teractions of these potent inhibitors with other enzymes of purine nucleoside or nucleotide metabolism. It has been shown, for instance, that both coformycin and deoxycoformycin inhibit AMP deaminase with respective K_i (inhibition constant) values of approximately $5 \times 10^{-8}M$ and $3 \times 10^{-6}M$ (*25*).

Cells of the line B-mix K-44/6 can be readily adapted to growth in medium containing horse serum. Although equine red blood cells, plasma, and serum do contain low but significant levels of adenosine deaminase activity, this activity is not detectable when the serum is used to supplement the medium at the usual level of 5 percent or 10 percent. Thus, B-mix K-44/6 cells grown in medium supplemented with horse serum provide a cell system virtually devoid of adenosine deaminase activity.

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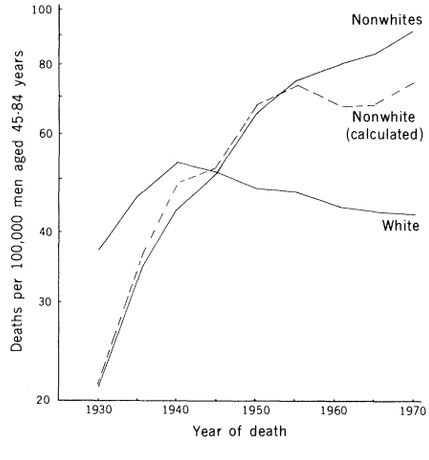
Cohort Mortality for Prostatic Cancer Among United States Nonwhites

Abstract. *In recent decades, age-adjusted mortality rates from prostatic cancer have risen precipitously among blacks, remaining unchanged among whites. It is now the most common cancer among United States black males. When nonwhite mortality rates were examined by age and birth cohort, it was found that peak rates occurred at every age in the cohort of 1896 to 1900, and declined thereafter. This presages an arrest and reversal of the time trend in summary mortality rates as more recent nonwhite cohorts reach the ages of maximum risk.*

Although prostatic cancer is the second most common cancer among men in the United States and is the most common cancer in black males, its etiology remains essentially unknown. The most striking aspect of its epidemiology is the substantially higher occurrence of the disease among blacks when compared to whites, a difference which appears not to be due to readily identifiable factors associated with socioeconomic status (*1*). Age-adjusted prostatic cancer incidence and mortality rates among blacks in the United States have increased dramatically over the past few decades (*2*). In Fig. 1, age-adjusted prostatic cancer death rates are shown for U.S. whites and nonwhites over the period 1930 to 1970. The rates have been standardized to the 1950 total U.S. male population aged 45 through 84 years. For both races, mortality increased during the decade 1930 to 1940, after which time the rates for whites declined slightly while those for nonwhites continued to increase. The approximate linearity on the logarithmic scale shows that the relative increase in the rates for nonwhites and the decrease in the rates for whites since 1940 have been essentially constant.

The sharply rising mortality from prostatic cancer among blacks raises concerns about even higher disease rates in the future. However, age-adjusted rates for various time periods often mask underlying patterns within particular age



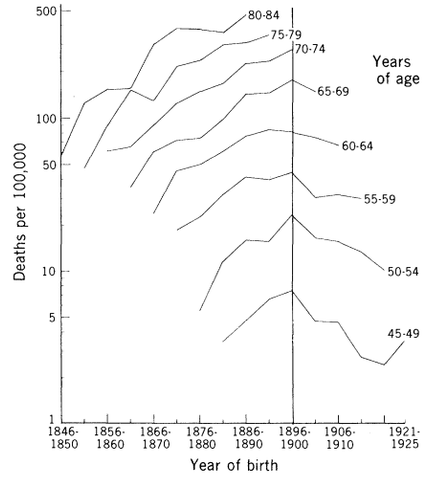


Fig. 1 (left). Annual age-adjusted prostatic cancer mortality rates per 100,000 U.S. males aged 45 to 84 years. The data are separated for whites and nonwhites, and a computed rate is shown for nonwhites. The rates are shown at 5-year intervals from 1930 to 1970 and are adjusted to the 1950 U.S. male population aged 45 to 84 years (*6*). Fig. 2 (right). Annual age-specific prostatic cancer mortality rates per 100,000 by cohort for U.S. nonwhite males born between 1846 and 1925 (*6*).

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groups. An examination of time trends by age-specific groups led us to suspect that a cohort or generational effect might be wholly or at least partially responsible for the observed increase in prostatic cancer mortality rates among blacks. To this end, we have analyzed prostatic cancer mortality rates among men aged 45 to 84 years for separate birth cohorts of U.S. nonwhites extending from 1846 to 1925. While it would have been preferable to utilize black rates for the analyses, these are not available. However, since blacks make up the large majority of nonwhites, only a small effect could be attributed to other nonwhites.

The cohort data are shown graphically in Fig. 2. Rates for all ages peak in the birth cohort of 1896 to 1900. Cohorts born prior to that time show a consistent increase in rates for all age groups, and cohorts born after 1896 to 1900 show a fairly consistent decline. An analysis of variance (F statistic) was computed and confirmed that the cohort effect was indeed nonrandom ($P < .001$). The reason that the age-adjusted rates calculated from current data continue to increase is that the earlier cohorts, those born before 1900, comprise the older age groups which contribute most heavily to the summary rates. If trends among younger nonwhite cohorts continue, and as the effect of the earlier cohorts fades, it can be expected that overall mortality rates from prostatic cancer in blacks will begin to decline.

By means of a log-linear statistical model (*3*), the magnitude of the cohort effect can be assessed. The age-adjusted prostatic cancer rates among nonwhites with the cohort effect statistically removed are shown in Fig. 1 (dashed line). These modeled rates essentially parallel the observed nonwhite rates until 1955. At that time, the slope in the modeled rates decreases until 1965 and then shows a slight increase in 1970. A similar decrease was observed among whites 15 years earlier.

A frequently offered explanation for the secular increase in cross-sectional prostatic cancer mortality rates is that it can be accounted for by improvements in the medical care, screening, and accuracy of diagnosis among blacks over time. The nature of prostatic cancer makes it particularly sensitive to such changes, so that the increases might be artifacts of reporting systems. The proportion of nonwhite males dying from ill-defined and unknown causes declined from 5.7 percent in 1930 (*4*) to 3.3 percent in 1970 (*5*), and this might have had a minor influence on prostatic cancer rates. However, these reasons would not explain the fact that the increases observed for the 1896 to 1900 cohort are followed by decreases in subsequent cohorts, at least for men under the age of 70 for whom data are available.

We have carried out a similar analysis of mortality data for whites and no such generational pattern was seen, a finding consistent with the fact that cross-sectional rates for whites have shown very little change in the past five decades.

Research into the historical experience of the 1896 to 1900 and earlier nonwhite birth cohorts might provide clues to agents associated with prostate cancer. Given the distance in time, we acknowledge the potential difficulties of such a task.

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3. The log-linear model is:

$$\log (r_{ij(k)}) = \mu + \alpha_i + t_j + c_{(k)}$$

where the logarithm of the rate of prostatic cancer $r_{ij(k)}$ is modeled by the sum of a constant represented by μ, the effects of the ith age group represented by a_i, the effects of the jth time period represented by t_j, and the effects of the kth cohort represented by $c_{(k)}$. Note that the term $c_{(k)}$ may be considered as a time-age interaction since each cohort is uniquely defined by the pair of variables, time period, and age. The components of this model were estimated by the method of least squares, and the fit of the model to the observed data is extremely good. The proportion of the variation explained by the model is 99.3 percent. The estimates of the components of the model with the values of $c_{(k)}$ set to zero yield an assessment of the "cohort effect." The F-statistic (with 14 and 47 degrees of freedom) for testing the statistical significance of this reduced model is 20.38 [$F_{14,57}(.05) = 1.87$]; thus, the contribution due to differences among cohorts to the variation in nonwhite prostatic cancer rates is not likely to have occurred by chance. This reduced model produces estimates of age-adjusted rates for prostatic cancer in which the cohort effect has been removed statistically, as shown in Fig. 1.
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Calcareous Deposits in the Renal Sac of a Molgulid Tunicate

Abstract. *Weddellite (calcium oxalate dihydrate) and calcite (anhydrous calcium carbonate phase) are components of concretions in the renal sac of the ascidian tunicate* Molgula manhattensis. *The presence of weddellite along with urate in the concretions suggests a resemblance to human kidney stones, although, unlike the latter, the concretions in* Molgula *do not seem to be pathologic deposits.*

The role of the renal sac in the ascidian family Molgulidae (Tunicata, phylum Chordata) has remained a puzzle since the structure was first described more than a century ago (*1*). Usually thought to function as a kidney, chiefly because concretions in its lumen contain uric acid (*2–4*), the renal sac nevertheless possesses various features that are unusual for an excretory organ. For example, the bladder-like, sausage-shaped structure has no apertures or ducts at any time in the life cycle of *Molgula* (*4*). Its large lumen sequesters solid concretions easily visible to the naked eye and also—in at least five species of *Molgula*, including *M. manhattensis*—consistently harbors dense populations of fungus-like microorganisms (*4*).

The chemical activities of the renal sac have been surmised almost exclusively from the presence of uric acid in the organ. However, uric acid is not the sole precipitate in the renal sac lumen. If renal sac concretions of *M. manhattensis* are immersed in 5.25 percent sodium hypochlorite (NaClO; Clorox), much of the concretionary material, including uric acid, is quickly digested, leaving behind a residue that includes transparent dipyramidal crystals and, in some animals, a number of spheroid, opaque concretions (*5*). We have examined the composition of this NaClO-resistant, bioinorganic fraction isolated from *M. manhattensis* collected in San Francisco Bay, California.

We have seen tetragonal, dipyramidal crystals, with or without columnar faces (Fig. 1), in all sexually mature *M. manhattensis* from San Francisco Bay and have also found them in specimens of *M. manhattensis* from Woods Hole, Massachusetts, and Chesapeake Bay (Maryland and Virginia). These crystals lie "free" in the renal sac fluid as single or

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