Published in final edited form as:

Soc Sci Q. 2008 July 17; 89(3): 817–830. doi:10.1111/j.1540-6237.2008.00562.x.

Major League Baseball Players' Life Expectancies*

Jarron M. Saint Onge,
University of Houston

Richard G. Rogers, and
University of Colorado at Boulder

Patrick M. Krueger
University of Texas School of Public Health at Houston

Abstract

Objective—We examine the importance of anthropometric and performance measures, and age, period, and cohort effects in explaining life expectancies among major league baseball (MLB) players over the past century.

Methods—We use discrete time hazard models to calculate life tables with covariates with data from *Total Baseball*, a rich source of information on all players who played in the major league.

Results—Compared to 20-year-old U.S. males, MLB players can expect almost five additional years of life. Height, weight, handedness, and player ratings are unassociated with the risk of death in this population of highly active and successful adults. Career length is inversely associated with the risk of death, likely because those who play longer gain additional incomes, physical fitness, and training.

Conclusions—Our results indicate improvements in life expectancies with time for all age groups and indicate possible improvements in longevity in the general U.S. population.

We present major league baseball (MLB) player life expectancies with attention to age, period, and cohort trends, and anthropometric and performance measures. We employ more than 100 years of data on a select population to produce some of the most accurate life expectancy estimates for U.S. adult males extant. Baseball players are a valuable population to study because they provide a wealth of longitudinal population data encompassing a multitude of cohorts and periods; there is detailed and accurate information about their births, deaths, and careers; their performance is recorded, evaluated, and highly scrutinized in a public forum; and they represent a subset of the U.S. male population that is marked by high levels of physical fitness and social and economic success, which may provide insights into potential longevity gains for the general population.

MLB players typically have longer life expectancies than the general male population because of their high physical activity and overall health (Schnor, Parner, and Lange, 2000); selection for talent and fitness (Abel and Kruger, 2006); favorable heights and weights; low smoking rates (Severson et al., 2005); access to high-quality healthcare during their careers (Metropolitan Life Insurance Company, 1975); and high prestige and incomes, which allow

*Direct correspondence to Jarron M. Saint Onge, Department of Sociology, 450 Philip Hoffman Hall, University of Houston, Houston, TX 77204-3012 (e-mail: jmsaintonge@uh.edu).

We will share all coding information with investigators who satisfy the requirements of and purchase the data from Sport Media Enterprises. An early version of this article benefited from presentation at the 2006 Annual Meeting of the Southern Demographic Association and the 2007 Annual Meeting of the Population Association of America.

access to high-quality healthcare during and after their baseball careers (Hauptert, 2003; Kotarba, 2001; Nakao and Treas, 1990).

Waterbor et al. (1988) found that MLB players who debuted between 1911 and 1925 had a 6 percent lower age standardized mortality rate than white men in the United States. Abel and Kruger (2006) determined that players who debuted between 1900 and 1939 lived 4.8 years longer than the age-adjusted male population. And the Metropolitan Life Insurance Company (1975) revealed that those who played between 1876 and 1973 had 28 percent lower mortality than white males in the general population. The mortality advantage for MLB players was small for those who debuted between 1876 and 1900, and larger for those who debuted between 1901 and 1973. We extend prior research by examining MLB players who debuted between 1902 and 2004, and estimating life expectancies that adjust for period and cohort trends in survival.

Anthropometric Characteristics

Gains in life expectancy over time may be due in part to anthropometric factors such as handedness, body mass, and height. Average heights of successive generations have increased over time (Costa and Steckel, 1997; Komlos and Lauderdale, 2007). As a select group, baseball players may benefit from “physiological capital” and the longevity gains associated with increased height (Fogel, 2003). Overweight and obese classifications are associated with increased mortality risk, and obesity is increasing over time in the United States (Flegal et al., 2002; Rogers, Hummer, and Krueger, 2003), but little is known about the obesity-mortality relationship among MLB players, a physically fit population. The link between handedness and mortality is unclear. Some research that includes appropriate controls and examines prospective mortality finds less than a year’s difference in age at death among left- and right-handed baseball players (Halpern and Coren, 1988), while others show no significant differences (Abel and Kruger, 2004). MLB players are an ideal population in which to study the relationship between handedness and mortality because they are a healthy and active subpopulation.

Performance Measures

Career length is a measure of success and may imply higher levels of physical functioning, motor-skill coordination, talent, and status, which in turn may increase longevity. Players who have long careers might also have better health due to more years of training and support from team physicians (Kotarba, 2001). Studies of job performance and life expectancy within high-status professions offer mixed results. Among MLB players, Hall of Fame inductees had significantly shorter lives than age-matched comparisons, and were twice as likely to have died from cardiovascular causes (Abel and Kruger, 2005). Only modest longevity gains have been linked to performance and career longevity (Abel and Kruger, 2006; Waterbor et al., 1988).

Data and Methods

Our data come from an electronic version of *Total Baseball* (Thorn, Birnbaum, and Deane, 2004), the official encyclopedia of MLB, which contains detailed information about every player who has ever played in the major leagues, including birth and death dates, date of debut, career performance, and play-related statistics. We include MLB players who debuted between 1902 and 2004. Our analyses include position players and exclude pitchers due to potential differences in career length and selection into the major league. Because MLB teams expand their rosters from 25 to 40 players in September to audition new players and long-term minor league players, we eliminate those who were included in season-ending roster expansions for

a month or less and who did not play in the next season (for similar coding, see Witnauer, Rogers, and Saint Onge, 2007).

Baseball players are public figures who are scrutinized by many fans and organizations—including the Society for American Baseball Research (SABR) Biographical Committee—both during and after their careers, resulting in very accurate reports of birth and death dates. Birth dates may be more likely than death dates to be misreported, especially if the player himself is uncertain of the date, but there are no obvious incentives for players to misreport birth dates, so this error is likely to be random. Because fans and statisticians have detailed information about players' lives (such as full name, region of residence, and nationality), reports of death are likely to be more accurate than statistical linkages to the National Death Index, a standard method for linking national data sets like the National Health Interview Survey or the National Health and Nutrition Examination Survey to prospective mortality.

Nevertheless, missing dates of death, especially among older players, can upwardly bias life expectancies. We consulted with the authors of *Total Baseball* and SABR to verify ages and vital status for 11 players who were aged 95 and older and who had not yet died. One player died on January 15, 2004, three players died in 2005, and one died in 2006. Jack Dalton was born on July 3, 1885, but has an unknown date of death, which would make him 119 years old at the end of our follow-up period; we dropped his record. Of the remaining individuals, three were aged 95, one was 96, and one was 97 at the end of the follow-up period. This age distribution, even at the older ages, appears quite reasonable, with a few individuals at the very oldest ages.

Variables

We create person-year data, so that each player contributes one record for each year from his debut in the major league to his year of death (if he died during the follow-up period) or the end of 2004 (if he survived). Over the 102-year study period, 6,772 players contribute 241,218 person-years and 3,030 deaths. The youngest death was that of Al Montgomery, who died at 22.5 years of age. We calculate age for each person-year as the number of years (and fractions of years) between the date of birth and January 1 of the calendar year in each person-year, and then group these into five-year age groups ranging from 20–24 to 85 and older.

Period, based on calendar years, also advances in each person-year, and is coded into eight 10-year intervals, ranging from pre-1910 through 1970–2004. The last category includes 35 years to ensure stable estimates. We define three cohorts based on the date of debut: the Early (1902–1945), Golden (1946–1968), and Modern (1969–2004) Eras. We use the *Total Baseball* (Thorn, Birnbaum, and Deane, 2004) definitions of the eras, except that we begin with 1902 instead of 1901 to avoid some of the league instability present in 1901 (see Witnauer, Rogers, and Saint Onge, 2007), and we expand the Modern Era to 2004 from 2003 to accommodate the additional year of data. Because 75 percent of players start playing between ages 16 and 25, debut and birth cohorts are highly correlated.

Anthropometric variables include height, body mass, and handedness. Handedness indicates the player's throwing hand, which, unlike batting, is invariant. Height, measured in inches, varies little during young and middle adult years, and is coded as less than six feet or six feet or taller. We calculate body mass index (BMI) and classify individuals as normal weight ($18.5 \leq \text{BMI} < 25.0$), overweight ($25.0 \leq \text{BMI} < 30.0$), and obese class I ($35.0 \leq \text{BMI} < 40.0$) (WHO, 1997). Calvin Pickering had the highest BMI at 32.61. Height and weight are usually ascertained at time of debut, but weights may be updated by *Total Baseball* for long careers or for obvious weight changes. Weight updates are rare because few players substantially change their weight and many players have short careers. Performance measures include career length categorized into less than 10 or 10 or more years and first-year and sum career total player

rating (TPR). TPR is created 820 Social Science Quarterly by the authors of *Total Baseball* (see Thorn, Birnbaum, and Deane, 2004), and compares players on batting and fielding statistics while controlling for factors like ballparks and position played.

Analytical Methods

We use logistic regression to estimate discrete time hazards models for the risk of death between the date of debut and the end of the follow-up period (Allison, 1982). We follow players from their first year of play rather than their date of birth because, by definition, they have all survived to debut. Discrete time hazards models allow us to assess the impact of covariates on the risk of death and to calculate life tables with covariates. Life tables with covariates are an underutilized useful technique that can be extended to a variety of event outcomes. Using the coefficients from the discrete time hazards models, we calculate age-specific central death rates, based on the formula $m_x = 1/(1+e^{-z})$, where x represents a specific age group and z is the sum of the coefficients for the intercept, age group, and selected values of the other covariates (Moore and Hayward, 1990; Rogers et al., 2005). When we show cohort (or period) trends in our figures, we multiply the period (or cohort) coefficients by their respective percentage distributions to hold them at their mean values. Thus, cohort (or period) trends are shown for the “average” period (or cohort). We use the m_x values to construct abridged life tables for ages 20 and above.

Results

Table 1 presents descriptive statistics of the covariates based on pooled person-years from 1902 through 2004 and suggests that the observations are distributed toward the younger ages, when most players enter the major league. The small percentage of players at the oldest ages results from mortality at younger ages and the relatively few players who have had enough time to advance to the very oldest ages. The largest percentage of players resides in the most recent period due to team expansion and players from prior years surviving to current periods. The percentage of players in each cohort is more evenly distributed, with the highest percentage of players starting in the Early Era.

Most players fall within the normal BMI category; the 41 percent who are classified as overweight are concentrated toward the lighter end of this category, and just 0.28 percent fall into the obese class I category. Unlike males in the general U.S. population, no player qualified for obese class II ($35.0 \leq \text{BMI} < 40.0$) or obese class III ($\text{BMI} \geq 40$). Over half the players are less than six feet tall, and 86 percent are right-handed. A large proportion of the players have negative career and first-year player ratings. Only 14 percent of MLB players have a positive career rating, and only 22 percent have a positive first-year player rating, which indicates the difficulty of succeeding in professional baseball. Accordingly, only 24 percent of players played MLB for 10 years or more.

Table 2 displays the discrete time hazard coefficients for each model. Our final model does not include all covariates simultaneously because not all variables are related to mortality (see below). The first three models examine age, period, and cohort trends. Model 1 shows that the odds of death increase with age. Compared to players aged 20–24, those aged 40–44 are 3.74 ($e^{1.32}$) times as likely to die, those aged 50–54 are 10.9 times as likely to die, and players aged 70–74 are 54.6 times as likely to die over the follow-up period.

Model 2 of Table 2 reveals that more recent calendar periods are associated with lower risks of death, when adjusting for age. The greatest declines in mortality, as indicated by the differences in coefficient magnitude, take place between the 1920–1929 and 1930–1939 periods and the 1960–1969 and 1970–2004 periods. Model 3 shows that the coefficients for period and age are reduced but remain strong predictors of mortality after adjusting for the

cohort of debut. The next three models examine the anthropometric measures. Model 4 shows a graded but nonsignificant relationship between BMI and the odds of death over the follow-up period. Further, there is no significant relationship between height (Model 5) or handedness (Model 6) and mortality. The final three models examine the performance measures. Neither first-year rating (Model 7) nor career rating (Model 8) is significantly associated with the odds of death. However, those who play for 10 or more years have 14 percent lower odds of death over the follow-up period than those who have shorter careers (Model 9).

Table 3 presents MLB player life expectancies for the most recent period, 1970–2004, based on the multivariate hazard coefficients from Table 2, Model 2. For instance, $m_{25-29} = 0.0005$, or $1/(1+e^{-(0.52 + (-6.16 - 1.97))})$. The subsequent columns are derived according to Siegel and Swanson (2004). MLB players have higher life expectancies (e_x) than the general U.S. male population at all ages, but the advantage diminishes with age. Twenty-year-old MLB players can expect to live 58.1 additional years in the period 1970–2004 (and in the “average” cohort), whereas comparably aged males in the general U.S. population can expect to live 53.3 years in the period 1989–1991 (Armstrong, 1997).

Figure 1 illustrates life expectancies for calendar periods (Panel A) and cohorts (Panel B), calculated from Table 2, Model 2. Panel A shows that each period ushers in higher life expectancies for MLB players when graphed for the “average” cohort. Life expectancies at age 20 were 45.7 years among those alive between 1910 and 1919, 53.6 years among those alive between 1930 and 1939, 56.3 years among those alive between 1950 and 1959, and 59.6 years among those alive between 1970 and 2004. Panel B shows MLB player life expectancies by cohort when holding each period at its mean. At age 20, players from the Modern Era can expect to live 65.5 years, compared to 52.4 years from the Early Era and 58.3 from the Golden Era.

Conclusion

Compared to the general male population, MLB players enjoy longer life expectancies, in part because they are selected for fitness and talent, and they have high levels of physical activity and prestige during their baseball careers. Life expectancies for professional baseball players are higher than those for the general male U.S. population with similar advantages to those found by Abel and Kruger (2006) for MLB players who debuted between 1900 and 1939.

A central contribution of this article is the documentation of age, period, and cohort trends in adult male mortality. Most national estimates calculate period life expectancies that assume that the mortality risk of those who are currently age 65 will remain the same into the future, when, say, those who are currently age 25 reach age 65. In contrast, our longitudinal data allow us to calculate cohort life expectancies that account for the improved mortality at all ages, as calendar periods progress. Mortality risk increases with age, but declines in more recent calendar periods, a fact that coincides with secular improvements in life expectancy for the general population over time. Large gains between 1900 and 1940 coincide with major improvements in the public health infrastructure and medical technology during this period (Cutler and Miller, 2005). Longevity also increases across cohorts. At age 20, Modern Era players can expect to live an additional 65.5 years (in the “average” period), compared to 55.8 years for males at age 20 in the U.S. population (Arias, 2006). This 9.7-year gap results from the exceptional health among baseball players, as well as from differences between period and cohort life expectancies. The relatively high life expectancies among the Modern Era players are lower than the maximum life expectancies predicted by more optimistic researchers (Oeppen and Vaupel, 2002), but may continue to increase with advances in modern training methods and sports medicine. Importantly, these advances suggest that salutary health behavior changes can lead to potential longevity gains for the general population.

Our data contain two centenarians: John Daley lived to 100 years of age and Karl Swanson lived to 102 years of age. The number of centenarians in these data will grow as life expectancy in the United States continues to increase over time and as more players reach the oldest ages. In time, these data could be used to study aging among the oldest men.

In separate analyses (not shown), we examined the importance of nativity on life expectancy. Data limitations precluded any direct analysis of race/ethnic differences. About 11 percent of our sample is foreign born, with the majority coming from Latin American countries, including the Dominican Republic, Mexico, Cuba, Puerto Rico, and Venezuela. Although not significant, in most cases foreign-born players had lower odds of mortality than U.S. natives, with the exception of Dominicans and Venezuelans, who had higher but nonsignificant odds ratios. The lack of significant findings by nativity may be due to the more recent arrival of Hispanic immigrants to the United States and, as such, their relatively low risk of death. Increasing numbers of foreign-born players in the future will allow us to examine the importance of nativity on life expectancies.

None of the anthropometric measures were significantly related to mortality. Once adequate controls are included, handedness has little impact on adult mortality (see also Abel and Kruger, 2004; Halpern and Coren, 1988). Although height may be a measure of prior nutrition in the general population, especially in earlier cohorts (Fogel, 2003; Komlos and Lauderdale, 2007), it is unassociated with mortality among professional baseball players, possibly because they are very physically fit or because height varies little among players who are typically about six feet tall. Body mass is not associated with mortality among MLB players perhaps because so few are obese (0.28 percent of players in our pooled sample were obese class 1), because BMI during playing years does not capture weight changes at later ages, or because BMI does not adequately assess mortality risk in populations marked by high levels of fitness.

Career longevity affects mortality (see also Abel and Kruger, 2006), but individual performance measures do not. Separate models (not shown) that adjust for both career length and player ratings show that the benefits of long careers do not result from player ability. Instead, longer careers may protect against premature mortality because players maintain their peak fitness for more years. Player performance may be unrelated to mortality risk because it indicates success in highly specialized and often fairly short careers that may end decades before an individual dies. Longevity gains may be related to second careers characterized by high levels of determination, discipline, and competitiveness, coupled with strong social networks and name recognition derived from major league baseball (Gmelch, 2001).

Sports fans amass detailed statistics on professional players and can now add life expectancies to their collections. Compared to the general population, MLB players enjoy higher social status, prestige, income, and, ultimately, longer lives. Baseball has been very good to many players and the characteristics of baseball players provide insight into possible future longevity gains among the U.S. male population.

Acknowledgments

We thank Sport Media Enterprises for supplying the data; the Department of Sociology, University of Colorado, for purchasing the data license; Nancy Mann for editorial assistance; the University of Colorado Population Center (Grant R21 HD51146) and the University of Texas Population Research Center (Grant R24 HD42849) for administrative and computing support; and the reviewers for their insightful and helpful comments.

References

- Abel, Ernest L.; Kruger, Michael L. Left-Handed Major League Baseball Players and Longevity Re-Examined. *Perceptual and Motor Skills* 2004;99:990–92. [PubMed: 15648498]

- Abel, Ernest L.; Kruger, Michael L. The Longevity of Baseball Hall of Famers Compared to Other Players. *Death Studies* 2005;29:959–63. [PubMed: 16265814]
- Abel, Ernest L.; Kruger, Michael L. The Healthy Worker Effect in Major League Baseball Revisited. *Research in Sports Medicine* 2006;14:83–87. [PubMed: 16700406]
- Allison, Paul D. *Event History Analysis: Regression for Longitudinal Event Data*. Beverly Hills, CA: Sage Publications; 1982.
- Arias, Elizabeth. United States Life Tables, 2003. *National Vital Statistics Reports* 2006;54(14):1–40. [PubMed: 16681183]
- Armstrong, Robert J. U.S. Decennial Life Tables for 1989–91. *United States Life Tables* 1997;1(1)
- Costa, Dora L.; Steckel, Richard H. Long-Term Trends in Health, Welfare, and Economic Growth. In: Steckel, RH.; Floud, R., editors. *Health and Welfare During Industrialization*. Chicago, IL: University of Chicago Press; 1997. p. 47–89.
- Cutler, David; Miller, Grant. The Role of Public Health Improvements in Health Advances: The Twentieth Century United States. *Demography* 2005;42:1–22. [PubMed: 15782893]
- Flegal, Katherine; Carroll, Margaret D.; Ogden, Cynthia L.; Johnson, Clifford L. Prevalence and Trends in Obesity Among US Adults, 1999–2000. *Journal of the American Medical Association* 2002;288:1723–27. [PubMed: 12365955]
- Fogel, Robert W. Secular Trends in Physiological Capital: Implications for Equity in Health Care. *Perspectives in Biology and Medicine* 2003;46(3):S24–S38. [PubMed: 14563072]
- Gmelch, George. When Baseball Careers End. *Nine: A Journal of Baseball History and Culture* 2001;9(2):1–22.
- Halpern, Diane F.; Coren, Stanley. Do Right-Handers Live Longer? *Nature* 1988;333:213. [PubMed: 3367996]
- Haupt, Michael. Whaples, Robert, editor. *The Economic History of Major League Baseball*. EH.Net Encyclopedia. 2003. Available at (<http://eh.net/encyclopedia/article/haupt.mlb>)
- Komlos, John; Lauderdale, Benjamin E. Underperformance in Affluence: The Remarkable Relative Decline in U.S. Heights in the Second Half of the 20th Century. *Social Science Quarterly* 2007;88(2):283–305.
- Kotarba, Joseph A. Conceptualizing Sports Medicine as Occupational Health Care: Illustrations from Professional Rodeo and Wrestling. *Qualitative Health Research* 2001;11(6):766–79. [PubMed: 11710076]
- Metropolitan Life Insurance Company. Longevity of Major League Baseball Players. *Statistical Bulletin* 1975;56:2–4.
- Moore, David E.; Hayward, Mark D. Occupational Careers and Mortality of Elderly Men. *Demography* 1990;27(1):31–53. [PubMed: 2303140]
- Nakao, Keiko; Treas, Judith. *GSS Methodological Report 70*. Chicago, IL: NORC; 1990. Computing 1989 Prestige Scores.
- Oeppen, Jim; Vaupel, James. Broken Limits to Life Expectancy. *Science* 2002;296(5570):1029–30. [PubMed: 12004104]
- Rogers, Richard G.; Hummer, Robert A.; Krueger, Patrick M. The Effect of Obesity on Overall, Circulatory Disease- and Diabetes-Specific Mortality. *Journal of Biosocial Science* 2003;35(1):107–29. [PubMed: 12537160]
- Rogers, Richard G.; Hummer, Robert A.; Krueger, Patrick M.; Pampel, Fred C. Mortality Attributable to Cigarette Smoking in the United States. *Population and Development Review* 2005;31(2):259–92.
- Schnor, Peter; Parner, Jan; Lange, Peter. Mortality in Joggers: Population Based Study of 4658 Men. *British Medical Journal* 2000;321(7261):602–03. [PubMed: 10977835]
- Severson, Herbert H.; Klein, Karin; Lichtensein, Edward; Kaufman, Nancy J.; Orleans, C Tracy. Smokeless Tobacco Use Among Professional Baseball Players: Survey Results, 1998 to 2003. *Tobacco Control* 2005;14:31–36. [PubMed: 15735297]
- Siegel, Jacob S.; Swanson, David A., editors. *The Methods and Materials of Demography*. Vol. 2. New York: Academic Press; 2004.

- Thorn, John; Birnbaum, Phil; Deane, Bill, editors. Total Baseball. Vol. 8. Toronto, Canada: Sport Media Publishing, Inc; 2004.
- Waterbor, John; Cole, P.; Delzell, Elizabeth; Andjelkovitz, D. The Mortality Experience of Major League Baseball Players. *New England Journal of Medicine* 1988;318:1278–80. [PubMed: 3362185]
- Witnauer, William D.; Rogers, Richard G.; Saint Onge, Jarron M. Baseball Career Length in the Twentieth Century. *Population Research and Policy Review* 2007;26(4):371–86.
- World Health Organization (WHO). Obesity: Preventing and Managing the Global Epidemic. Geneva, Switzerland: World Health Organization; 1997.

FIGURE 1.
Major League Baseball Player Life Expectancies by Period and Cohort

TABLE 1
Percentage of Selected Characteristics, Major League Baseball Players, 1902–2004

Characteristics	Percentage
<i>Age Group</i>	
20–24	4.23
25–29	11.82
30–34	12.70
35–39	11.89
40–44	10.91
45–49	9.91
50–54	8.85
55–59	7.73
60–64	6.58
65–69	5.39
70–74	4.16
75–79	2.94
80–84	1.79
85+	1.11
<i>Period</i>	
< 1910	0.85
1910–1919	3.98
1920–1929	6.42
1930–1939	8.36
1940–1949	10.13
1950–1959	11.22
1960–1969	11.73
1970–2004	47.31
<i>Cohort</i>	
Early Era	56.19
Golden Era	23.74
Modern Era	20.07
<i>Anthropometric Variables</i>	
Body Mass Index	
Normal (18.5–<25.0)	58.80
Overweight (25.0–<30.0)	40.92
Obese Class I (30.0–<35.0)	0.28
Height	
<6 feet	54.81
≥ 6 feet	45.19
Handedness	
Right handed	86.47
Left handed	13.53
<i>Performance Measures</i>	

Characteristics	Percentage
Career Rating	
Negative	86.03
Positive	13.97
First-Year Rating	
Negative	77.51
Positive	22.49
Seasons Played	
< 10 years	76.46
10+years	23.54

Note: Based on person-years.

Source: Derived from *Total Baseball*, 8th edition, 2004. 822 Social Science Quarterly

TABLE 2
Major League Baseball Player Hazard Coefficients on Mortality, 1902–2004

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
<i>Age Group [20–24]</i>									
25–29	0.42	0.52	0.52	0.52	0.53	0.52	0.52	0.53	0.51
30–34	0.56	0.72	0.69	0.72	0.73	0.72	0.72	0.73	0.70
35–39	0.74*	0.99*	0.92*	0.99*	1.00*	0.99*	0.99*	1.00*	0.97*
40–44	1.32***	1.67***	1.56***	1.67***	1.67***	1.67***	1.67***	1.67***	1.65***
45–49	1.68***	2.12***	1.96***	2.12***	2.12***	2.12***	2.12***	2.12***	2.09***
50–54	2.39***	2.91***	2.69***	2.91***	2.92***	2.91***	2.91***	2.91***	2.88***
55–59	2.78***	3.37***	3.09***	3.38***	3.38***	3.37***	3.37***	3.38***	3.34***
60–64	3.17***	3.83***	3.51***	3.83***	3.83***	3.83***	3.83***	3.83***	3.79***
65–69	3.60***	4.30***	3.94***	4.31***	4.31***	4.30***	4.31***	4.31***	4.27***
70–74	4.00***	4.77***	4.36***	4.77***	4.78***	4.77***	4.77***	4.77***	4.73***
75–79	4.35***	5.18***	4.72***	5.18***	5.19***	5.18***	5.18***	5.18***	5.14***
80–84	4.92***	5.81***	5.30***	5.82***	5.82***	5.81***	5.81***	5.82***	5.77***
85+	5.45***	6.40***	5.83***	6.40***	6.41***	6.40***	6.40***	6.40***	6.36***
<i>Period [<1910]</i>									
1910–1919	–0.20	–0.20	–0.18	–0.20	–0.20	–0.20	–0.20	–0.20	–0.20
1920–1929	–0.54	–0.54	–0.44	–0.54	–0.54	–0.54	–0.54	–0.54	–0.53
1930–1939	–1.08**	–1.08**	–0.89*	–1.08**	–1.08**	–1.08**	–1.08**	–1.08**	–1.08**
1940–1949	–1.17**	–1.17**	–0.92*	–1.17**	–1.17**	–1.17**	–1.17**	–1.17**	–1.14**
1950–1959	–1.47***	–1.47***	–1.14**	–1.47***	–1.47***	–1.47***	–1.47***	–1.47***	–1.43***
1960–1969	–1.47***	–1.47***	–1.08**	–1.47***	–1.47***	–1.47***	–1.47***	–1.47***	–1.43***
1970–2004	–1.97***	–1.97***	–1.39***	–1.97***	–1.97***	–1.97***	–1.97***	–1.97***	–1.97***
<i>Cohort [Early Era]</i>									
Golden Era			–0.49***	—	—	—	—	—	—
Modern Era			–1.02***	—	—	—	—	—	—
<i>Anthropometric Variables</i>									
Body Mass Index [normal 18.5–<25.0]									
Overweight (25.0–<30.0)				0.04	—	—	—	—	—

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Obese Class I (30.0–<35.0)				0.57	—	—	—	—	—
Height [<6 feet]									
> 6 feet					0.03	—	—	—	—
Handedness [right handed]									
Left handed						– 0.02	—	—	—
Performance Measures									
First-year rating							0.03	—	—
Career rating								0.00	—
Seasons Played [<10 years]									
10+years									– 0.15 ^{***}
Intercept	– 7.15	– 6.16	– 6.15	– 6.18	– 6.16	– 6.17	– 6.19	– 6.16	– 6.13
– 2 Log likelihood	26773.12	26478.88	26404.04	26475.95	26478.34	26478.81	26477.38	26478.07	26470.58

* $p \leq 0.05$;
** $p \leq 0.01$;
*** $p \leq 0.001$.

Note: Referent categories in brackets.
Source: Derived from *Total Baseball*, 8th edition, 2004.

TABLE 3
Major League Baseball Player Life Expectancies for the Period 1970–2004

Age Group	m_x	q_x	l_x	d_x	L_x	T_x	Life Expectancies (ex)	
							MLB	U.S. Males
20–24	0.0003	0.0015	100,000	146	499,634	5,810,771	58.11	53.25
25–29	0.0005	0.0025	99,854	246	498,652	5,311,137	53.19	48.67
30–34	0.0006	0.0030	99,607	300	497,286	4,812,485	48.31	44.10
35–39	0.0008	0.0039	99,307	391	495,557	4,315,199	43.45	39.57
40–44	0.0016	0.0077	98,916	766	492,665	3,819,641	38.62	35.09
45–49	0.0024	0.0121	98,150	1,188	487,780	3,326,977	33.90	30.66
50–54	0.0053	0.0264	96,962	2,558	478,416	2,839,197	29.28	26.37
55–59	0.0085	0.0414	94,404	3,911	462,244	2,360,780	25.01	22.30
60–64	0.0133	0.0642	90,493	5,807	437,949	1,898,536	20.98	18.53
65–69	0.0212	0.1008	84,686	8,532	402,101	1,460,587	17.25	15.12
70–74	0.0332	0.1534	76,154	11,686	351,556	1,058,486	13.90	12.05
75–79	0.0493	0.2194	64,468	14,147	286,974	706,929	10.97	9.39
80–84	0.0891	0.3645	50,321	18,341	205,754	419,956	8.35	7.12
85+	0.1493	1.0000	31,980	31,980	214,202	214,202	6.70	5.31

Note: The estimates control for cohort effects.

Source: Derived from Table 2, Model 3 and Armstrong (1997).