

# Firefighter Heart Presumption Retirements in Massachusetts 1997–2004

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**Objective:** “Heart Presumption” legislation is common throughout North America. We sought to study Massachusetts firefighters retiring with heart disability awards. **Methods:** The authors conducted a retrospective review of Massachusetts firefighters: 362 receiving Heart Presumption pensions (1997–2004) and a comparison group of 310 professionally active firefighters. **Results:** Of retirements, 77% were due to coronary heart disease and 23% for other cardiovascular conditions. Only 42% of the retirements were related to discrete on-duty events. Fire suppression (odds ratio = 5.1, 95% confidence interval = 1.2–22.3) and alarm response (odds ratio = 6.4, 95% confidence interval = 2.5–17) were associated with markedly higher risks of duty-related heart retirement events than nonemergency activities. Cardiovascular risk factor prevalence was high among all retiree subgroups and significantly greater than among control firefighters in almost all cases. **Conclusions:** Our study supports calls for improved cardiovascular prevention and risk reduction strategies among firefighters. (J Occup Environ Med. 2006;48:1047–1053)

Cardiovascular disease, primarily due to coronary heart disease (CHD), is the leading cause of lifetime mortality among firefighters as well as principal cause of “on-duty deaths” (fatalities resulting from injury or illness occurring during fire department duties). Cardiovascular disease accounted for approximately 45% of firefighters’ on-duty deaths from 1977 to 2004.<sup>1–3</sup> This compares with 22% of on-duty deaths due to CHD among police and detectives, 15% among occupational fatalities overall,<sup>2</sup> and 11% among other emergency medical service workers.<sup>4</sup> We recently demonstrated that most on-duty CHD fatalities in the fire service are likely to be work-precipitated and occur in firefighters with underlying CHD.<sup>5</sup>

Experts have often held that smoke exposure, physical exertion, and psychologic stressors increase cardiovascular risk among firefighters.<sup>6</sup> The Industrial Disease Standards Panel in Toronto, Canada,<sup>7</sup> and “Heart Presumption” legislation in 37 U.S. states and two Canadian provinces<sup>8</sup> have accepted this assumption compensating firefighters who develop CHD and other vascular disease. However, scientific evidence of increased cardiovascular mortality rates among firefighters remains inconclusive.<sup>9–12</sup>

Despite the implementation of Heart Presumption legislation throughout much of North America and the associated individual, family, community, and societal costs of premature deaths and disability, little is known regarding the occupational and medical risk factors underlying these retirements. We are not aware of any studies describing the health

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status of the firefighters receiving these legislated pensions. Therefore, we undertook a systematic study of Heart Presumption retirements among Massachusetts firefighters. In this article, we describe the medical basis of the retirements, compare underlying cardiovascular risk factors between those retiring due to CHD and those retiring due to other cardiovascular diagnoses, and compare firefighters whose retirements were associated with discrete on-duty events with retirees whose cardiovascular disease manifested off-duty. Finally, we compare the retirees' prevalence of cardiovascular risk factors with those of professionally active Massachusetts firefighters.

## Materials and Methods

### Study Population

**Retirees.** We included all firefighters awarded Heart Presumption or other cardiovascular-related disability pensions from 1997 to 2004 from the Commonwealth of Massachusetts in accordance with state law and Public Employee Retirement Administration Commission (PERAC) guidelines and whose cases underwent review by PERAC-appointed medical panels. PERAC identified these cases by searching their database for all firefighters with disability pensions June 1996 through the end of 2004 and any of the following: an injury description field entry that was cardiovascular; a medical review panel field entry of "cardiology"; a body part field entry of "heart"; or disability field entry of "accidental heart," "accidental cardiac," "ordinary cardiac," or "accidental death cardiac." PERAC nurses then reviewed all the cases with medical files identified to ensure that the disability benefit awards were cardiovascular-related. Finally, we excluded any cases whose date of retirement was before January 1, 1997, or after December 31, 2004.

We developed a standardized data extraction form, which was then used by PERAC nurses to extract all relevant information by hand from re-

tirement administration files. Coded data extraction sheets, void of personal identifiers, were reviewed by a physician (JDH) and clarified when necessary with the nurses before entry in an SPSS 12 database.<sup>13</sup> The human subjects committee of the Harvard School of Public Health examined our protocol and determined that the use of the anonymous coding sheets was exempt from further review.

**Professionally Active Control Firefighters.** We used a well-characterized cohort of 310 professional firefighters, drawn from all regions of Massachusetts, who underwent baseline medical surveillance in 1996/1997. Their testing included a full medical history, examination, and nonfasting metabolic profile. The control firefighters' vital status and continued professional activity in Massachusetts were redocumented at a 1998 periodic examination. The periodic examinations of these firefighters and their results, including cardiovascular risk factors and other health information, have been previously characterized in detail.<sup>5,14-17</sup> The use of these examination results for research has been approved by the Institutional Review Boards of the Harvard School of Public Health, the Cambridge Health Alliance, and the Northeast Specialty Hospital.

### Primary Variables of Interest and Their Definitions

The presence of major cardiovascular risk factors were defined for both groups according to the Framingham study<sup>18</sup> and our previous firefighter fatality investigation.<sup>5</sup> Hypertension was considered present if a resting blood pressure was  $\geq 140/90$  mm Hg, the firefighter had a diagnosis of hypertension, and/or the firefighter was receiving antihypertensive therapy. We also considered firefighters as hypertensive if there was documentation of left ventricular hypertrophy, a finding highly associated with hypertension.<sup>18</sup> Firefighters with a smoking history were

classified as current smokers unless they had quit smoking more than 12 months before their diagnosis or examination.<sup>18</sup> We considered those having serum cholesterol  $\geq 200$  mg/dL, a diagnosis of hypercholesterolemia, and/or prescribed lipid-lowering therapy as hypercholesterolemic. Diabetes mellitus was defined as present if the firefighter had received this diagnosis, was receiving insulin or hypoglycemic medication, and/or blood glucose exceeded 150 mg/dL.<sup>18</sup> Body mass index was calculated from each firefighter's height and weight according to international guidelines.

Preexisting evidence of CHD or other arterial occlusive disease was defined as any of the following: a previous abnormal exercise or radio-nuclide stress test or a history of coronary artery bypass grafting, angioplasty, myocardial infarction, angina, carotid stenosis, or peripheral vascular disease.<sup>5</sup>

We defined on-duty retirements as those based on illness or fatality "occurring while a firefighter was working and/or performing any fire department duty"<sup>3</sup> in agreement with the National Institute of Occupational Safety and Health, Federal Emergency Management Agency (FEMA), and National Fire Protection Association (NFPA)<sup>2,3</sup> and our previous study.<sup>5</sup> Professional duties engaged in during or proximate to an "on-duty" event were also classified in accordance with our previous investigation of firefighter CHD fatalities.<sup>5</sup>

### Estimation of the Relative Proportions of Firefighters' Time Spent in Different Duties

Like in our previous study,<sup>5</sup> to estimate the proportion of time firefighters spend in each type of duty, we used information from fiscal year 2002 from the Cambridge, Massachusetts, Fire Department serving a community of approximately 100,000 inhabitants. The department provided: the total number of incidents, runs, and run times; the

distribution of emergency calls and dispatches by hour of the day; a breakdown of incident types between fire and nonfire emergency responses; as well as mean incident and mean response times and the estimated number of hours spent each week in training and fire prevention activities, respectively.

**Statistical Analysis.** We performed analyses with SPSS 12<sup>13</sup> and SAS.<sup>19</sup> Independent *t* tests were used to compare differences in mean values.  $\chi^2$  values were used to compare differences in proportions among groups. Multivariable adjusted comparisons of proportions were calculated with binary logistic regression and examined each risk factor as an independent predictor controlling for all other covariate risk factors. We set the level of statistical significance at 0.05 (two-tailed) for all tests.

## Results

During the study period, we identified 362 cardiovascular-related disability awards with medical files in the Commonwealth of Massachusetts. Of the 362 cases, 351 (97%) were classified as Heart Presumptions and 11 were legally classified as another heart-related type of disability. Two (0.6%) had fatal events that led to their presumption awards. The remaining 360 affected firefighters retired with a disability pension. The retirees ranged in age from 31 to 66 years with a mean of  $54 \pm 7$ , whereas the controls ranged from 20 to 58 years with a mean of  $39 \pm 7$  ( $P < 0.001$ ). Among the heart retirees, 83% were over 50 years old, whereas 95% of the active firefighters were less than 50 years old.

CHD accounted for 77% of all heart retirements. Among those awarded pensions for non-CHD causes hypertension/hypertensive heart disease accounted for over one third of those cases and 8% of the total. The remaining pensions were awarded for supraventricular arrhythmias (5%), cardiomyopathy (3%), cerebrovascular accidents (3%), syncope (1.4%),

**TABLE 1**

Characteristics of the Retirements: CHD Retirements versus Non-CHD Retirements

	CHD Retirements ( <i>n</i> = 278) Percent ( <i>n</i> )	Non-CHD Retirements ( <i>n</i> = 84) Percent ( <i>n</i> )	<i>P</i>	Multivariate <i>P</i> *
Age $\geq 45$ yr	94 (262)	87 (72)	0.031	<0.0001
Age >50 yr	77 (213)	77 (64)	NS	—
Current smoking	30 (76)	22 (13)	NS	0.011
Hypertension	59 (142)	74 (54)	0.027	0.205
Diabetes mellitus	26 (62)	17 (10)	NS	0.003
Cholesterol $\geq 5.18$ mmol/L (200 mg/dL)	81 (170)	64 (21)	0.040	0.752
Prior diagnosis of CHD or other evidence of arterial-occlusive disease	22 (48/215)	0 (0)	—	0.012
Obesity, body mass index $\geq 30$ kg/m <sup>2</sup>	41 (98/238)	66 (41/62)	0.001	0.650

\*Multivariate analyses adjusted for all listed predictors with the exception of age >50 yr (age  $\geq 45$  used).

CHD indicates coronary heart disease.

aortic aneurysms (1.1%), and other (1.1%), respectively.

Table 1 compares CHD retirements with non-CHD retirements with respect to cardiovascular disease risk factors. The non-CHD retirements included more firefighters under the age of 45 ( $P = 0.031$ ) and were more likely to be hypertensive ( $P = 0.027$ ) and obese ( $P = 0.001$ ). The CHD retirements were more likely to have high cholesterol ( $P = 0.040$ ). Overall, however, the risk factor profiles were similar. In multivariate analyses, the differences for age, smoking, and diabetes were significant. Of the 48 cases with a preexisting diagnosis of arterial occlusive disease, 38 (79%) had preexisting CHD alone. Four (8%) had only peripheral vascular disease, two (4%) had only cerebrovascular disease and four (8%) had CHD in addition to peripheral vascular disease or cerebrovascular disease. When CHD cases with a preexisting diagnosis of CHD or other arterial occlusive disease were excluded (data not shown), the prevalence of risk factors remained quite similar among the CHD retirements, and the comparison with non-CHD cases also was not substantially different.

Information on the retirement's relation to firefighting duties was available for 347 (96%) of the firefighters. Only 42% of Heart Presumption retirements occurred on-duty, whereas the majority retired due to disease that manifested off-duty (cumulative). Table 2 compares these two groups with respect to cardiovascular disease risk factors. There were no significant differences, although the off-duty retirements had somewhat more prevalent smoking, diabetes mellitus, and obesity. Limiting this comparison of on-duty versus off-duty retirements with CHD cases (data not shown) did not materially alter the results with the exception that the excess prevalence of smoking among the off-duty group reached a trend level ( $P = 0.068$ ) of significance in univariate analysis.

Table 3 describes the estimated relative risks of an on-duty heart retirement precipitating event among various job duties adjusted for the estimated proportion of time per year spent in each activity. Compared with nonemergency duty, we found significantly increased risks during fire suppression (odds ratio [OR] = 51, 95% confidence interval [CI] = 12–223) and alarm response (OR = 6.4, 95% CI = 2.5–17).

**TABLE 2**

Characteristics of Heart Retirements: On-Duty versus Off-Duty

	<b>On-Duty Retirements (n = 147) Percent (n)</b>	<b>Off-Duty Retirements (n = 200) Percent (n)</b>	<b>P</b>	<b>Multivariate P*</b>
Age ≥45 yr	92 (135)	94 (188)	0.522	0.802
Age >50 yr	78 (115)	76 (153)	0.796	—
Current smoking	24 (30)	32 (57)	0.156	0.173
Hypertension	60 (73)	64 (113)	0.628	0.484
Diabetes mellitus	20 (24)	26 (43)	0.259	0.684
Cholesterol ≥5.18 mmol/L (200 mg/dL)	76 (75)	80 (108)	0.523	0.109
Prior diagnosis of coronary heart disease or other evi- dence of arterial-occlusive disease	18 (20)	17 (25)	0.869	0.847
Obesity, body mass index ≥30 kg/m <sup>2</sup>	42 (50)	49 (83)	0.232	0.563

\*Multivariate analyses adjusted for all listed predictors with the exception of age >50 yr (age ≥45 used).

**TABLE 3**

Relative Risk of On-Duty Retirement for Various Job Duties Adjusted for the Estimated Proportion of Time per Year Spent in Each Professional Duty

<b>Type of Duty</b>	<b>Actual Heart Events (n = 117) Percent (n)</b>	<b>Expected Heart Events (n = 117) Percent (n)</b>	<b>Odds Ratio (95% confidence interval)</b>
Fire suppression	43 (50)	2 (2)	51 (12–223)
Training	2.6 (3)	8 (9)	0.68 (0.2–2.7)
Alarm response	19 (22)	6 (7)	6.4 (2.5–17)
Alarm return	1.7 (2)	10 (11)	0.37 (0.07–1.8)
Emergency medical service/nonfire emergency	8.5 (10)	23 (27)	0.75 (0.3–1.8)
Fire house and other nonemergency activities	26 (30)	52 (61)	1 (—)

Table 4 compares CHD retirements with professionally active control firefighters. In unadjusted comparisons, all risk factors except obesity were statistically significant predictors of CHD retirement. In multivariate comparisons, age, current smoking, diabetes, and prior arterial occlusive disease were all significant independent predictors of CHD retirement. Age was the strongest predictor (adjusted OR = 52, 95% CI = 19–139).

Table 5 compares non-CHD retirements with professionally active control firefighters. In unadjusted comparisons, all risk factors except elevated cholesterol were statisti-

cally significant predictors of non-CHD retirement. In multivariate comparisons, only age and hypertension were significant independent predictors of CHD retirement. Again, age was the strongest predictor, but less so than for CHD retirement (adjusted OR = 7.8, 95% CI = 2–31).

## Discussion

Our study demonstrated several major findings among primarily nonfatal cardiovascular firefighter retirements. First, as expected, in Massachusetts, most Heart Presumption awards were due to CHD; however, an unexpectedly large proportion (23%) was due to

other cardiovascular causes. In particular, isolated hypertension or hypertensive heart disease accounted for 8% of all retirements. Second, firefighters retiring due to CHD compared with those retiring from non-CHD vascular causes, while showing some differences, were similar in terms of their overall cardiovascular risk profiles. Strikingly, we found almost no differences in the risk profiles of firefighters whose retirements were associated with discrete on-duty events in comparison with firefighters whose heart disease manifested off-duty. Fourth, in agreement with our previous study of CHD fatalities among firefighters, we found excess risk for on-duty events strongly associated with fire suppression and alarm response. Fifth, as expected, the retirees had much higher prevalences of cardiovascular risk factors compared with professionally active control firefighters. Taken together, our findings suggest that certain firefighting activities increase the risk of a cardiovascular event in susceptible firefighters. For the most part, however, heart retirements among Massachusetts firefighters most likely result from an excess of personal cardiovascular risk factors among older firefighters, and over half were unrelated to specific on-duty events. Thus, the current descriptive study supports the need for cardiovascular prevention and risk reduction strategies among Massachusetts firefighters in agreement with previous conclusions.<sup>1–3,5,20</sup>

Major cardiovascular risk factors are detectable at routine examinations and mostly modifiable. However, most fire departments do not require firefighters to exercise regularly, and they also do not require periodic medical examinations or physical fitness testing. This is clearly the case in Massachusetts where a 2004 NFPA survey determined that 89% of the state's firefighters work in departments with no program to maintain basic health and fitness.<sup>21</sup> One obstacle to the testing of veteran firefighters is that some believe it discrim-



**TABLE 4**  
CHD Retirements versus Active Firefighters (controls)

	CHD Retirements (n = 277) Percent (n)	Active Firefighters (n = 310) Percent (n)	Odds Ratio (95% confidence interval) Multivariate Odds Ratio* (95% confidence interval)
Age ≥45 yr	94 (261)	21 (64)	63 (35–111) 52 (19–139)
Current smoking	30 (76)	10 (31)	3.9 (2.5–6.2) 2.9 (1.3–6.3)
Hypertension	59 (141)	21 (65)	5.4 (3.7–7.9) 1.2 (0.6–2.4)
Diabetes mellitus	26 (62)	3 (8)	13 (6.1–28) 5.0 (1.7–15)
Cholesterol ≥5.18 mmol/L (200 mg/dL)	80 (169)	63 (196)	2.4 (1.6–3.6) 0.8 (0.4–1.6)
Prior diagnosis of CHD	22 (48)	1 (3)	30 (9.1–96) 8.8 (1.9–41)
Obesity, body mass index ≥30 kg/m <sup>2</sup>	41 (98)	34 (104)	1.4 (0.96–1.9) 0.7 (0.3–1.3)

\*Multivariate analyses adjusted for all listed predictors.  
CHD indicates coronary heart disease.

**TABLE 5**  
Non-CHD Retirements versus Active Firefighters (controls)

	Non-CHD Retirements (n = 84) Percent (n)	Active Firefighters (n = 310) Percent (n)	Odds Ratio (95% confidence interval) Multivariate Odds Ratio* (95% confidence interval)
Age ≥45 yr	87 (72)	21 (64)	26 (13–51) 7.8 (2.0–31)
Current smoking	22 (13)	10 (31)	2.5 (1.2–5.1) 2.9 (0.6–14)
Hypertension	75 (55)	21 (65)	11 (6.1–20) 4.8 (1.3–18)
Diabetes mellitus	17 (10)	3 (8)	7.7 (2.9–20) 4.3 (0.7–28)
Cholesterol ≥5.18 mmol/L (200 mg/dL)	65 (22)	63 (196)	1.1 (0.51–2.24) 1.3 (0.3–5.5)
Obesity, body mass index ≥30 kg/m <sup>2</sup>	66 (41)	34 (104)	3.6 (2.0–6.4) 2.9 (0.8–11)

\*Multivariate analyses adjusted for all listed predictors.  
CHD indicates coronary heart disease.

inates against older firefighters. Such practices preventing periodic testing, however, result in exposing firefighters who are no longer fit to the risk of disability injury and death.<sup>5</sup> In our study, in comparisons with control firefighters, age was the strongest independent predictor of disability retirement even after adjustment for all

other cardiovascular risk factors. This supports that physical abilities, fitness, and medical testing results should not be age-adjusted.

Another indicator from the current study that fitness standards for incumbent firefighters are lacking is that almost half (46%) of those receiving a pension were obese by

body mass index criteria. Other investigations document that major problems with obesity in the fire service begin long before retirement. We previously reported a 33% prevalence of obesity among the professionally active control firefighters,<sup>14</sup> which increased to 40% 4 years later.<sup>15</sup> Similar cross-sectional results were also observed in a Texas cohort.<sup>22</sup> Additionally, Womack et al<sup>23</sup> found that both exercise tolerance and lean body mass were below age-predicted averages in another firefighter cohort. Furthermore, Roberts et al<sup>24</sup> demonstrated that even new firefighter recruits were overweight and had low-normal aerobic capacities. Therefore, fitness promotion, including nutrition and exercise programs, should be widely promoted and provided by fire service authorities.

Smoking, hypertension, hypercholesterolemia, and prevalent CHD were also quite common among the retirees in this study. The high prevalence of smoking among those receiving Heart Presumption retirements supports Massachusetts law, which has since 1988 prohibited new firefighters from smoking.<sup>25</sup> The high rates of hypertension and hypercholesterolemia were not surprising. We have previously shown that hypertension and dyslipidemia are often inadequately treated among professionally active Massachusetts firefighters and that uncontrolled hypertension is associated with a higher risk of adverse changes in employment status.<sup>15–17</sup> Therefore, we believe that risk factor screening alone is insufficient, and fire department medical programs should include incentives to promote more aggressive risk factor reduction. These should include measures for progressively controlling hypertension,<sup>17,26</sup> which is a treatable illness yet one whose failure to control accounted for almost 10% of heart retirements and most likely contributed to others.

We found that fire suppression accounted for 43% of on-duty events leading to retirement, which is remarkable because fire suppression

may only represent 2% or less of a firefighter's yearly duties. The most likely explanation for the highly elevated event risk compared with that of nonemergency duty is the increased cardiovascular demands of fire suppression.<sup>27-30</sup> Also in agreement with a triggering hypothesis and earlier research documenting increased heart rates in firefighters responding to alarms,<sup>27,31</sup> we found a 6.4-fold increase in the relative risk of a cardiovascular event during alarm response. Heart rate and blood pressure increase in response to alarms consistent with fight or flight physiology and remain elevated in unfit firefighters.<sup>32</sup> In addition, firefighters can be exposed to significant noise from truck sirens during alarm response, also increasing blood pressure. Our relative risk estimates for both fire suppression and alarm response with respect to heart retirements were quite similar to the magnitude of risk we previously observed for these two firefighting activities among on-duty CHD fatalities.<sup>5</sup>

We acknowledge several limitations regarding our study. First, it was retrospective in nature and, second, it was based on review of nonuniform medical documentation supporting each retirement. Heart Presumption and other cardiovascular retirements in Massachusetts are not required to undergo a standard battery of anthropometric, metabolic, cardiovascular, and exercise testing to apply for disability. If such a system had existed, it would have provided more information regarding the health and risk factor status of these firefighters, would have eliminated most missing data, and improved comparisons among different groups of retirees. We also know that second jobs are common among firefighters, but information regarding possible exposures from nonfirefighting jobs was not available for the retirees or control firefighters. It is unclear, however, how this limitation, present in almost all studies of firefighters, might have affected the results, if at all. Third, our results characterize primarily

nonfatal heart retirements. Firefighter heart deaths are often approved for awards at the local, municipal retirement board level and are not required to undergo medical review by PERAC. These are mostly deaths occurring off-duty or subsequent to retirement for another reason as well as a few on-duty heart deaths. Two (<1%) of our cases were on-duty fatalities. Six more on-duty heart fatalities occurred among Massachusetts professional firefighters from 1997 to 2004 according to FEMA and U.S. Fire Administration records.<sup>2,33</sup>

Our study also had many strengths. First, this is the only systematic study of Heart Presumption retirements that we know of, although such legislation covers most of North America. Second, we had access to information on all of these retirements with medical reviews for an 8-year period. Third, our estimation of relative risks for specific job activities was done using incident and response data from an urban Massachusetts fire department, which was likely to be representative of Massachusetts firefighters. Because we hypothesized that strenuous emergency activities carry the highest risks of CHD death, we sought an urban fire department to ensure a sufficient level of emergency incidents. To the extent that using an urban professional department to estimate the frequency of job activities and emergency responses resulted in overestimates of the extent of fire suppression and other emergency activities for suburban and rural firefighters, this would have biased our results toward the null hypothesis. Fourth, our control (professionally active) firefighters also represented all regions of Massachusetts, and their examinations were fully standardized. Therefore, the groups were comparable for region and occupation. Additionally, there was a strong predisposition to determine all prevalent risk factors present among the controls through their comprehensive examinations,

which again biased our results toward the null hypothesis and made our design more conservative.

## Conclusions

We described 362 firefighters receiving cardiovascular retirements in Massachusetts over an 8-year period. Approximately 75% of retirements were attributed to CHD and less than one half were associated with specific duty-related events. Regardless of the type of heart disease and whether their retirement was duty-associated or manifested off-duty, all of these subgroups were remarkable for a high prevalence of classic and mostly treatable, cardiovascular risk factors, which were significantly higher than those found among professionally active control firefighters. The current study, although limited to Massachusetts, strongly supports previous calls for improved cardiovascular prevention and risk reduction strategies among firefighters.<sup>1-3,5</sup> We encourage further investigation by researchers elsewhere in North America to determine if the current results from Massachusetts regarding Heart Presumption retirements are typical.

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JDH was responsible for data extraction, performed chart reviews of firefighter retirees, supervised database management, performed analyses, and was responsible for primary manuscript preparation and revision. LS assisted with data entry, database management, and data analyses. LP was responsible for all multivariate analyses and statistical oversight. JB assisted with obtaining funding and data access and contributed to manuscript revision. SNK conceived the study, obtained funding, supervised all aspects of the project, and was instrumental in manuscript preparation and revision. Special thanks to the Public Employee Retirement Administration Commission (PERAC) Commissioners; Joseph E. Connarton, Executive Director of PERAC, Kevin Blanchette, Barbara Lagorio, Mary Jane Carritte, Katherine Hogan, and Paul Laliberte.

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