality they are presumed to describe [1]. Arrest rates, for instance, tell us at least as much about the police as about those arrested [2]. Suicide rates tell us as much about the coroner or medical examiner system as about those committing suicide [3]. Changing patterns of respiratory deaths are more revealing of changing diagnostic and coding practices than of the changing incidence of a variety of disease entities [4].

The purpose of this paper is thus twofold. By examining the distribution of autopsies in one urban county over an 11 year period, we hope to be able to make some inferences about: a) the institutions that perform autopsies and some of the forces leading to the patterns that emerge; and b) the likely validity of official mortality data as they are produced from one year to the next. We will point out that the organization of the medical care system in this county is such as to lead to an overautopsying of the young, the black, and the poor. While there may be good reasons for doing autopsies as we do, we will suggest that in a period when the emerging medical problems of importance concern chronic diseases in an aging population some attention ought to be given to investigating those deaths more intensively than we do at present. Despite criticisms of nosologies commonly employed by pathologists [5], we are going to assume that an autopsied individual is likely to have the cause(s) of death more accurately determined and recorded than one who is not autopsied.

As nearly as we have been able to discover, there is not much information available on the incidence and prevalence of autopsies either locally, nationally, or internationally. What figures are available suggest that the average autopsy rate from one state to another is about 20–30 percent [6], but the range is considerable: from 42 percent in Hawaii to 11 percent in Kentucky (in 1968). Elsewhere, the range is of the same or greater magnitude: about 50 percent in London [7], contrasted with essentially zero in some parts of Ireland, where indeed some deaths are never reported at all [8]. In some parts of Sweden, the rate is 95 percent [9].

Received for publication 11 Jan. 1973; revised manuscript received 27 Feb. 1973; accepted for publication 19 March 1973.

¹ Assistant professor of Preventive Medicine and Community Health and of Sociology, University of Rochester, Rochester, New York.

² Medical Examiner, Monroe County, New York and clinical assistant professor of Pathology and of Psychiatry, University of Rochester, Rochester, New York.

It is generally agreed, by pathologists at least, that the autopsy room is the Temple of Truth. It is clear that a significant proportion of pre-mortem diagnoses are altered by postmortem examinations. Almost 50 years ago Wells [10] noted the inadequacy of ante-mortem diagnoses for a variety of cancers. More recently Bauer and Robbins [11] have noted the same inadequacy. Prutting [12] has noted that sarcoidosis, acute pancreatitis, liver abscess, "primary" bronchogenic carcinoma, and bacterial endocarditis among others have all been recorded in sizable numbers at postmortem examinations and missed or mis-diagnosed ante-mortem. Among circulatory disorders (primarily strokes and myocardial infarcts) variability has been noted in incidence and prevalence of a variety of diagnostic categories which are related to diagnostic fashions from place to place [13]. In a study of the diagnosis of "strokes" in New Haven, Florey and his associates [14] found considerable disagreement between clinical and autopsy findings as to the type of stroke. In this study, however, we will not be concerned with assessing the validity of ante-mortem diagnoses by comparing them to postmortem diagnoses. We will rather be concerned with accounting for the distribution of autopsies in the population.

Methods

As part of a larger study of the epidemiology of suicide, an effort was made to assess the validity of official statistics for Monroe County, New York. For the purposes of the larger study, tapes of all death certificates of residents of the county were obtained from the State Health Department for the years 1960-1970. IBM cards are punched from each certificate in the County Health Department, but certificates are also sent to the State Health Department where tapes are made. In general, the reliability of the state tapes is good, comparing favorably with epidemiologic data tabulated from county records and published previously [15]. Thus, though the validity of the data is unknown, its reliability—that is, the reproducibility of the observations using somewhat different recording systems—is quite good.

Each certificate contains, besides cause of death and basic demographic information such as age, race, sex, and address, items concerning where the individual died, whether or not an autopsy was performed, and who signed the death certificate. This information is not gathered in a comparable fashion from year to year. For example, certifier of death was coded only in 1968-1970, and the codes changed in 1970. Again, until 1967 whether or not an autopsy was performed was coded simply "yes," "no," or "not stated." In 1968-1969 the coding was elaborated further to include whether or not the autopsy was used in determining cause of death. Then, in 1970, the codes were changed again to the way they had been earlier. It is the computer tapes from the State Health Department that will be used to provide most of our data on the epidemiology of autopsies.

The Setting

Monroe County, like many other northern urban areas, has experienced a considerable change in the composition of its population over the decade of the sixties. It grew from about 586,000 in 1960 to almost 712,000 in 1970, an increase of more than 125,000. In 1960, the population was 4 percent black, whereas in 1970 it was 7.3 percent black. These figures, of course, are misleading. The city of Rochester actually lost population while the suburbs gained. Within the city, the population changed to one that was increasingly, though not predominantly, black. Thus, as in many other places, to say "inner city" is actually to mean the black ghettos, though it is clear that many whites continue to live in these areas as well.

Monroe County is one of the richest counties in the nation. Not surprisingly, therefore, it has a comparatively large and sophisticated medical care system, including a medical school and large university hospital along with a variety of other affiliated and non-affiliated hospitals. Again, not unlike other urban areas, the university hospital along with one of the affiliated community hospitals, cares for the bulk of the population living in the inner city. Other hospitals scattered in different parts of the city and county draw from predominantly white areas [16].

Results

Over the 11 year period for which we have data, 67,540 residents of Monroe County died, with an average of 6,140 deaths per year. In Table 1 we have displayed the age specific death rates for whites and blacks in Monroe County for 1960, 1964, and 1970, the three years for which there are reliable population data (a special census was done in 1964). As age distributions were computed in different groupings in 1970, we have applied the percent distribution of age groups from the 1964 census to the 1970 population figures to estimate the age distribution in that year. It is clear, and by no means surprising, that blacks in general have higher death rates than do whites at virtually every age.

TABLE 1—Age specific death rates by race (per 1000), Monroe County, New York.

Age	1960		1964		1970	
	Black	White	Black	White	Black	White
0-9	4.6	2.1	3.6	2.1	2.4	1.3
10-19	2.4	0.8	3.2	0.8	1.7	0.8
20-29	2.1	1.0	2.0	1.2	2.9	1.1
30-39	3.8	1.3	5.0	1.5	5.1	1.0
40-49	6.5	3.4	11.1	3.7	13.3	2.7
50-59	24.2	9.7	20.3	9.4	22.3	8.2
60-69	39.8	25.0	39.4	24.2	28.2	19.6
70	59.7	81.7	97.8	84.6	84.1	72.3

In Table 2 we have displayed the percentages of blacks and whites who were autopsied in each of the three census years (the other years between 1960-1970 show the same patterns). The overall autopsy rate is about 33 percent per year. In general, young people are autopsied more commonly than older people, but young blacks are autopsied more commonly than young whites. The higher percent of autopsies of the blacks who die each year is also seen in the older age groups.

If we treat autopsies as we would a disease category and compute the age specific autopsy rate, we see the figures as displayed in the second half of Table 2. As blacks have a higher death rate than whites and as a higher proportion of blacks than of whites who die are autopsied, it is no surprise that the age specific autopsy rate should also be higher for blacks than whites.

If we calculate relative risk of being autopsied [15], we note that, adjusting for age, black women are 1.5 times as likely to be autopsied as white women and black men 2.2 times as likely to be autopsied as white men. (95 percent confidence limits are 1.10 and 2.05 for women and 1.69 and 2.81 for men.) There is no evidence by chi square test of heterogeneity of relative risk between ages for either men or women. It is clear that in the Medical Examiner's Office there is a higher suspicion of foul play when young adult black

TABLE 2—Autopsies by race, age, and year (in percent), Monroe County, New York.

Age	1960		1964		1970	
	Black	White	Black	White	Black	White
0-9	86.5	74.6	82.5	70.8	81.4	77.0
10-19	100.0	79.1	79.0	59.5	94.0	78.5
20-29	66.7	67.2	91.0	67.5	80.0	69.3
30-39	66.7	57.8	70.8	66.1	76.3	65.2
40-49	68.7	52.8	52.9	55.3	67.2	57.7
50-59	55.9	40.7	42.9	43.8	53.3	43.9
60-69	41.9	34.3	32.4	28.9	47.6	35.7
70	25.0	22.0	35.0	24.5	37.0	21.0
Autopsies/1000 population (age specific autopsy rate)						
0-9	4.0	1.6	3.0	1.5	2.0	1.0
10-19	2.4	0.6	2.5	0.5	1.6	0.6
20-29	1.4	0.7	1.8	0.8	2.3	0.7
30-39	2.5	0.8	3.5	1.0	3.9	0.7
40-49	4.4	1.8	5.9	2.1	8.9	1.5
50-59	13.5	3.9	8.7	4.1	11.9	3.6
60-69	16.3	8.6	12.8	7.0	13.4	7.0
70	14.9	18.0	34.2	20.7	31.2	15.1

men die than when deaths occur among other individuals, but that in itself does not explain the observed differences which occur in all age groups.

As we pointed out above, the black population is clustered in central Rochester. The Third Ward was 80 percent black in 1970 and the Seventh Ward 69 percent black. The rest of the city was 10 percent black while the suburbs and more rural parts were about 2 percent black. We have also pointed out that most blacks are hospitalized either at the university or an affiliated hospital. This is reflected in the figures representing where people die (in 1969-1970). 25 percent from the Third Ward and 23.1 percent from the rest of the city and 14.9 percent from the outlying county also died there. In a sense, however, these figures are misleading. Though the Third and Seventh Wards are primarily black, the majority of deaths occur among elderly whites who have not moved from the area as blacks moved in. Table 3 shows the number and percent of autopsied deaths for blacks and whites from the central city to the outlying areas, and it is clear that: (1) Relatively more blacks than whites from all areas are autopsied; and (2) the minority of whites in the central city accounts for a large proportion of the deaths.

Besides race and age, sex is the variable most often examined in relation to a variety of events. In the case of autopsies, there is a tendency for men to be autopsied somewhat more frequently than women, but not to a major degree. Over the eleven year period

TABLE 3—Autopsies in Monroe County (percent autopsied) 1969-1970.

	Black		White	
	No.	%	No.	%
3rd Ward	156	66.7	124	32.5
7th Ward	133	70.0	77	27.8
Rest of City	93	63.7	2092	32.5
Rest of County	9	52.9	1475	34.6
Unknown	0	0	15	65.2

on the average, 36.1 percent of the men and 28.4 percent of the women who died were autopsied. The difference is consistent and of the same order of magnitude from one year to the next.

If we compare autopsied to non-autopsied deaths by the distribution of causes of death, we find that they are approximately the same, with only a few exceptions. That is, about the same proportion of autopsied as non-autopsied deaths are found in most disease categories. There are obvious exceptions: violent deaths such as homicides, suicides, and accidents have in recent years almost always been autopsied; perinatal deaths also are almost always (about 90 percent) autopsied; on the other hand, deaths from circulatory diseases (heart disease and stroke primarily) more often than not go unautopsied. Of the people who die each year, anywhere from 30-40 percent of those who are autopsied will be signed out as having died from circulatory disease. Of those who go unautopsied, closer to 60 percent are signed out as due to circulatory diseases.

A number of these patterns have not been stable over the eleven year period. For example, Table 4 indicates the proportion of deaths diagnosed as suicide that were autopsied each year. Though the numbers are small, there is some indication from these figures that the increasing rate that has been observed may be due more to the thoroughness of examination than to an actual increase in the real world. Thus, in 1960 the county switched from a coroner system to a medical examiner system. Though we don't have figures from the 1950's, it is our impression that the medical examiner did a higher proportion of autopsies than did his predecessors. Nonetheless, he was unable to do an autopsy unless he had permission of the family. The law was changed in 1965 so as to allow the medical examiner to do an autopsy without permission of the family. In the middle of 1968, the present medical examiner, who has a specific interest in suicide, was appointed. These institutional changes appear to be related to some increase in the rate over the 11 year period.

TABLE 4—*Suicide rates, Monroe County, New York.*

Year	Total Suicides	Suicide Rate per 100,000	Autopsied, %
1960	57	9.72	42.1
1961	67	11.2	79.1
1962	58	9.5	63.8
1963	66	10.6	50.0
1964	76	11.99	67.1
1965	65	10.0	73.9
1966	54	8.19	94.4
1967	64	9.52	64.1
1968	76	11.09	60.5
1969	89	12.74	94.4
1970	85	11.94	97.7

It is clear from what we have observed already that where one dies has considerable influence on whether or not one is likely to be autopsied. We have noted that the university hospital draws from the inner city. More to the point, of the blacks who died in 1969-1970, 33 percent died in that institution. Of whites, only 12 percent died there. Though the autopsy rate was the same for each race, (62.8 percent for whites, 69.8 percent for blacks), it is clear that relatively more blacks dying in the city will be autopsied simply because of where they die.

Again, however, race tends to exert an effect independent of the place where one dies. Table 5 gives the autopsy rates (1969-1970) of a variety of institutions. It is clear that in

TABLE 5—Autopsy rates by type of institution (1969–1970), Monroe County, New York.

	White		Black	
	No.	%	No.	%
V.A.	117	52.9	11	91.7
Nursing home, etc.	170	8.8	18	36.0
General Hospital 1 (affiliated)	722	51.0	29	76.3
General Hospital 2 (affiliated)	359	43.7	16	69.6
General Hospital 3 (affiliated)	559	52.4	70	75.3
Unaffiliated Catholic	297	36.2	40	66.7
University	659	62.8	104	69.8
Private	135	35.6	5	62.5
Unaffiliated Community Hospital	31	25.4	0	0
State Mental Hospital	160	33.5	0	0
Other	64	32.3	3	75.0
Other State Institution	2	28.6	1	100.0

virtually all types of institutions blacks are autopsied proportionately more than whites. That age is not the only explanatory variable is evident when we look at the rates from nursing homes and homes for the elderly. Even those hospitals that treat very few blacks have a tendency to autopsy them more than they do whites.

Though a considerable amount has been written over the years concerning the importance of doing autopsies, not much has been written about the process by which consent is obtained. In their study of a university hospital, Duff and Hollingshead [17] noted the pressure for consent exerted on families by house staff. Though private physicians may have felt the desirability of an autopsy, they were much more likely to acquiesce in the families' refusal or leave the hard sell to the house staff, a fact resented by some house officers [18].

Duff and Hollingshead did not present data on the differential autopsy rates of private versus staff patients, though they did indicate that lower class patients were most likely to be autopsied. It was our impression that staff patients would be autopsied more commonly than private patients. In order to investigate that possibility, we obtained data from the university hospital on the characteristics of all people dying in that institution from August 1970 through July 1972 (the only period for which the data were readily available).

Unfortunately for our purposes, the distinction between staff and private is no longer easily made as any patient who is admitted without a private physician is assigned the attending on his service. Thus, for the purpose of record keeping, virtually everyone has a private physician; and it is impossible to distinguish from the records what the reality is. It is even difficult to distinguish patients by the division to which they are assigned because in recent years considerable, though by no means complete, mixing has occurred.

Though we could not distinguish between staff and private patients using the computerized records at our disposal, in the process of attempting to do so an unexpected finding did emerge. In the period for which we had hospital data (August 1970–July 1972) the overall autopsy rate was 58 percent. This was not consistent from service to service, however. Six services had autopsy rates below 50 percent. Five of these were surgical services (out of a total of six surgical floors) and the sixth was the Emergency Department. Many people dying in the Emergency Department are Medical Examiner cases and so are autopsied outside of the hospital and do not necessarily appear on the hospital records.

If we compare the autopsy rates on these five surgical floors with the autopsy rate in the remainder of the hospital (omitting deaths in the Emergency Department), it turns out that the surgical floors have a combined autopsy rate of 41 percent whereas the rest of the

hospital has an autopsy rate of 66 percent. Interestingly, 9 patients died on the psychiatric floors during this two year period, and only 3 were autopsied.

We presume the reason for the lower autopsy rate on the surgical services is the assumption that, having operated, the surgeon knows accurately what the cause of death is. As it was not our purpose in this study to compare ante-mortem diagnosis with post-mortem findings, we are in no position to say what the results of such a study on a surgical service would be. We would not assume *a priori* that diagnosis of cause of death would necessarily be accurate when done after surgery. Many pathologists, indeed, would argue the case rather more strenuously than we have here.

Discussion

We began this paper by suggesting that vital statistics are the product of organizations and that the way such organizations work will determine the validity of the statistics and will be revealed by those statistics. It is clear from the preceding pages that who gets autopsied depends only in part on the kind of disease diagnosed ante-mortem. Also important are such factors as race, age, where one lives, and where one goes to die.

Many years ago Abraham Flexner [19] recommended that university hospitals be built in urban areas where they would be close to a source of "clinical material." Over the years, the complexion of the "clinical material" has changed as different groups have moved in and out of the cities; and it is probably the case that given a high autopsy rate in these hospitals the adequacy of vital statistics has changed correspondingly. Thus, it is likely that during the present century the urban poor have had their deaths reported more accurately than any other group. While this may be of little consolation to the affected groups, it is perhaps of some use to the epidemiologist and historical demographer.

Throughout most of this paper, we have discussed the process by which autopsy patterns may reveal the workings of a variety of social institutions. At this point it is appropriate to ask what these findings may reveal about the validity of vital statistics in general. We have already suggested that such figures are more likely to be valid for the urban poor, nowadays the black urban poor, than for other groups. Moreover, figures for young people are likely to be more valid than for older people.

It is thus likely to be the case that epidemiological studies in populations with demographic and health care features similar to those described here will experience some difficulty in attempting to compare diseases between races, even correcting for age. The difficulties are enhanced, of course, when one attempts to make regional comparisons. It has been noted, for instance, that death rates from cerebrovascular disease are higher for blacks than whites and higher for blacks in southern rural areas than in northern urban areas [20]. It has been suggested that sociological rather than biological factors are of most explanatory value, relating perhaps to level of social stress or dietary habits. It may well be, however, that urban blacks are autopsied more commonly than rural blacks and so a more nearly accurate assessment of the true incidence of cerebrovascular disease is possible. Similarly, if blacks are autopsied more frequently than whites, their higher death rate may be attributable in part at least to more adequate postmortem diagnosis (see, however, Ref 21). As this is not a study of the epidemiology of cerebrovascular disease, we do not propose to pursue the topic further save to suggest that a variety of diseases said to differ between races and regions may be a result of nothing more than different prevailing autopsy practices.

In addition, one may legitimately ask on what basis autopsies are done? Clearly, there are numerous reasons for doing autopsies: to maintain hospital accreditation; for teach-

ing and research; for legal purposes; and, perhaps incidentally, to help assure the validity of vital statistics. All of these factors help determine the pattern that emerges in any region. We have shown, however, that they seem to lead to the over-autopsying of the young, the black, and the poor as opposed to the elderly, the white, and the somewhat more affluent.

As the population changes, however; that is, as age increases and disease patterns change from the acute to the chronic; one might wonder whether the present policy concerning who gets autopsied is indeed the most appropriate one. As Bauer and Robbins [11] have pointed out, cancers of all sorts are becoming more common as a cause of death and are still missed or mis-diagnosed at the same rate as 50 years ago. We recognize, of course, that there is no "policy" as such but rather a congeries of interests all of which result in something that looks like a policy only after the fact. Nonetheless, what would happen to the validity of vital statistics if, instead of autopsying in the present fashion, we did something like autopsy a random sample of the population that dies each year? Clearly, many more people would be autopsied who are older, white, and affluent. In addition, we would autopsy many more people who die of what are presumed to be the most common causes—circulatory diseases and cancer, for instance. While these may be the most common problems, it is by no means clear that they are the best understood.

We should note that autopsies are expensive. Each one may cost \$200–\$300. If we assume the lower figure is correct and that 33 percent of the 67,540 deaths were autopsied, it turns out that almost 4.5 million dollars have been spent on autopsies in Monroe County during the years 1960–1970, though this estimate may be 50 percent below the real figure. Given the changing disease and population patterns as they appear to be emerging in this country, it is interesting that a disproportionate amount of money is spent on the less common problems. There are, as we mentioned above, many reasons for doing autopsies, not all of which have to do with understanding the pathophysiology of the most common causes of death. Whether it is "appropriate" to do autopsies primarily on the less common problems and not on the most common ones is a question of social policy and values and is not necessarily answerable in scientific terms. In any case, it may well be that so many people die of common causes that there are still enough autopsied to satisfy investigative purposes at the same time as less common causes continue to be studied.

We believe it to be true, however, that as the cities continue to change in their demographic composition, the validity of vital statistics will change accordingly. In addition, if autopsy policies change in some fashion—if, for instance, every hospital in the county had an autopsy rate of 75 percent—we might see a change in the distribution of a variety of diseases. It would be useful to be able to assess how much of the changing disease patterns we are likely to see in the future will be due to policy changes concerning autopsies and how much will be due to changes actually taking place in the real world. At present, such assessments are almost impossible to make.

We have pointed out, then, that several factors are involved in the pattern of autopsies as they have emerged in this study. Clearly, where one dies is an important variable and is by no means random but reflects the organization of the entire medical care system. Race also exerts an independent effect, witness the generally higher autopsy rate for blacks in all hospitals but the university's. Both the organization of medical care and the differing attitudes towards blacks are of course a reflection of larger forces acting in the general society. As such, the epidemiology of autopsies is a rough indicator of the quality of social relations, much as blood donation [22] and the selection of subjects for human research [23] are.

A third important factor determining the likelihood of being autopsied is age. There are probably a variety of reasons for the higher incidence of autopsies among the young than the elderly. Most important, perhaps, is that the death of a young person is relatively unexpected and therefore worthy of investigation. We suggest, however, that this has had the paradoxical effect of attracting attention away from the most common events—deaths among the elderly; paradoxical in that we are witnessing a rather new phenomenon in demographic history, the emergence of aging populations. Due to our common sense notion that death is a natural event among the elderly, we are not investigating a phenomenon about which we really know very little, the aging process itself. As fertility declines, the elderly represent a larger and larger proportion of the population. Increasingly we have been, and will continue to be, faced with the problem of chronic and degenerative diseases. It would appear appropriate to devote more resources to their understanding.

Summary

We have shown that the autopsy pattern in one urban county over an 11 year period had led to a disproportionately high autopsy rate among young people and blacks at all ages. We have suggested that this is in part due to the high autopsy rate (for all races) at the university hospital along with the fact that the largest number of blacks die there. In addition, however, blacks who die at other institutions are autopsied more frequently than whites dying in those same institutions. This pattern is a reflection of both the organization of the medical care system in this and other urban communities as well as the prevailing attitudes towards blacks in particular and the poor in general.

The fact that the young are autopsied more frequently than the elderly is understandable in terms of our common sense notions of the unnaturalness of death among the former as opposed to the latter. It has had the paradoxical effect, however, of drawing our attention away from that segment of the population whose diseases are becoming of increasing concern and importance to the medical care system generally. We have thus suggested that an alternative pattern of autopsying which directs our attention to the investigation of chronic degenerative diseases might be a more appropriate strategy in the years to come as fertility continues to decline and we are increasingly faced with an aging population.

Acknowledgments

The research on which this report is based was supported in part by NIMH grant No. 1R01MH21273. We are grateful to Dr. Robert L. Berg, Dr. James Bartlett, Dr. Milton Bohrod, Mr. Gerald Bunce, Dr. Charles Odoroff, Mr. James Pifer, and Dr. Klaus Roghmann for a variety of aid and advice. We are especially grateful to Mr. Fito M. Logrillo, Director of the Office of Biostatistics of the New York State Health Department, and to other members of the staff for making available to us the death certificate tapes in their care.

References

- [1] Kitsuse, J. I. and Cicourel, A. V., "A note on the uses of official statistics," *Social Problems*, Vol. 11, 1963, pp. 131-139.
- [2] Wilson, J. Q., "The police and the delinquent in two cities" in *Controlling Delinquents*, S. Wheeler, Ed., Wiley, New York, 1968.
- [3] Douglas, J. D., *The Social Meanings of Suicide*, Princeton University Press, Princeton, New Jersey, 1967.
- [4] Feinstein, A. R., "The intellectual morbidity of vital statistics," *Medical Counterpoint*, Vol. 1, 1969, pp. 34-40.
- [5] Feinstein, A. R., *Clinical Judgment*, The Williams and Wilkins Company, Baltimore, 1967.

- [6] Arthaud, J. B., "Autopsies in the United States—frequency by states," *Journal of the American Medical Association*, Vol. 213, 1970, p. 1195.
- [7] Teare, R. D., "The Scotland Yard Autopsy," *Bulletin of the New York Academy of Medicine*, Vol. 44, 1968, pp. 843–853.
- [8] Dean, G., "The need for accurate certification of the cause of death and for more autopsies," *Journal of the Irish Medical Association*, Vol. 62, 1969, pp. 273–278.
- [9] Britton, M., "The consequences of informing relatives of intended autopsies in conjunction with death in hospital," *Acta Socio-Medica Scandinavica*, Vol. 4, 1972, pp. 37–58.
- [10] Wells, H. G., "Cancer statistics as they appear to a pathologist," *Journal of the American Medical Association*, Vol. 88, 1927, pp. 399–403.
- [11] Bauer, F. W. and Robbins, S. L., "An autopsy study of cancer patients: I. accuracy of the clinical diagnoses (1955 to 1965) Boston City Hospital," *Journal of the American Medical Association*, Vol. 221, pp. 1471–1474.
- [12] Prutting, J. M., "Introduction to the symposium on medical progress and the postmortem," *Bulletin of the New York Academy of Medicine*, Vol. 44, 1968, pp. 793–798.
- [13] Kuller, L. and Seltser, R., "Cerebrovascular disease mortality in Maryland," *American Journal of Epidemiology*, Vol. 86, pp. 442–450.
- [14] Florey, C., Senter, M., and Acheson, R., "A study of the validity of the diagnosis of stroke in mortality data: II. comparison by computer of autopsy and clinical records with death certificates," *American Journal of Epidemiology*, Vol. 89, 1969, pp. 15–24.
- [15] Babigian, H. M. and Odoroff, C. L., "The mortality experience of a population with psychiatric illness," *American Journal of Psychiatry*, Vol. 126, 1969, pp. 470–480.
- [16] Wersinger, R., "Service areas for patient care in the County of Monroe and City of Rochester," Genesee Region Health Planning Council, Rochester, New York, 1970.
- [17] Duff, R. S. and Hollingshead, A. B., *Sickness and Society*, Harper and Row, New York, 1968, see especially pp. 320–329.
- [18] Katz, J. L. and Gardner, R., "The intern's dilemma: the request for autopsy consent," *Psychiatry in Medicine*, Vol. 3, 1972, pp. 197–203.
- [19] Flexner, A., *Medical Education in the United States*, A Report to the Carnegie Foundation for the Advancement of Teaching, Bulletin No. 4, New York, 1910.
- [20] Moriyama, I., Krueger, D. E., and Stamler, J., *Cerebrovascular Diseases in the United States*, Vital and Health Statistics Monographs, American Public Health Association, Harvard University Press, Cambridge, Mass., 1971, p. 227.
- [21] Kuller, L. H., Bolker, A., Saslaw, M. S., Paegel, B. L., Sisk, C., Borhani, N., Wray, J., Anderson, H., Peterson, D., Winkelstein, W., Jr., Cassel, J., Spiers, P., Robinson, A. G., Curry, H., Lilienfeld, A. M., and Seltser, R., "Nationwide cerebrovascular disease mortality study: II. comparison of clinical records and death certificates," *American Journal of Epidemiology*, Vol. 90, 1969, pp. 545–555.
- [22] Titmuss, R. M., *The Gift Relationship*, Pantheon Books, New York, 1971.
- [23] Gray, B. H., "Some vagaries of consent" in *Experimentation with Human Beings*, J. Katz, Ed., Russell Sage Foundation, New York, 1972.

Department of Preventive Medicine
260 Crittenden Boulevard
Rochester, New York 14642