

Life Expectancy and Cause of Death in Popular Musicians

Is the Popular Musician Lifestyle the Road to Ruin?

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Does a combination of lifestyle pressures and personality, as reflected in genre, lead to the early death of popular musicians? We explored overall mortality, cause of death, and changes in patterns of death over time and by music genre membership in popular musicians who died between 1950 and 2014. The death records of 13,195 popular musicians were coded for age and year of death, cause of death, gender, and music genre. Musician death statistics were compared with age-matched deaths in the US population using actuarial methods. Although the common perception is of a glamorous, free-wheeling lifestyle for this occupational group, the figures tell a very different story. Results showed that popular musicians have shortened life expectancy compared with comparable general populations. Results showed excess mortality from violent deaths (suicide, homicide, accidental death, including vehicular deaths and drug overdoses) and liver disease for each age group studied compared with population mortality patterns. These excess deaths were highest for the under-25-year age group and reduced chronologically thereafter. Overall mortality rates were twice as high compared with the population when averaged over the whole age range. Mortality impacts differed by music genre. In particular, excess suicides and liver-related disease were observed in country, metal, and rock musicians; excess homicides were observed in 6 of the 14 genres, in particular hip hop and rap musicians. For accidental death, actual deaths significantly exceeded expected deaths for country, folk, jazz, metal, pop, punk, and rock. *Med Probl Perform Art* 2016; 31(1):37-44.

In this study, we investigated whether the prevailing wisdom about the path of popular musicians as a “classic script” of sex, drugs, failed rehabilitation, bitterness,

and early death has empirical support. There are four recent studies that document a profession in crisis.

The first study¹ showed that pop musicians achieving recent fame or notoriety suffered earlier death compared with population data, and that this finding was robust when age, sex, ethnicity, and nationality were controlled. Inclusion criteria were pop musicians who performed on any album in the All-Time Top 1,000 albums² from five modern popular music genres (i.e., rock, punk, rap, R&B, electronica). This study calculated total years of musician survival since becoming famous, the date of which was determined by the earliest date of first chart success. In this sample of 1,064 popular musicians, post-fame mortality was 1.7 times greater than demographically matched populations in the USA and UK. Median age of death for the North American musicians was 35.18 yrs. Mortality 5 years post fame was 2.4%. Chronic drug or alcohol abuse or overdose accounted for one quarter of the 100 deaths documented in the specified time frame. Pop star survival always fell below that of the matched populations in every year post-fame up to 25 yrs. In the period 2 to 25 yrs post fame, this sample of popular musicians experienced two to three times the risk of mortality when compared with the general population.

The second study³ examined the hypothesis that the popular music industry is, as is often claimed in the media, more strongly associated with risk-taking, substance abuse, and early death than comparable general populations and that the prevalence of these factors differs by type of performer (solo artist vs band member), nationality (North American vs European), and the experience of childhood adversity. In a sample of 1,489 rock and pop musicians who achieved fame between 1956 and 2006, the median age of death for the North American musicians was 45.2 yrs, compared with 39.6 yrs for the European musicians. Like the earlier study, musician mortality increased with time since fame and exceeded comparable population death rates for the same time period. Death was strongly associated with substance abuse, risk-taking, and the experience of childhood adversity. Half of the musicians who died from substance abuse or risk-taking had experienced childhood adversity, compared with a third of those who died of the same causes but had no childhood adversity recorded. The greater the number of childhood adversities, the more likely a musician was to die of substance

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abuse or risk-taking. Clinical and epidemiological studies^{4,5} have repeatedly identified a strong association between childhood adversity, substance abuse, and risk-taking in later life. Post-fame survival was significantly lower compared with matched general populations: 99.3% in the first year post-fame and 87.6% 40 yrs post-fame. Solo performers had twice the mortality rate (22.8%) compared with band members (10.2%). Survival improved after 1980 but was still lower than population comparators.

The third study,⁶ conducted to investigate whether the age of 27 was a high-risk age for death in popular musicians, found that the risk of death for “famous” musicians aged 20 to 30 yrs was two to three times higher than the general UK population. The smoothed death rate showed a peak at 32 yrs with greatly increased risk of death after age 60. All three of these studies included only those who had achieved a top selling album, and accordingly the numbers were small and not representative of the population of pop musicians.

The fourth study³² examined causes and patterns of death in 280 hip-hop and rap artists who died between 1987 and 2014. The sample was predominantly male (97%) and black (92%). The mean age of death was 30 yrs (median age was 29 yrs), with age range 15 to 75 yrs. Homicide accounted for 55% of deaths, followed by unintentional injury (13%), cardiovascular causes (7%), cancer (6%), suicide (4%), and infectious diseases (3%). Those dying by homicide had a mean age of 27 yrs. Of the African-American male population aged 15–34 years in this sample, 65% died by homicide.

Currently, we understand very little about the characteristics of the popular musician population because there have been very few population studies undertaken. The aim of this study was to assemble a comprehensive representative dataset comprising the population of popular musicians who died between January 1950 and December 2014 in order to assess whether:

- (i) pop musicians enjoyed a normal lifespan relative to similar general populations;
- (ii) their causes and distribution of deaths matched those from comparative general populations;
- (iii) there were differences between male and female musicians in lifespan and cause of death; and
- (iv) genre membership was associated with different patterns of mortality and cause of death.

Genre might be expected to reflect personality⁷ to some degree, and the links are therefore of particular interest. Some tentative hypotheses were generated based on established knowledge about patterns of death in general populations and what is generally accepted as true in the popular music industry. Accordingly, we hypothesized that popular musicians would have shorter lifespans compared with general populations, that female musicians would have longer lifespans than male musicians, that metal musicians would suffer higher rates of suicide than other genres, that hip hop and rap musicians would show higher homicide rates than other genres, and that jazz musicians would be more likely to die of alcohol-related causes.

METHODS

Defining the Population

Popular music is defined as (almost) any music that does not belong to the classical music genre. Popular musicians may be singers, instrumentalists, or both. Popular genres include African, ballad, bluegrass, blues, Cajun, calypso, Christian pop, conjunto, country, doo-wop, electroclash, folk, funk, gospel, hard rock, hip hop, honky tonk, indie, jazz, Latin, metal (all forms: atmospheric, avant-garde, black, dark, death, extreme, glam, heavy, melodic, thrash), new wave, polka, pop, psychedelic, punk, punk-electronic, rock (including shock rock, glam rock), rap, reggae, rhythm and blues (R&B), rock and roll, rockabilly, ska, soul, swamp, swing, techno (includes electronic and experimental), western, and world music.³³ Musicians from all of these genres were included in this study.

Although more than 200 sources, including electronic listings and listings in encyclopaedias, were accessed in order to compile the population for this study, the following are offered as the major exemplars of the sources used: Nick Tavelski's *Knocking on Heaven's Door: Rock Obituaries*,⁸ Komara's *Encyclopaedia of the Blues*,⁹ The Dead Rock Stars' Club website,¹⁰ R.I.P. Encyclopaedia Metallicum,¹¹ Voices from the Dark Side (for dead metal musicians),¹² Wikipedia's List of Dead Hip Hop Artists¹³ and hip hop obituaries, Rate Your Music: Hip Hop Obituaries,¹⁴ rapper and other genre-based death websites including “Those We Have Lost in Music—Soul and R&B,”¹⁵ The Living Tradition (folk music),¹⁶ Ultimate Classic Rock,¹⁷ Dead Punk Stars,¹⁸ Maximum Ink Music Magazine,¹⁹ The Rock n' Roll Death List,²⁰ BIZARRE!!! The Dead, the Criminals and the Strange Tales Related to Music and Musicians,²¹ Drugs and Roll, and Cause of Death-Suicide.²² [A complete listing of websites accessed for this study is available upon request from the authors.]

The year 1950 was selected as the earliest year of death because records before this date are scant and unreliable. Further, pop music as we understand it today “took off” after World War II, as did the technology that is so integral to the popular music lifestyle, including international touring, sophisticated sound recording, multimedia promotional productions, fan clubs, and the ubiquitous paparazzi.

Determining Cause of Death

The cause of death was verified, if possible, from at least two independent sources, which included obituaries, death records, pop musician websites, biographies, newspaper or magazine articles, and blogs. Causes of death were coded to match as closely as possible the codes used by the US Centers for Disease Control and Prevention.³⁴ Accidental death was coded for any death by injury or misadventure that was not intentionally caused by self (i.e., suicide) or as a deliberate act of a second party (i.e., murder). We also coded deaths from heart-related causes, AIDS, diabetes, liver- and kidney-

related causes, and cerebrovascular causes. All other illnesses were coded as “all other illnesses.”

Defining Music Genres

Music genres were grouped as shown in Tables 2 and 3. These groupings were based on the identification of distinctive and dominant musical styles. Earlier derivations of the dominant style or contemporaneous variations of the dominant style were grouped together. The groupings were as follows: blues; country/country and western/boogie woogie/honky tonk/bluegrass; gospel/spiritual/Christian rock; experimental/electronic/techno/ disco/funk; folk/ballad/polka; hip hop; jazz/bebop/Dixieland; metal; pop; punk; rap; rhythm and blues/doo wop/soul; rock/rockabilly; and world music.

Data Analysis

Because there was no measure of the total population of musicians to act as a denominator in the calculation of mortality rates, we first investigated differences in the proportion of deaths from different causes for different ages at death. In most populations, each age group produces a “signature” in the pattern of cause of death, in particular deaths from natural causes, that represent a much higher proportion of deaths at older ages. Because 90% of the musicians were American, we compared cause of death with the US population as a reasonable proxy for the lifestyle. Preliminary analyses of the data excluding the 10% classified as world (i.e., non-American) musicians did not change the results obtained; accordingly, we retained this group in the dataset. The average year of death for those in the sample for which we have all the data is 2001/2002, so we compared our data with US 2002 top 15 causes of death data available from the Centers for Disease Control and Prevention (CDC).²² We examined the overall statistical fit for each genre with the average of the population in 10-year age groups (>65, <25, and then 25 to 34, etc.) and separately for each cause by genre. The 10-yr age groups were chosen because the data were easily available in this form and there were sufficient numbers in each group to provide statistically significant measures. Statistical fit was assessed using Pearson’s chi-squared goodness-of-fit test with the expected number being based on the male population causes of death proportions for each age group (only 10% of the population was female).

To determine overall mortality, we constructed a measure of lives exposed to the risk of dying, i.e., the denominator in the calculation of the mortality rate. One approximate way of calculating this is to start with a stationary population, as is modelled by a standard life table. This is then adjusted on the assumption that the population observed has been growing at a constant rate. This method is commonly used by demographers and actuaries.²³ For a stationary population as reflected in a life table:

$$l_{x,t} = l_{x-1,t-1} - d_{x-1,t-1} \quad (1)$$

$$l_{\omega-1,t-1} = d_{\omega-1,t-1} \quad (2)$$

where the $l_{x,t}$ refers to the number of people alive aged x exact at time t , and the $d_{x,t}$ refers to the deaths of those aged x in the year following t . The final age is ω . We know that the number alive at the beginning of the final year of life is equal to those that die in that year, and the number alive at each earlier age can be found by adding those who are at that age to those who survive to the following age.

If the age structure of the population is constant and mortality rates have not been changing, but the size of the population has been growing at a constant rate g , then the number alive at each age and the number dying at each age will also be growing at rate g :

$$l_{x-1,t}/l_{x-1,t-1} = d_{x-1,t}/d_{x-1,t-1} = 1 + g \quad (3)$$

Equation (2) gives us the number alive in the last year of life, and we can insert the equalities from (3) into (1) to recursively calculate younger ages by:

$$l_{x,t} = (1 + g)^{-1} (l_{x-1,t} - d_{x-1,t}) \quad (4)$$

$$l_{x-1,t} = (1 + g)l_{x,t} + d_{x-1,t} \quad (5)$$

Data Screening

Data on gender, year born, age at birth, age at death, decade of death, cause of death, and music genre membership were compiled for all musicians ($n=13,195$) who met inclusion criteria. Prior to data analysis, the characteristics of the data set were evaluated to assess its suitability for the analysis of mortality rates. There was a large increase in the number of reported deaths in the decade 2000 and in the subsequent half-decade to the present day (2010–2014) due to the rise of the internet.

The proportion of deaths by genre and year of death was examined and presented in Figure 1. Figure 2 presents the cause of death by year, showing that this is more likely to have been captured after 1990.

There were no obvious anomalies in these data. HIV/AIDS seems to have disappeared as a significant cause of death from 2000, possibly because of the availability of anti-retroviral drugs. In the US male population, deaths from AIDS fell from 20% of all deaths in the early 1990s among 35 to 44 yr olds to 7% by 2002, a pattern reflected in our data.

Table 1 shows that the average age of death is relatively constant over the study period, which supports our assumptions that the age structure of the population and mortality rates do not change significantly for most of this period. The numbers do not progress entirely regularly for reasons probably related to record-keeping and changes in media reporting as much as changes in the actual population.

RESULTS

The z -test for column proportions ($p<0.05$) showed the overall proportions of males and females in the sample by decade were similar, and they appeared, with some minor

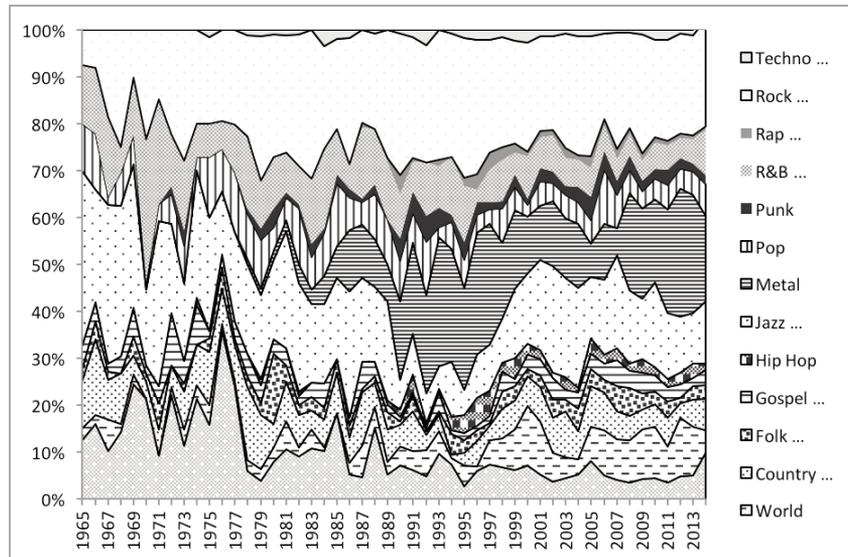


FIGURE 1. Year of death by genre.

variations, to suffer similar causes of death, with a comparable shorter lifespan than the general female population. The main question investigated was the extent to which violent deaths (accidents, homicide, and suicide) were more likely among the musician population.

Table 2 shows actual and expected deaths by genre and classifies cause of death by violence, liver-related, or other causes. The expected deaths were calculated assuming the same number of deaths, but following the pattern in the US male population grouped in 10-yr age bands. The last two rows estimate the excess deaths by recalculating the expected deaths, assuming the same ratio of violent to natural causes as in the population—i.e., assuming that the excess number of violent deaths is explained by deaths that would otherwise not have occurred. When determining excess deaths for a genre, the assumption is made that

deaths from all other causes occur in the proportion that occurs in the reference population. For instance, nonviolent deaths in the rock genre would account for 70.7% of deaths ($1,427 = 1,360 + 67$ out of 2,017 in Table 2) if the reference population proportions were applied. It was then assumed that the 1,257 ($1,158 + 99$) nonviolent deaths actually observed would have accounted for 70.7% of the total deaths if there had been no excess deaths from violence.

This would have meant that there would only have been 1,777 deaths ($1,257/0.707$) in total, or 240 fewer than the 2,017 actually observed. The results carry through for those over 65 (not shown in the tables), where there were 136 violent deaths, as against an expected number of 63.

We assumed that excess deaths from liver diseases can largely be explained by alcohol abuse. Overall, there were 69 extra deaths from liver-related diseases for musicians

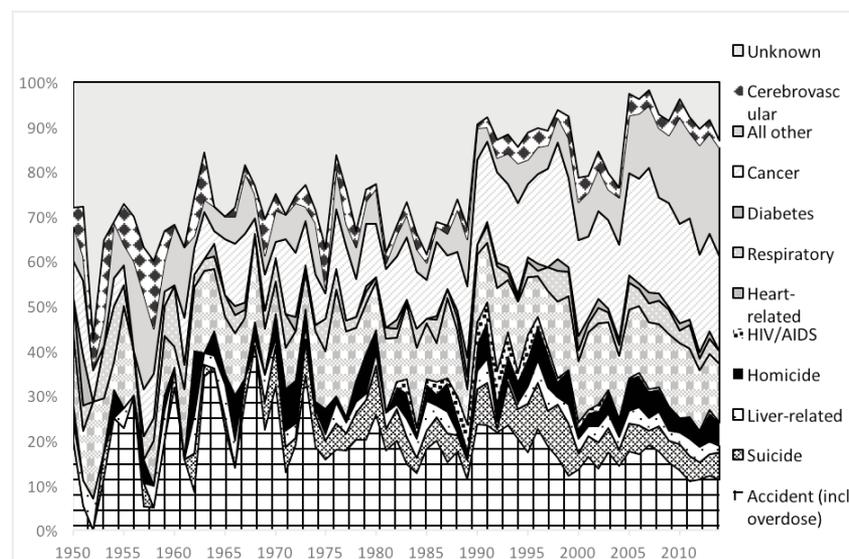


FIGURE 2. Causes of death by year.

TABLE 1. Age at Death by Year

| Year of Death | < 30 | 31 to 50 | 51 to 70 | > 70 | Average Age |
|---------------|------|----------|----------|------|-------------|
| 1955–59 | 16 | 30 | 49 | 9 | 50 |
| 1960–64 | 29 | 38 | 62 | 7 | 47 |
| 1965–69 | 42 | 62 | 103 | 22 | 50 |
| 1970–74 | 60 | 84 | 92 | 34 | 49 |
| 1975–79 | 38 | 124 | 135 | 41 | 51 |
| 1980–84 | 37 | 169 | 141 | 85 | 53 |
| 1985–89 | 46 | 158 | 161 | 118 | 55 |
| 1990–94 | 98 | 207 | 153 | 44 | 47 |
| 1995–99 | 140 | 272 | 267 | 115 | 50 |
| 2000–04 | 248 | 545 | 859 | 559 | 56 |
| 2005–09 | 430 | 784 | 1250 | 633 | 54 |
| 2010–15 | 325 | 704 | 1091 | 821 | 58 |

under age 65. Over 65 (not in the tables), there were 69 liver-related deaths compared with an expected 3, consistent with a later onset of alcohol-related causes of death. Under the age of 65, partly because expected numbers are smaller, the results for liver disease are statistically significant only for country, metal, and rock genres.

Examining ages <65, where violent deaths were more numerous, Table 2 shows that the number of violent deaths is significantly higher (at 97.5% significance*) for all genres except blues, gospel, R&B, and experimental.

Specific Causes of Violent Death

There were significant differences in the pattern of causes of violent death by genre. Table 3 shows actual and expected deaths for each genre and cause of death. The expected deaths are calculated assuming the total natural

*At roughly 2.5% level using a standard actuarial approximation (if mortality rates are binomial and small, they can be estimated by a Poisson approximation, which in turn can be approximated by the Normal). The variance of the expected number of deaths is therefore equal to the expected number.

TABLE 2. Causes of Death by Genre for Musicians Who Died at <65 yrs*

| | Blues | World | Country | Folk | Gospel | Hip Hop | Jazz | Metal | Pop | Punk | R&B | Rap | Rock | Exper. | Total |
|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|------------|--------------|
| Actual Deaths | | | | | | | | | | | | | | | |
| Violent | 65 | 162 | 109 | 59 | 40 | 135 | 185 | 445 | 114 | 124 | 101 | 97 | 760 | 37 | 2,433 |
| Natural | 266 | 310 | 176 | 107 | 90 | 55 | 457 | 331 | 189 | 122 | 268 | 33 | 1158 | 69 | 3,631 |
| Liver | 21 | 15 | 19 | 7 | 4 | 2 | 33 | 34 | 10 | 13 | 10 | 1 | 99 | 5 | 273 |
| Expected Deaths Using Population Mortality | | | | | | | | | | | | | | | |
| Violent | 61 | 126 | 59 | 39 | 36 | 110 | 137 | 369 | 89 | 99 | 88 | 79 | 590 | 32 | 1,915 |
| Natural | 278 | 345 | 233 | 128 | 94 | 79 | 514 | 421 | 213 | 151 | 278 | 51 | 1360 | 75 | 4,219 |
| Liver | 13 | 17 | 11 | 6 | 5 | 3 | 24 | 20 | 11 | 8 | 13 | 2 | 67 | 4 | 204 |
| Total | 352 | 487 | 304 | 173 | 134 | 192 | 675 | 810 | 313 | 259 | 379 | 131 | 2017 | 111 | 6,337 |
| Excess Deaths Compared With Population | | | | | | | | | | | | | | | |
| No. | 4 | 49 | 62 | 25 | 6 | 59 | 61 | 140 | 35 | 40 | 17 | 46 | 240 | 7 | 790 |
| As % of violent deaths | 7% | 30% | 57% | 43% | 15% | 43% | 33% | 31% | 31% | 32% | 17% | 47% | 32% | 18% | 27% |

*Statistical significance at 2.5% is shown in bold. Exper. = experimental.

deaths (excluding liver-related deaths) are as expected, and that the total number of deaths is adjusted, as was done in the last two rows of Table 2.

Homicides

Statistically significantly higher rates of homicide were evident among 7 of the 14 genres, particularly world, hip hop, and rap. Most of these deaths occurred under age 35 (not shown in table). Fifty of the 142 total deaths of hip hop and 54 of the 103 deaths of rap musicians under age 35 could be considered excess homicides. If we assume that musicians from these genres are mostly black, and compare these genres with the US black male population under age 35,²⁴ which has higher rates of homicide than the white male population under 35, the extra deaths are still almost double those expected. These populations were more intensely investigated in the fourth study mentioned earlier,³² which found that nearly all the deaths occurred in cities with over twice the national rate of homicide.

Accidents and Alcohol

Country, folk, jazz, metal, pop, punk, and rock all had higher than expected deaths by accident, but rates were comparable with population expectations for blues, world, gospel, R&B, experimental, hip hop, and rap, where the higher number of homicides seems to be compensated by lower levels of accidental deaths. The additional deaths from accident were statistically significant (with the number of excess deaths) for country (n=50), folk (13), jazz (61), metal (92), pop (33), punk (29), and rock (225). These additional accidents are most likely related to higher rates of alcohol abuse, with country, metal, and rock also reporting excess deaths from liver diseases under age 65. Over 65 (and not shown), the country, jazz, R&B, and rock genres also exhibited excess liver-related deaths, thus tending to confirm higher alcohol consumption at all ages.

TABLE 3. Male Deaths at Age <65 yrs by Genre and Cause of Death*

| | Blues | World | Country | Folk | Gospel | Hip Hop | Jazz | Metal | Pop | Punk | R&B | Rap | Rock | Exper. |
|-----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------|------------|
| Actual | | | | | | | | | | | | | | |
| Accidental death (incl overdoses) | 38 | 82 | 77 | 33 | 28 | 32 | 134 | 259 | 80 | 76 | 66 | 20 | 521 | 18 |
| Suicide | 11 | 21 | 26 | 15 | 1 | 16 | 26 | 137 | 20 | 25 | 8 | 8 | 153 | 10 |
| Liver-related death | 21 | 15 | 19 | 7 | 4 | 2 | 33 | 34 | 10 | 13 | 10 | 1 | 99 | 5 |
| Homicide | 16 | 59 | 6 | 11 | 11 | 87 | 25 | 49 | 14 | 23 | 27 | 69 | 86 | 9 |
| HIV/AIDS | - | 5 | - | 1 | 1 | 5 | 4 | 5 | 13 | 4 | 3 | 3 | 22 | 3 |
| Heart-related death | 102 | 99 | 62 | 24 | 29 | 17 | 131 | 97 | 56 | 36 | 95 | 7 | 328 | 24 |
| Respiratory diseases | 30 | 23 | 9 | 5 | - | 5 | 28 | 12 | 12 | 5 | 11 | 3 | 56 | 6 |
| Diabetes | 11 | 11 | 5 | - | 5 | 2 | 17 | 11 | 2 | - | 7 | - | 21 | 1 |
| Cancer | 72 | 83 | 69 | 48 | 26 | 16 | 180 | 138 | 66 | 47 | 84 | 10 | 458 | 17 |
| All other illnesses | 36 | 64 | 23 | 28 | 21 | 8 | 69 | 51 | 28 | 21 | 37 | 9 | 222 | 15 |
| Cerebrovascular | 15 | 25 | 8 | 1 | 8 | 2 | 28 | 17 | 12 | 9 | 31 | 1 | 51 | 3 |
| Total | 352 | 487 | 304 | 173 | 134 | 192 | 675 | 810 | 313 | 259 | 379 | 131 | 2,017 | 111 |
| Expected | | | | | | | | | | | | | | |
| Accidental death (incl overdoses) | 36 | 67 | 27 | 20 | 20 | 43 | 73 | 167 | 47 | 47 | 51 | 29 | 296 | 18 |
| Suicide | 16 | 29 | 12 | 9 | 9 | 17 | 32 | 68 | 20 | 19 | 22 | 11 | 125 | 7 |
| Liver-related death | 12 | 15 | 9 | 5 | 5 | 2 | 21 | 16 | 9 | 7 | 13 | 1 | 57 | 4 |
| Homicide | 7 | 17 | 5 | 5 | 5 | 16 | 16 | 55 | 12 | 14 | 12 | 11 | 82 | 5 |
| HIV/AIDS | 8 | 13 | 6 | 4 | 4 | 5 | 14 | 27 | 9 | 8 | 10 | 3 | 52 | 3 |
| Heart-related death | 82 | 92 | 54 | 32 | 27 | 12 | 139 | 85 | 55 | 34 | 81 | 7 | 338 | 20 |
| Respiratory diseases | 8 | 9 | 5 | 3 | 2 | 1 | 14 | 5 | 5 | 2 | 8 | 0 | 30 | 2 |
| Diabetes | 11 | 12 | 7 | 4 | 3 | 2 | 18 | 12 | 7 | 4 | 10 | 1 | 45 | 3 |
| Cancer | 86 | 93 | 55 | 33 | 26 | 11 | 145 | 76 | 54 | 31 | 83 | 7 | 339 | 20 |
| All other illnesses | 62 | 80 | 42 | 27 | 24 | 23 | 110 | 116 | 51 | 39 | 67 | 14 | 313 | 19 |
| Cerebrovascular | 10 | 11 | 7 | 4 | 3 | 2 | 17 | 11 | 7 | 4 | 10 | 1 | 42 | 2 |

*Statistical significance at 1% is shown in bold. Exper. = experimental.

There were too few female musicians to undertake a similarly detailed analysis, but the trends in their data were aligned with their male colleagues—with 35% of deaths being from unnatural causes as against 42% for males. This meant that there were many more accidental female deaths than expected at younger ages and more alcohol-related deaths for females over age 55.

Suicides

While the modelling showed 14 extra deaths from suicide in country and 28 extra deaths from suicide in rock musicians, there were 137 suicides of metal musicians reported against an expected 68, which represents a high and statistically significant number of excess suicides for this genre.

Specific Natural Causes

This analysis was problematic because of the differences between our media-based classifications of disease, which were necessarily less precise than population data based on official death certificates. For instance, the HIV-related deaths captured in our data represented only half that expected from the population. It appears that some of these were reported as cancer deaths rather than the true underlying cause (HIV).

Overall, the proportions of deaths from cancers, heart disease, strokes, and respiratory illnesses were consistent with population averages. There were statistically higher

than expected deaths from cancer in jazz, punk, rock, and metal musicians. Further investigation may reveal some medical explanation, quite likely related to smoking, but none is available at this time.

In order to check the robustness of the data to any changes in the data sources, the above analyses were performed on the post-2000 data separately. Apart from the expected reduction in deaths from HIV/AIDS, there was also a reduction in deaths from respiratory causes across all genres, reflecting a reduction in cigarette smoking.

Overall Mortality

Table 4 shows excess musician mortality from excess violent deaths and liver disease at each age group compared with population mortality. The additional deaths were clearly statistically significant at the 1% level in each group, and even more so when combined. There can be very little doubt that mortality is higher for this group of musicians.

TABLE 4. Excess Death Rates from Unnatural Causes

| Age Group | No. | % of Total |
|-----------|-----|------------|
| <25 | 169 | 47% |
| 25–34 | 337 | 38% |
| 35–44 | 219 | 21% |
| 45–54 | 179 | 14% |
| 55–64 | 160 | 10% |
| >64 | 143 | 5% |

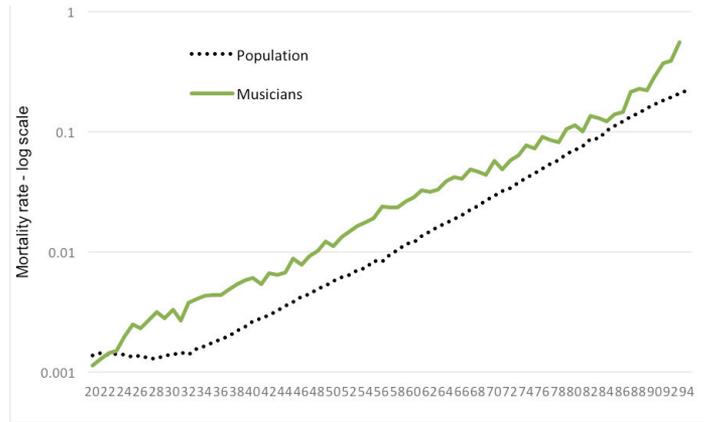


FIGURE 3. Mortality for male pop musicians (*solid line*) vs the US male population (*dotted line*).

As a first estimate of the rate of growth of the population [in equations (3) to (5) developed in the data analysis section above], we fitted a geometric progression to the number of deaths reported each year until 1999. The year 1999 was chosen as a cut-off because the increase in numbers in the years after 2000 seemed unlikely to reflect population growth, and these years were therefore excluded for this analysis.

We undertook this analysis of male musicians for all genres together because of insufficient data to conduct separate analyses by genre. The results produced mortality rates about twice as high as for the population as a whole over the whole age range (Fig. 3). Using the logarithmic scale for the y-axis means that parallel lines would imply that the musician mortality is a fixed ratio of the population. The convergence at higher ages suggests that the percentage difference reduced over time, as would be expected.

DISCUSSION

Our first two research questions investigated whether pop musicians enjoyed a normal lifespan and whether causes of death matched those for the comparative general population. The answer to both questions is an unequivocal no. Popular musicians died earlier and in greater proportions from violent deaths (accident, suicide, homicide) and from liver disease compared with the general US population. With respect to our third research question, there were not really enough female deaths to draw robust conclusions, but the percentage of deaths by accident at younger ages was similar for both genders. Female gender did not appear to offer any protection from early death.

Our fourth question was to explore whether genre affected mortality—i.e., whether type of death varied as a result of the musicians' music genre. Results showed that there were excess violent deaths in popular musicians for most genres and excess deaths from liver-related disease compared with the US population, particularly for country, metal, and rock musicians. For accidental death, actual deaths significantly exceeded expected deaths for country,

folk, jazz, metal, pop, punk, and rock musicians, but not for blues, world, gospel, hip hop, R&B, and rap. Excess suicides were observed in country, metal, and rock musicians; excess homicides were observed in 6 of the 14 genres, in particular hip hop and rap musicians.

Fifthly, overall mortality calculations showed that there was evidence of considerable excess mortality from violent deaths and liver disease for each age group studied compared with general population mortality patterns. These excesses were highest for the <25-year age group and reduced chronologically thereafter, with the lowest rate of excess death occurring in the oldest age group (>64 yrs).

Overall mortality calculations for each genre showed mortality rates that were about twice as high compared with the population when averaged over the whole age range. These findings agree with the extra mortality identified in the cause of death analysis in Table 4, but the 100% extra mortality was somewhat higher than would be explained by violent deaths alone. Nonetheless, the 100% extra mortality and the shape of the curve is consistent with the much smaller but more detailed analyses by Bellis et al.¹³ While the Bellis et al. studies focused on the very small number of musicians who had charted in the top 1,000 albums, our study explored the characteristics of a much more broadly defined population of popular musicians. It is noteworthy that our study found that fame alone cannot be invoked as the sole cause of popular musician vulnerability to early or violent death.

Because this was a quantitative study of dead musicians, whose aim was to gather population data to establish a baseline of the extent and outcome of the occupational hazards in the pop music world, we can only speculate about the potential causes of these results. It is likely to be a combination of factors inherent in the popular music industry and the vulnerability from either constitutional factors or adverse childhood experiences that many young musicians bring with them into their profession.³

The different patterns of morbidity among popular musicians from different musical genres suggest that music genre is a lifestyle, not just a type of music.^{25–27} The most

striking exemplars of this claim are metal music, whose central message is one of hopelessness and nihilism,²⁸ and hip hop and rap musicians, whose drug- and crime-related lifestyle is associated with higher rates of death by homicide, a pattern also observed by Lawson.³²

Heavy metal has been included in a group of music genres labelled “problem music”²⁶ because of its strong association with psychological vulnerability, social deviance, increased use of substances, and impulsivity, vandalism, and delinquency.²⁹ Listening to heavy metal music has also been associated with suicidality.³⁰ Although other genres were also associated with suicide, the number of excess deaths by suicide in metal musicians far exceeded that in all other genres. Although several studies have pointed to greater suicide acceptability in fans of metal music,³¹ this is first study to identify a high suicide risk among metal musicians.

CONCLUSIONS

Popular musicians as an occupational group are highly vulnerable to the vagaries of their workplaces and their inherent personal vulnerabilities. This study has confirmed journalistic anecdotes and the results of smaller studies that there is an overall excess mortality in the popular music population, due in large part to deaths from violent causes compared with general populations. In short, popular musicians were more likely to die from non-natural causes, and their overall mortality was twice as high as that of a comparable general population.

Although many of the genres are too new to have allowed their members time to have lived a full lifespan, it is probable from these results that many pop, rock, metal, electronic, punk, hip hop, and rap musicians simply may never live long enough to acquire the illnesses of middle and old age. Subsequent research decades hence, when these newer genres have matured sufficiently to contain members with ages spanning population life expectancies, may further clarify the preliminary conclusions drawn from this study.

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