

**Statistics on Suicide and
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Suicide rates among young adults in the United States have been on the rise in the past four decades, with white males at greatest risk.¹ In 1897, Emile Durkheim proposed that religion provided a source of social integration that decreased the likelihood of suicide.² His hypothesis was based on research of religious affiliation and suicide rates in Europe. Pope's reanalysis of Durkheim's data, using covariates such as economic status, casts doubt on Durkheim's interpretation of the data.³ However, others have suggested that religious affiliation is an important factor in the study of suicide,⁴ and studies including religious measures other than religious affiliation have usually found an inverse association between religious activity and suicide.⁵ Specifically, Stack studied the association of church attendance and suicide and found it most significantly related in young adults, the group with the greatest decline in church attendance.⁶

The purpose of our study is to quantify the relationship between Latter-day Saint Church activity, as measured by ordination of male members to priesthood offices, and suicide rates in the State of Utah from 1975 to 1979. The young Latter-day Saint men who attain the appropriate priesthood offices in their church provide an identifiable subpopulation of Utah males who have regular church attendance.

Utah was settled by members of The Church of Jesus Christ of Latter-day Saints; in 1999 about 70 percent of the state's population belonged to this religious faith.⁷ The Church affirms that the priesthood should be available to all male members age twelve and above who meet certain activity requirements (including regular church attendance). The Church keeps accurate records regarding ordination of male members to the Aaronic Priesthood (first available at age twelve) and the Melchizedek Priesthood (first available at age eighteen). Thus, ordination to priesthood offices is a reasonable surrogate for church activity among young LDS males.

Subjects and Methods

LDS Church Membership Records. Children are blessed and given a name (equivalent of christening) in the Church within six months of birth. At this time, a membership record is created. The membership

record becomes permanent when a child is baptized, usually at age eight. Children who were blessed and given a name but not subsequently baptized are removed from Church records at age twenty-one.

The Church created a centralized record system for all its members in 1941 by entering the membership records of each local Church unit into a master file maintained at Church headquarters in Salt Lake City. This central file held the membership record, and the local unit also maintained a copy. Thereafter, when a person became a member of the Church, a clerk in the local unit created a membership record in duplicate. The original was sent to Church headquarters in Salt Lake, and the local unit kept the duplicate. Changes such as baptism, marriage, divorce, ordination to priesthood, or death were recorded on the record at the local units, and a copy of the action was sent to the central file, where the record was updated. Between 1962 and 1984, the Church automated this system, but hard-copy records were maintained on individuals at Church headquarters through 1983.

Before 1984, the local-unit clerk marked the date of a just-deceased member's death on the record and forwarded it to the central file. The person's central record was marked "deceased" and placed into a separate file organized alphabetically under the year of death. These records were then microfilmed.

Between 1982 and 1984, the records of all members who died from 1941 to 1982 were entered onto magnetic tape.⁸ The data elements captured were name, date of birth, names of spouse and children (if applicable), and information on priesthood ordination.

Examination of the data clearly showed they were incomplete after 1980. One possible reason is that computer automation had begun to impact the quality of the nonautomated files. As a result, data on deceased LDS Church members is accurate from 1941 to approximately 1980 only. Thus to examine mortality data of the LDS population in Utah, we restricted our data set to those resident in Utah between 1975 and 1979 inclusive. This five-year period is complete, with little or no discernible effect from the automation project.

Denominators. The number of LDS Church members by age and priesthood level was available from the Church's automated record system beginning in 1975. These numbers provided the denominator for the rates for the LDS population. To calculate the suicide rate for 1975–79, we used the LDS population in Utah as of July 1, 1977. The LDS population was subtracted from the estimate of the total Utah population for 1977 based on the U.S. census for 1970 and 1980 to obtain age-specific denominators for the non-LDS population.

Cause of Death. The LDS Church's records of deceased members do not provide the cause of death. In order to obtain this information, we had to link the Church records to the death certificates for Utah. The death certificates for 1975 to 1979 were available from the State of Utah in a machine-readable form for this purpose.

Record Linking. Probabilistic record linking was used.⁹ For this matching, the principal components were SOUNDEX-coded¹⁰ last name, last name, SOUNDEX-coded first name, first name, first initial, middle initial, birth day, birth month, birth year, and marital status. Weights were assigned by the algorithm.¹¹ Each linked record had to match in at least seven of the ten categories. After the computer program was run, each match was hand checked.

The underlying cause of death coded by nosologists of the State of Utah Bureau of Vital Records was accepted as the cause of death, and no recoding was done. International Classification of Diseases codes 950–59¹² were accepted as suicides.

There were 339 suicides in Utah for males ages 15–34 for the years 1975–79. The record-linking algorithm identified 184 Utah suicides that were committed by LDS Church members.

Measuring Church Activity. As a policy, an active male member of the Church is ordained to the Aaronic Priesthood on or shortly after his twelfth birthday. A young man who remains active is ordained to the Melchizedek Priesthood, usually sometime around his nineteenth birthday. Since census data were available for standard five-year age groups, the following definitions were used for LDS Church activity. For young men ages 15–19, those who had been ordained to the Aaronic Priesthood were considered to be active. Those who had been baptized but remained unordained were considered inactive. Those who had not been baptized or who were not matched to the deceased member file were considered to not be members of the LDS Church. For men ages 20–34, those who had been ordained to the Melchizedek Priesthood were considered to be active. Those who were ordained only to the Aaronic Priesthood or were baptized but not ordained were considered to be inactive. Those who were not baptized or not linked were considered to not be members of the LDS Church.

Rates. Age-specific rates by five-year age intervals from ages 15 to 34 were calculated for each of the three subgroups: active LDS, inactive LDS, and non-LDS. The age-specific rates were then applied to the 1970 U.S. population, and an adjusted rate was computed. The standard error of each rate was then calculated.¹³ A rate ratio using the active LDS population as the referent category was calculated. The associated confidence interval was estimated at 95 percent.¹⁴

TABLE 1. Number of suicides by church status for men ages 15–34 for the years 1975–79.

Status	Suicides	Population at Risk
Active LDS	59	583,165
Inactive LDS	124	268,955
Non-LDS	156	248,500

TABLE 2. Age-adjusted suicide rates per hundred thousand and rate ratios with 95 percent confidence intervals for 15-to-34-year-old males in Utah, 1975–79.

Status	Direct Std. Rate	Std. Error Rate	Ratio	Lower Limit	Upper Limit
Active LDS	9.77	1.29	1.00		
Inactive LDS	41.70	4.20	4.27	2.88	5.66
Non-LDS	62.10	4.98	6.36	4.44	8.28

In table 3, the age-adjusted rates and the rate ratios for 15- to 24-year-olds and 25- to 34- year-olds are compared to the 1977 U.S. rates for white males.¹⁵

TABLE 3. Age-adjusted suicide rates per hundred thousand and rate ratios with 95 percent confidence intervals for 15- to 24- and 25- to 34-year-old males in Utah, 1975–79.

Age 15–24				
Status	Direct Std. Rate	Ratio	Lower Limit	Upper Limit
Active LDS	8.86	1.00		
Inactive LDS	35.00	3.95	2.15	5.75
Non-LDS	55.00	6.21	3.74	8.67
U.S. White Male (1977)	22.90	2.58		

Age 25–34				
Status	Direct Std. Rate	Ratio	Lower Limit	Upper Limit
Active LDS	11.1	1.00		
Inactive LDS	51.3	4.63	2.45	6.81
Non-LDS	72.2	6.52	3.51	9.53
U.S. White Male (1977)	26.7	2.41		

Results

The number of suicides and the size of the population at risk for males ages 15–34 in the State of Utah from 1975 to 1979 are shown in table 1. The age-adjusted rates per hundred thousand for 15–34 year olds in Utah by level of activity and membership are shown in table 2. Table 2 also shows rate ratios using the active LDS as the referent group. Inactive LDS males experienced a suicide rate roughly four times that of active LDS males. Non-LDS males experienced a suicide rate roughly six times that of active LDS males.

The suicide rate for inactive LDS males remains at about four times the rate of active LDS males, and the suicide rate for non-LDS males remains at about six times of active LDS males for both age groups. The rates rise with age for all groups. For both age groups (table 3), the active LDS male suicide rate is statistically significantly ($p = 0.001$) less than the U.S. white male rate. On the other hand, both the rates for the inactive LDS males and the non-LDS males are statistically significantly higher ($p = 0.001$) than the U.S. white male rate.

Discussion

Place of Residence. Latter-day Saint wards (local units) are geographically based, and within Utah their boundaries conform closely to the state boundaries. There are no cities with more than two thousand residents that overlap any of the state's borders. The records of the LDS population in Utah were obtained from the LDS Church's automated records system. This system is updated weekly to account for Church members who move or change status. When a member takes up temporary residence outside the home ward, a temporary record is forwarded to the new ward. Deaths are reported back to the home ward by the temporary ward. Deaths of Utah residents occurring in other states are forwarded to the Utah Registrar of Vital Records. These records were included in the matching process.

Probabilistic Matching. It is possible that the difference in mortality between LDS males and non-LDS males is a result of error caused by too few death certificates linking to the LDS records. Other studies have reported that up to 8 percent of records did not link when they should have.¹⁶ In this study, only 54 percent of the records linked although approximately 70 percent of the population during the period studied was LDS. However, any differential risk of suicide death between active LDS and non-LDS would also result in percentages of matches differing from the population distribution. A more extensive evaluation of the linkage bias was given by Lyon, who used all causes of death.¹⁷

While a potential bias associated with probabilistic record matching might explain the overall difference between LDS males and non-LDS males, it cannot explain the difference between active LDS males and inactive LDS males. Active LDS males will be most likely to have accurate Church records, which would increase the likelihood of matching to the death record in this category. Poor matching would be more likely to occur among inactive LDS males, whose Church records are probably less accurate. Thus differences in suicide rates between active and inactive members are most likely to be underestimated due to poor linkage.

Activity Surrogate. While timely priesthood ordination is a reasonable surrogate for Church activity, this measure has its flaws. Since an individual may be ordained to the priesthood and then subsequently become inactive, it is likely that the active LDS category is artificially large.

In an effort to examine this hypothesis, standardized rates were calculated for each five-year age group and are shown in table 4. If dropout from the active group was occurring, it would be seen by comparing age groups having more recently ordained individuals with age groups having a longer time lag between ordination and suicide. Because the 15–19 age group is concerned with individuals ordained to the Aaronic Priesthood, there is no way to perform a test for trend on a single group. However, since Melchizedek Priesthood ordination generally occurs around age 19, for age groups 20–24, 25–29, and 30–34 we have a natural way to examine this hypothesis. We would expect that males ages 20–24 who had received the Melchizedek Priesthood would have the highest activity because this age group is the closest to ordination. Similarly, we would expect that in the 30–34 age group, priesthood ordination would be a poor surrogate for activity. We see that in these three age groups, the age standardized rates increased from 3.55 to 8.18 to 14.5. Applying a Mantel test¹⁸ for trend to these data yields an χ^2 of 7.77 with 1 degree of freedom, which is significant at the $p = 0.01$ level. Thus, there is a significant increase in suicide rate as a function of time since Melchizedek Priesthood ordination.

TABLE 4. Age-adjusted suicide rates per hundred thousand and standard errors for active LDS men for five-year age groupings 15–19 to 30–34, 1975–79.

Age Group	Count	Population	Std. Rate	Std. Error
15–19	30	223,535	13.40	2.45
20–24	5	140,690	3.55	1.59
25–29	10	122,210	8.18	2.59
30–34	14	96,730	14.50	3.87

Conclusions

Religious activity rates of males as measured by lay priesthood office in The Church of Jesus Christ of Latter-day Saints was significantly inversely associated with suicide rates in the State of Utah. Inactive LDS males had age-adjusted suicide rates approximately four times those of active LDS males. Non-LDS males had suicide rates approximately six times those of active LDS males. U.S. white males had rates approximately two and one-half times those of active LDS. In the group where church activity is most closely approximated by lay priesthood office, the U.S. rate is nearly seven times that of active LDS.

Update

We have recently concluded an analysis of data covering the years 1991–95. Except for the 15–19 age group, the suicide rates for active LDS remain significantly lower than inactive LDS in Utah, non-LDS in Utah, and national rates. In the 15–19 age group, active LDS rates are virtually identical to national rates, and these rates are significantly lower than those for inactive LDS and non-LDS.

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8. Walter Stevens, Duncan C. Thomas, and Joseph L. Lyon, "Leukemia in Utah and Fallout from the Nevada Test Site," *Journal of the American Medical Association* 264, no. 5 (1990): 585–91.
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