# The Life Expectancy of Correctional Service of Canada Employees(1)

*The Evaluation Branch of the Correctional Service of Canada recently initiated a study of the life expectancy of correctional officers (CXs) to investigate whether there is an occupational risk associated with being a correctional officer. This study compared the life expectancy of Correctional Service of Canada employees, with a particular focus on CXs, with that of the rest of the federal public service.*

## Research Design

The life expectancy, or mortality patterns, of correctional officers was analyzed through a statistical technique known as survival analysis, or more specifically, proportional hazards models. Survival analysis is a statistical technique used to evaluate the interval between two events, such as birth and death (life expectancy).

Traditional statistical techniques, such as calculating the average time between two events, cannot be used because there are too many complicating factors. For instance, the event of interest, in this case death, may not occur for all people during the period in which they are observed, and the actual period of observation may not be the same for all people. That is, not everyone retires or dies on the same day, and not everyone is born or starts working on the same day.

Data for this study were obtained from a computerized superannuation data base maintained by the Department of Supply and Services. Through this administrative system, contact is maintained with clients to make financial payments - pension benefits (i.e., annuities and annual allowances). The data for the current study consist of all federal public servants (except the Royal Canadian Mounted Police and the Canadian Armed Forces) who have, since 1974:

- retired from the federal public service (in which case they receive either a deferred or an immediate annuity);
- died while in service; or
- gone on long-term disability.

In all, the superannuation data file that we obtained consisted of records for 148,850 individuals - 3,851 had retired from the Correctional Service of Canada and of those 1,422 were classified as CXs. Due to the disproportionate gender distribution within the organization, particularly in the past, only male retirees were considered in this study.

## Survival Analysis

To appreciate the relative survival pattern of CX retirees, it was necessary to compare them with retirees of other federal public service classifications. The most logical initial comparison groups were other retirees from the Correctional Service of Canada in the non-CX classifications and all other retired federal public servants, regardless of their department or classification.

First, we estimated the survival distribution for these three groups. As we can see in Figure 1, the survival curve for the CX group was slightly steeper than that for all federal public service retirees. This indicates that the average (median) survival time for the CX group was slightly lower than that of the latter group. The survival curve for non-CX retirees from the Correctional Service was less steep than that of the group comprising all other federal public servants. This suggests that the average life expectancy for the non-CX group of retirees from the Correctional Service of Canada was slightly higher. Thus, it would appear that retirees from the Correctional Service of Canada fell into two groups - one near the lower bound of the expected range for all federal public servants, and one close to the upper bound for all federal public servants.

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**Figure 1**



Figure 1
Estimated Survival Plots for Selected Groups
(Males Only)
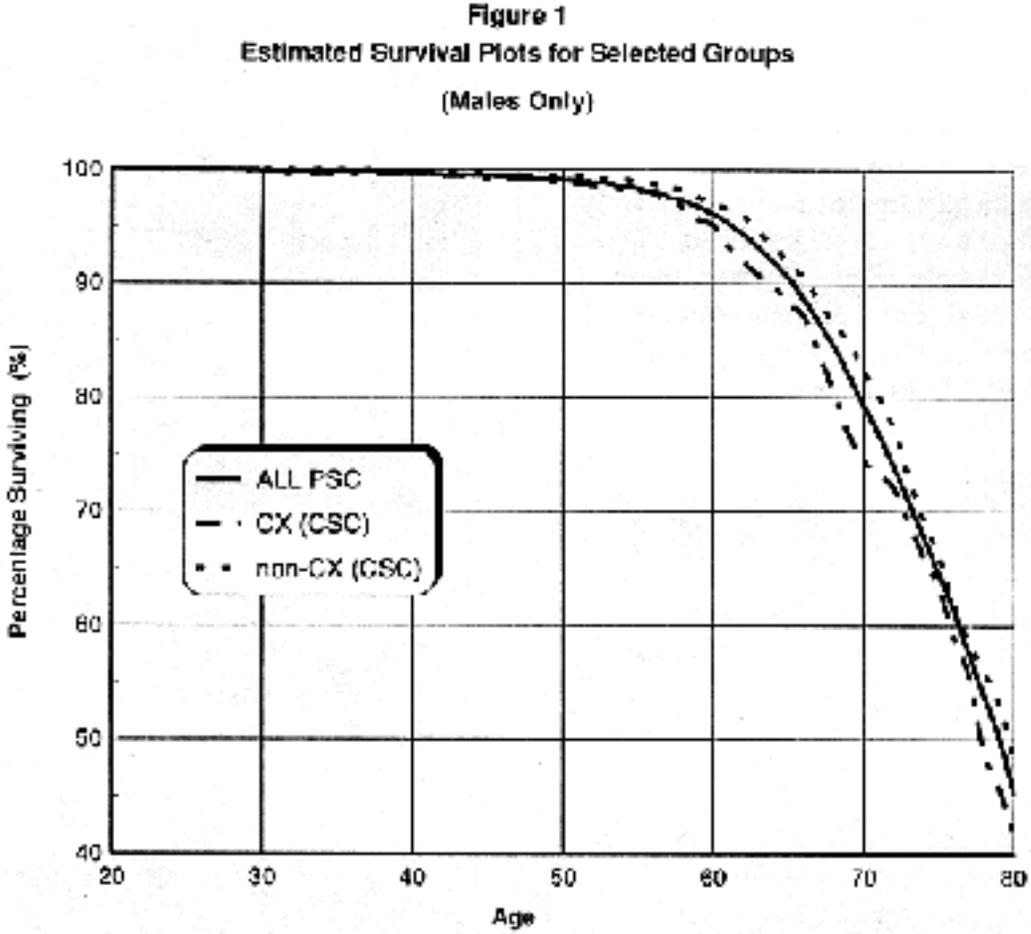
Another way of viewing the survival patterns of these three groups is presented in Figure 2. This graph provides a broader context for interpreting the life expectancies of these groups by contrasting them with those for all Canadian males (specifically for males at birth, age 20 and age 35) based on the 1986 Census of Canada.

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**Figure 2**

## Figure 2
## Average (Median) Survival Times
## (Males Only)
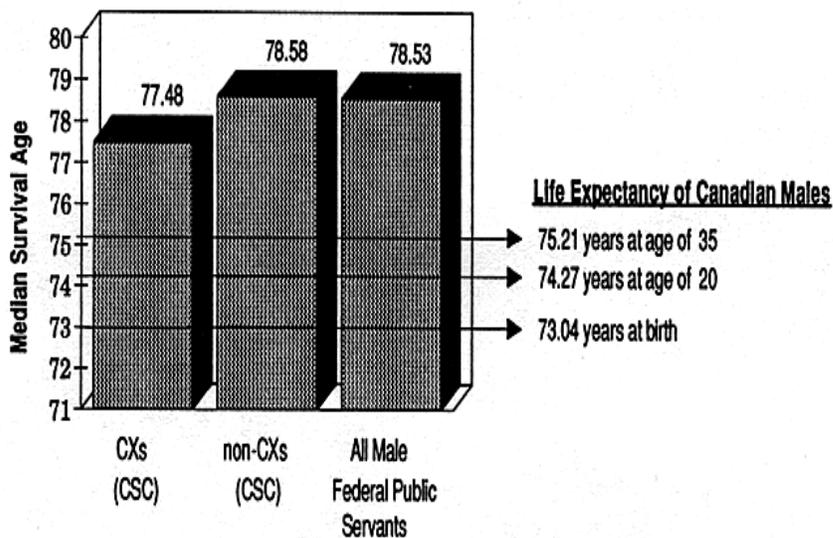


A comparison of the life expectancy between retired correctional officers and the general population showed that, overall, male correctional officers can expect to live somewhat longer than the average Canadian male. For correctional officers, their average age was approximately 36 years when they joined the Correctional Service of Canada. This may seem somewhat high, but many officers hired in the past were starting second careers - having served in, or retired from, the armed forces. As a consequence, the most appropriate comparison group for male CXs was that of Canadian males at age 35. In the overall Canadian population, males at age 35 can expect to live another 40 years, on average, to the age of 75.21.

Thus, as shown in Figure 2, correctional officers had a life expectancy several years longer than the average Canadian male. When compared with both non-CXs and other federal public service personnel, the life expectancy of correctional officers appeared to be about one year shorter. The subsequent discussion, however, indicates that these two differences are not statistically significant.

Statistical Comparisons

To compare statistically the life expectancy of CXs with the other two groups, we used the Cox proportional hazards model. The first model compared former CXs with non-CX retirees from the Correctional Service of Canada, and the second model compared former CX employees with all other retirees from the public service.

In developing these statistical models, it was necessary to control for several extraneous factors (independent variables). We statistically controlled for the following factors: employment starting age, length of service, reason for retirement (e.g., age, resignation, health, death) and social class (as measured by income level). We controlled for these factors for the following reasons.

First, since the age at which federal public servants start working for the federal government varies considerably, it is necessary to control for that factor in any comprehensive analysis. Widely varying

starting ages can introduce a significant bias in survival estimates if they are not controlled. All else being equal, people with later starting ages will have somewhat longer average life expectancies than younger people, since they have already survived all competing risks faced by individuals in younger age groups.

Second, it was necessary to control for length of service (the difference between an individual's starting and retirement age). Considerable variation exists in the retirement age of federal public servants; thus, it was possible to include length of service as an independent factor and to estimate its impact on life expectancy. We were fortunate to be able to control for length of service since it could then be used to test the major hypothesis as to whether people's jobs or careers affect their life expectancy in some way (e.g., working conditions or lifestyle). One would normally expect length of service to be positively related to life expectancy (as one increases, 50 does the other), even when controlling for starting age. If length of service has a negative relationship with the survival function, one could assume that the job is somehow responsible for shortening life expectancy. In this latter situation, those with more service, all else being equal, would have shorter expected life spans.

Third, we would naturally expect the reason for retirement to be related to life expectancy. In particular, we would expect that those who died in service would have the shortest survival distribution. Similarly, we would also expect that those who retired because of health problems might also have shorter life expectancies than either voluntary resignations or those who retired due to age.

Fourth, previous research on mortality has shown a strong relationship between life expectancy and social class. Since one of the strongest indicators of social class in North America is income, we expected that individuals with higher income levels would have a higher life expectancy than individuals with lower income levels.

Findings of Statistical Comparisons

The results from the two survival models demonstrate that the starting age, length of service and level of income are all statistically significant and positively related to the survival function. This means, for example, that those with higher incomes can expect to live longer than those with lower incomes. The remaining variable, reason for retirement, is also statistically significant but negatively related to the survival function. Thus, for example, as we expected, those who died before retirement or retired due to health-related reasons had shorter life expectancies.

The statistical comparisons of most interest, however, are the ones which distinguish the correctional officer (CX) retirees from the other two groups. The first model compared CXs with non-CXs from the Correctional Service of Canada. As we saw in Figure 2, CXs had a slightly lower life expectancy than non-CXs. However, once we controlled for the independent variables discussed previously, no statistical difference was found between the two groups. This means that CXs and non-CXs basically have the same life expectancy. It also means that the slight difference in life expectancy between the two groups was related to the independent variables we controlled for and not to occupational risk itself.

The second model compared CXs with ali other former federal public service personnel. As with the first

model, there was no statistically significant difference between the two groups.

Conclusion

This study demonstrates that there is no occupational risk associated with being a correctional officer in terms of reducing one's life expectancy. Both CXs and non-CXs can expect to live as long as any other federal public servant. More important, Correctional Service of Canada employees can expect to live several years longer than the average Canadian.

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*(1)*A considerably more detailed version of this article is available from the Evaluation Branch of the Correctional Service of Canada, 340 Laurier Avenue West, 4th Floor, Section E, Ottawa, Ontario K1A 0P9.