Systematic collection of epidemiological data on suicides may help in understanding the causes of suicide. The study also concludes that the family physician is in a key position to recognize the potential suicide and refer him to psychiatric resources as a hygienic precaution.

Study of Suicide in Philadelphia

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SUICIDE is an important and pressing problem. The figure of 141 suicides reported in Philadelphia in 1955 is not substantially lower than the 176 automobile fatalities in the same period. The importance is not lessened by the fact that there has been a downward trend in suicide since 1900, when the rate of suicide in Philadelphia was 11.3 per 100,000. In 1955 it was 7.2 per 100,000. In general, the 1900–55 trend in Philadelphia parallels that for the United States during the same timespan.

In cooperation with the office of the medical examiner, the division of mental health of the Philadelphia Department of Public Health conducted a study of suicides that occurred in Philadelphia during the 5-year period 1951–55. The purposes of the study were (*a*) to learn more about the characteristics of individuals who commit suicide, (*b*) to determine what data should be gathered routinely to obtain a better understanding of the suicide, and (*c*) to determine ways in which a public health agency might be instrumental in the prevention of suicide.

Data on the suicides were obtained from the records in the office of the medical examiner. The records included information obtained by police who questioned immediate members of the family, relatives, neighbors, landlords, and occasionally the family doctor at the time of the suicide. Additional facts had been obtained from the person who identified the body at the morgue. When members of the immediate family were too upset to perform this task, a more distant relative or friend less emotionally involved was substituted. In some cases information had been obtained at a formal inquest. Since the data were gathered from many different sources, it is understandable why the records showed considerable variation in the amount of information. When the suicide was a single person without relatives the information was sketchy.

Very little knowledge of the dynamics in the suicide was obtainable from the records, but some inferences about contributory factors and motivation can be drawn. Extreme caution, however, should be exercised in the interpretation of such data because the information may be unreliable and because factors found to be associated with suicide may not be causally connected.

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Classification of Suicides

In Philadelphia, during the 5-year period 1951–55, 742 deaths were classified as suicides by the office of the medical examiner. Of these, 555, or 75 percent, were men and 187, or 25 percent, were women. For whites, the sex ratio was 74 percent men and 26 percent women; for

the nonwhites, it was 83 percent men and 17 percent women. Because of the small number, the 12 nonwhite women in this study are not analyzed separately.

Ten percent of the suicides were nonwhite, whereas in the Philadelphia general population aged 15 years and older in 1950, 17 percent were nonwhite. The under-representation of nonwhites among suicides in Philadelphia follows the national pattern (*1*).

Of the total group, 90 percent were residents of Philadelphia, 9 percent were nonresidents, and about 1 percent were persons whose residence was not determinable.

Using the average estimated health district population during the 1951–55 period as a base, and the residential address of each suicide, rates were calculated for the 10 health districts into which the city is divided. The rates varied from 5.1 to 9.0 per 100,000 population in the various health districts. The highest rate was found for the center-city district, which includes cheap hotels, rooming houses, and "skid row." This finding agrees with those in studies in Chicago (*2*, *3*), in Minneapolis (*4*), in Seattle (*5*), and in Providence (*6*) that suicide is more prevalent in socially disorganized parts of the city.

The data, however, do not support the conclusion of the Minneapolis study that the suicide rate decreases in direct proportion to the number of miles from the center of the city. Actually, it is most difficult to make any generalizations about the distribution of suicides among the health districts because of (*a*) the lack of accurate population statistics within each health district, (*b*) the shifting of population from one health district to another, and (*c*) the number of factors associated with suicide, such as sex, race, age, and marital status. At best the data suggest that the suicide rate varies less than the incidence of mental disorder from one health district to another (*7*).

Philadelphia's suicide rate of 7.2 is lower than the national rate, which was 10.1 in 1953, the latest year for which statistics are available (*1*).

The Philadelphia rate is also lower than that of other large cities. For example, in Detroit (*8*) and in Baltimore (*9*) the suicide rates in 1955 were 9.8 and 10.0. In Cleveland (*10*) the suicide rate for 1953–54 was 12.8. For Cleveland and Baltimore, rates were 14.4 and 11.8 for whites, and 5.7 and 5.3 for nonwhites. The Philadelphia rates for the 1951–55 period were 7.9 for whites and 3.7 for nonwhites.

Table 1. Suicide rate [1] per 100,000 population, by age, sex, and race, Philadelphia, 1951–55

Age group	White		Nonwhite		Total group
	Males	Females	Males	Females	
75 and over	47.1	7.7	10.8	0	21.7
65–74	35.2	9.2	20.7	3.0	19.9
55–64	35.8	7.4	14.7	1.6	19.7
45–54	16.5	6.6	4.2	1.7	9.9
35–44	9.4	6.2	10.4	1.8	7.3
25–34	6.7	2.8	13.1	1.0	5.0
15–24	2.9	0.7	1.6	1.9	1.8
Total rate [2]	12.1	4.0	6.6	1.2	7.2

[1] Rates calculated by dividing the total number of suicides in each age group in the 5-year period by the appropriate 1950 census figures multiplied by 5.
[2] Does not take into account the age-specific rate for each group.

The lower rates in Philadelphia are difficult to explain. Presumably, the pressures of day-to-day living are no less in Philadelphia. It may be that the differences between the local rate and rates elsewhere in the country are a function of the adequacy of the reporting of suicides in Philadelphia. The medical examiner indicates a possibility that Philadelphia's suicide rate during the years in question may have been spuriously low. With the present improved laboratory facilities and more thorough investigation, the number of deaths classified as suicides may be expected to increase.

Age and Marital Status

The age of the suicides ranged from 15 to 94. There were significant (.01 level) sex and race differences. Among whites, 76 percent of the men were over 45 years of age compared with 63 percent of the women. Among males, the majority of nonwhites were under the age of 45; while the majority of whites were above the age of 45. The median age was 57.5 for white males, 51.1 for white females, and 38.0 for nonwhite males.

Age-specific rates, given in table 1, show a clear tendency for suicide rate to increase with age. There are, however, important differences between whites and nonwhites and between men and women. For whites, the increase of suicide rate with age is clear and is somewhat more pronounced for men than for women. These age differences generally agree with suicide rates for the country as a whole although the national rate for white women most frequently reaches a peak between the ages 55–64 and then decreases (*1*).

For nonwhite men, the suicide rate does not increase consistently with age. This may be a function of the small number of cases in the sample. It is clear, however, that the rate is highest for nonwhite males in the 65 years of age and older category.

Information on marital status, presented in table 2, was available in nearly all cases. It can be seen that nonwhites had a higher proportion of separated or divorced (23 percent) than the whites (13 percent), fewer widowed (4 percent) than the whites (17 percent), and more single persons (27 percent) than the whites (19 percent). The significant difference in marital status between whites and nonwhites may be, in part, due to differences in age. Since the nonwhites were a younger group, one would expect a lower incidence of widowed among them than among the whites. However, the differences between the two groups in the proportion of separated or divorced cannot be attributed to differences in age.

The marital status of the suicides was different from that of the general population in Philadelphia (1950 census). Comparisons were made between the suicides and the general population for those between the ages of 25 and 44 and those 45 years of age and older. No comparisons were made for the group under 25 years of age because there were only 26 suicides in this age category.

Among the suicides, there was a higher incidence of single, widowed, and separated or divorced persons than in the general population. The difference between the suicides and the general population was evident for both men and women and for whites and nonwhites in the two age groups. Of the white men aged 25 to 44, 30 percent of the suicides were single compared with 20 percent of the general population; 23 percent of the suicides were separated or divorced compared with 4 percent of the general population. For white women and nonwhite men, the differences between the suicides and the general population were similar.

For the age group 45 and over, the differences between the suicides and the general population were less marked with respect to single, and separated and divorced persons, but were in the same direction. As may be expected, a larger proportion of people in this age category were widowed than in younger age groups. For white men and women, but not for nonwhite men, the incidence of widowed was greater for the suicides than for the general population.

Table 2. Marital status of suicides, by race and sex (in percentages), Philadelphia, 1951–55

Marital status	White		Nonwhite		Total group (N= 742)
	Males (N= 496)	Females (N= 175)	Males (N= 59)	Females (N= 12)	
Single	20	17	27	25	20
Married	49	47	42	67	48
Widowed	16	22	3	8	16
Divorced or separated	14	13	27	0	14
Not stated	2	1	0	0	2

Nativity and Employment

Data on nativity indicated that 25 percent of the entire group was foreign born: 7 percent of the nonwhites and 27 percent of the whites. This is considerably higher than the 1950 census figures for Philadelphia, which show only 11 percent foreign born. This difference is more apparent than real and is due to the higher incidence of older people among the suicides than in the general population. When corrections are made for age, the difference between the incidence of foreign born among the suicides and in the general population disappears (table 3).

Data with respect to employment, physical and mental health, medical supervision, history of alcoholism, history of previous attempts or

Table 3. Percentage of foreign born among white [1] suicides and in the general white population, by age, Philadelphia, 1951–55

Age of foreign born	Suicides	General population [2]
65 and over	44	40
45–64	30	31
25–44	8	7
15–24 [3]	10	2

[1] Too few of the nonwhites were foreign born to permit a comparison of them with the general population.
[2] 1950 census.
[3] Number of suicides in age group=21.

Table 4. Employment status [1] of suicides, by race and sex (in percentages), Philadelphia, 1951–55

Employment status	White		Nonwhite		Total group (N=623)
	Males (N=489)	Females (N=69)	Males (N=59)	Females (N=6)	
Employed	35	39	31	17	35
Unemployed	26	25	25	0	26
Retired	14	4	3	0	12
Not stated	25	32	41	83	28

[1] Excluding housewives and students.

threats, and reported causes, are given for the total group only. Because of the high proportion of cases in which no information was available for these factors, it was not possible to make valid comparisons by race and sex.

Twenty-six percent of the suicides (table 4) were reported to have been unemployed. In half of the unemployed cases, poor physical or mental health was given as the reason for unemployment; in only 3 percent of the cases, seasonal opportunities for work or poor performances on the job were given as reasons, and in the balance of the cases the reason was not stated.

A breakdown by age groups shows very little variation in the percentage of individuals unemployed. The percentages vary from 23 percent of those in the age group 25–44 years to 28 percent of those in the age group 45–64 years. Of those in the 65 and older age category, 23 percent were reported to have been unemployed and 39 percent retired. For those below the age of 65, the incidence of unemployment is considerably greater than that found in the general population of Philadelphia, and even this is an underestimation since no information was available on employment for about 30 percent of the cases. For those 65 and older, the percentage unemployed or retired is about the same as in the general population in this age category, but information was lacking in 23 percent of these cases.

Physical and Mental Health

Reports of physical health (table 5) had been obtained from a number of different sources, usually from immediate members of the family and other relatives, from friends and neighbors, and occasionally from the family physician. Of the entire group 43 percent were reported to have been in poor health. Good health was reported in only 8 percent of the cases. In 48 percent of the cases no information was available about health status.

Information varied regarding mental illness (table 6). In some cases, the record referred to the fact that the deceased had been suffering from a nervous or mental condition without specifying symptoms. In others a nervous or mental condition was mentioned, together with specific symptoms indicating disturbance in mood, feelings, or behavior. These were primarily described as depressed states, but also as morose, brooding, agitated, upset, worried, confused, queer, acting odd, or remote. In still others the record made no mention of nervous or mental condition but did contain a de-

Table 5. Physical health of suicides as reported by relatives and friends, by race and sex (in percentages), Philadelphia, 1951–55

Health	White		Nonwhite		Total group (N=742)
	Males (N=496)	Females (N=175)	Males (N=59)	Females (N=12)	
Good	8	9	10	8	8
Ill	47	39	29	25	43
Not stated	45	53	61	67	48

Table 6. Reported mental condition of suicides, by race and sex (in percentages), Philadelphia, 1951–55

Mental condition	White		Nonwhite		Total group (N= 742)
	Males (N= 496)	Females (N= 175)	Males (N= 59)	Females (N= 12)	
Presumably normal	4	3	0	0	4
Nervous or mental condition	27	55	19	33	33
Mood or behavioral symptoms	39	29	24	17	35
Not stated	30	13	57	50	28

scription of mood, feelings, or behavior. For two-thirds of those suffering from a nervous or mental condition, but for only 3 percent of those with disturbances of mood and/or behavior, a history of nervous or mental condition was also reported.

Of the total group, 10 percent were reported to have had a history of alcoholism. This incidence may be an underestimation since information was not available for 90 percent of the cases. Nevertheless, the incidence of alcoholism among the suicides is considerably greater than that found among the general population, which has been calculated to be 4 percent by the alcoholism unit of Philadelphia General Hospital on the basis of the Jellinek formula.

Receiving Medical Care

In the case of persons who had been under medical care (table 7), the majority of the records gave the name of the physician and usually indicated whether the suicide had been under general medical supervision or under psychiatric care. When there was any doubt, the name of the physician was checked in the county medical society directory. In the other cases, the record merely stated that the deceased had been going to a doctor. In these cases it was not possible to determine the kind of medical care the deceased had received. As would be expected, there was a higher proportion under medical care (77 percent) among those for whom poor physical or mental health was reported.

Of the entire group, 13 percent were reported to have threatened suicide and an additional 9 percent had made one or more attempts. For 3 percent of the cases both previous attempts and threats were reported. Twenty-five percent incidence of either threats or attempts is probably an underestimation, since three-fourths of the records had no information on this point and in some cases threats were implied: "said he would be better off dead," "several times had said she wanted to die," "told wife he had nothing to live for and would be better off dead."

Causes of Suicide

The reported causes for the suicide, or unusual circumstances preceding the death, varied considerably. The causes, and the percent reporting these causes, are presented in table 8.

It is interesting to note that, although two-fifths of the suicides had been reported by relatives and friends to have been in poor physical health, it was given as the cause for suicide by only 18 percent. A similar discrepancy exists for mental disorders. However, it is possible that mental disorders may have been implicit in reasons classified under other categories: disturbed over the death of a relative, depressed, or very much upset when the spouse left him.

Although it is not valid to treat the data statistically because no information is available in nearly half of the cases, the findings suggest that age may be a factor in the causes or un-

Table 7. Medical care and supervision of suicides, by race and sex (in percentages), Philadelphia, 1951–55

Type of care	White		Nonwhite		Total group (N= 742)
	Males (N= 496)	Females (N= 175)	Males (N= 59)	Females (N= 12)	
Medical	29	41	8	8	30
Psychiatric	5	9	0	8	6
Type not specified	14	22	19	25	16
None	6	7	7	17	6
Not stated whether under care	46	21	66	42	41

Table 8. Reported causes or unusual circumstances in suicides, Philadelphia, 1951–55

Causes	Example	Percent of suicides [1]
Physical illness	Chronic illness	18
Mental disorders	Depression	12
Death or illness of relatives.	Spouse died	8
Financial and job difficulties.	Laid off from job	7
Disturbed family relationships.	Wife left him	5
Police or court action	Awaiting trial	4
Violence including threats	Murdered wife	4
Changed environment	Immigrated to city.	2
Unhappy love affair	Jilted by girl friend.	1
Miscellaneous	Suicide pact	1
None stated		44

[1] In about 5 percent of the suicides, more than one reason was given.

usual circumstances preceding the suicide. For those 45 years and older physical illness was reported as the cause in 25 percent of the cases compared with 3 percent for those under 45; while mental illness was mentioned as the cause in 9 percent of those 45 and older compared with 19 percent of those under 45. Disturbed family relationships were given as the cause for 13 percent of those under 45 compared with 2 percent of those 45 and older. Violence also seemed to be operating more in the younger group (10 percent compared with 2 percent of those 45 and older).

Method of Suicide

The method of suicide most frequently used was hanging, usually by rope (table 9). Firearms was second, and poison was third. Poisons included household drugs and chemicals such as barbiturates, aspirin, and morphine, and lye, ammonia, phenol, turpentine, and arsenic.

There was a significant sex difference with respect to the methods employed. Women were more likely to use poison and gas and less likely to use firearms than men. No significant race differences were found in method of suicide but age was a factor for men. Forty-two percent of the men aged 45 and older used hanging compared with 32 percent of those under 45; while 22 percent of those under 45 used poison and gas compared with 13 percent over 45.

Place of Suicide

The majority of the suicides took place in the home of the deceased (table 10). Twenty percent occurred on the street and in other public places. Women were more likely to commit suicide in their own homes and less likely to do so on the street and other public places. Of those suicides that occurred in the home, the bedroom and cellar were the preferred places. Each of these was chosen in about one-third of the cases. The kitchen and bathroom were each used by about 10 percent of the cases.

Twenty-four percent of the entire group left one or more suicide notes. A comparison of those who left notes with those who did not shows no significant differences with respect to sex, age, race, or marital status.

There was a significant difference, however, in regard to the method of suicide. Poison was used by 18 percent of those who left notes, but by 8 percent of those who did not leave notes. Firearms were used by 29 percent of those who left notes, but by 19 percent of those who did not. By contrast, hanging was the method used by 40 percent of those who did not leave notes, but by 31 percent of those who did.

No relationship was found between suicide

Table 9. Method of suicide, by race and sex (in percentages), Philadelphia, 1951–55

Method	White		Nonwhite		Total group (N=742)
	Males (N=496)	Females (N=175)	Males (N=59)	Females (N=12)	
Hanging	41	34	27	33	38
Firearms	26	8	22	25	21
Jumping	8	14	14	17	10
Cutting or piercing	6	2	5	8	5
Poison	7	22	9	17	11
Gas, carbon monoxide	9	14	10	0	10
Drowning	2	2	14	0	3
Other	2	3	0	0	2

Table 10. Place of suicide, by race and sex (in percentages), Philadelphia, 1951–55

Place	White		Nonwhite		Total group (N = 742)
	Males (N = 496)	Females (N = 175)	Males (N = 59)	Females (N = 12)	
Home	66	80	51	83	68
Business	5	1	2	0	4
Hospital	5	5	2	0	4
Relative's house	2	2	3	0	2
Prison	2	0	7	0	2
Other	21	12	36	17	20
Not stated	0	1	0	0	(1)

[1] Less than 0.5 percent.

and day of the week, month of the year, day of the lunar month, or season of the year. Certain times of the day are preferred to others, but the findings should be interpreted with considerable caution since information was available for only 38 percent of the cases. Of these, one-fifth occurred between 9 a. m. and 12 noon, one-sixth between noon and 3 p. m., and another one-sixth between 6 a. m. and 9 a. m. Only one-tenth occurred between midnight and 6 in the morning.

Discussion

This study, like other epidemiological studies of suicide, is limited because of the inadequacies of medicolegal records. Coroners, of necessity, gather information to establish the cause of death rather than to understand the suicide. If more significant insights and knowledge about suicide are to be developed, systematic information needs to be gathered at the time of death. Such information about the suicide should include his developmental background, extent of education, stability of employment, income, health, history of previous psychiatric hospitalization including diagnosis of mental disorder, interpersonal relationships, pattern of adjustment, temperament, interests, stress situations, and whatever other factors that may be deemed important. Such information should be obtained not only from members of the family, relatives, and friends but also from more objective collateral sources, such as the family doctor and employer, and through search of court, hospital, and social agency records.

The important finding of this study was that the majority of the suicides had been under medical supervision prior to their death, usually by the family doctor. This suggests that the family doctor is in a key position to recognize psychiatric problems in his patients at the earliest possible time and to refer them to appropriate psychiatric resources for special care and treatment. It would be helpful if material on the problem of suicide, with emphasis on methods of detecting individuals with suicidal tendencies, were introduced in the medical school curriculum.

REFERENCES

(1) U. S. National Office of Vital Statistics: Suicide. Death rates by age, race, and sex: United States, 1900–1953. Vital Statistics—Special Reports, vol. 43, No. 30. Washington, D. C., U. S. Government Printing Office, 1956.

(2) Cavan, R. S.: Suicide. Chicago, University of Chicago Press, 1928.

(3) Mowrer, E. R.: Disorganization, personal and social. Philadelphia, J. B. Lippincott Co., 1942.

(4) Schmid, C. F.: Social saga of two cities. An ecological and statistical study of social trends in Minneapolis and St. Paul. Minneapolis Council of Social Agencies Monograph Series No. 1. Minneapolis, 1937.

(5) Schmid, C. F.: Suicides in Seattle, 1914–1925. An ecological and behavioristic study. Seattle, University of Washington, 1928.

(6) Faris, R. E. L.: Social disorganization. New York, Ronald Press, 1948.

(7) Tuckman, J.: Characteristics of patients admitted to the psychiatric division of Philadelphia General Hospital in 1954. Philadelphia, Division of Mental Health, Department of Public Health, 1956.

(8) Detroit Department of Health: Annual report, 1955. Detroit, Mich., 1956.

(9) Baltimore Department of Health: Annual report, 1955. Baltimore, Md., 1956.

(10) Cleveland Division of Health: Biennial report, 1953–1954. Cleveland, Ohio, 1955.