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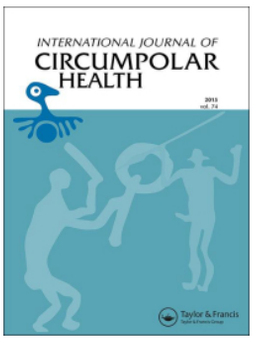

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ORIGINAL RESEARCH ARTICLE

Development of office-hours use of primary health centers in the early years of the 21st century: a 13-year longitudinal follow-up study

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ABSTRACT

This study, conducted in a Finnish city, examined whether a long-lasting observed trend in Finnish primary health care, namely, a decreasing rate of office-hour visits to general practitioners (GPs), would lead to reduced services for specific gender, diagnosis or age groups. This was an observational retrospective follow-up study. The annual number of visits to office-hour primary care GPs in different gender, diagnosis and age groups was recorded during a 13-year follow-up period. The effect of the decreasing visit rate on the annual mortality rate in different age and gender groups was also studied. The total number of monthly visits to office-hour GPs decreased slowly over the whole study period. This decrease was stronger in women and older people. The proportion of recorded infectious diseases (Groups A and J and especially diagnoses related to infections of respiratory airways) decreased. Proportions of recorded chronic diseases increased (Group I, cardiovascular diseases, diabetes and osteoarthrosis) during the follow-up. The annual rate of visits to office-hour GP/per GP decreased. There was a decrease in the mortality in two of the age groups (20–64, 65+ years) and no change in the youngest population (0–19 years). The decrease in the office-hours GP activity does not seem to increase mortality either.

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Community health centres; primary health care; practice management; mortality

Introduction

Finnish official statistics [1], a recent qualitative study [2] and a quantitative study [3], have shown that the number of visits to office-hours primary care doctors is decreasing in Finland. Vantaa (the 4th largest city in Finland) is no exception to this development and the number of patients seen by a single GP has decreased [4]. This development is different compared to other Nordic countries such as Denmark [5] and Sweden [6] or in neighbouring Estonia [3]. There is a lack of studies examining how this trend in office-hours GP services affects patients.

In this longitudinal follow-up study, we examined how this decrease in the number of visits to the GPs affected gender, diagnosis and age groups. Furthermore, our aim was to study whether this development led to an increase in mortality by studying mortality rates in different age groups during the same follow-up period.

Materials and methods

Study design

The present work is a retrospective longitudinal follow-up study from 2002–2014. It was performed in office-hours services in the public primary health care of the fourth largest city of Finland. In Vantaa, there were about 210,000 inhabitants in 2014. Visits to office-hour GPs of public communal health centres were studied. As a complementary, profit-driven system, a well-equipped, private health care exists. Primary health care is organised via three different channels in Finland: open and affordable health centres for all citizens, occupational health care provided to the labour force and private health care accessed by citizens out-of-pocket and minimally compensated by governmental sickness insurance. The data from private and occupational primary health care were missing from the present study.

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Study measures and outcomes

The data were obtained from the Graphic Finstar patient chart system (GFS, Logica LTD, Helsinki, Finland). The report generator of the GFS system provided yearly figures for the number of office-hours GP visits in different gender and age groups (0–19, 20–64 and 65+ years). This was the main measure for analysis in the present study. The other measure from the patient chart was the number of different ICD-10 (International Classification of Diseases 10th edition) diagnoses [7] recorded. The ICD-10 diagnoses were collected and examined at an accuracy of initial letter and three first digits. The twenty most common diagnoses in the office-hours services were studied in detail. The annual number of deaths in the previously mentioned age groups was provided by Statistics Finland. Data of the size of the population and number of GPs in Vantaa were provided by the statistics of Vantaa City [8]. The number of GPs was provided by the Human Resources department of the Social and Health Bureau of the City of Vantaa.

Ethical considerations

The register keepers (the social and health authorities of Vantaa) and the scientific ethical board of Vantaa City (TUTKE) granted permission (VD/8059/13.00.00/2016) to carry out the study. This study was implemented using the patient information system and anonymised patient data, thus without identifying the patients or physicians. According to the Finnish law regarding register studies (https://rekisteritutkimus.wordpress.com/luvat-ja-tietosuoja/), the study participants did not need to sign a Statement of Informed Consent because the study was retrospective, anonymised and based on patient information charts, and the investigators did not contact the participants.

Statistical analysis

The rates of change in numbers of all studied parameters were analysed using regression analysis followed by the t-test (GLM procedure of SigmaPlot 10.0 Statistical Software, Systat Software Inc., Richmond, CA, USA) [9–11]. Thus, the GLM model allowed us to count the mean slope (cofactor a) of the development of the amount of GP visits (visits/month) and its standard error of the mean (SEM) during the follow-up. The comparisons with the t-test were then performed to determine whether there are statistically significant changes in in the slopes. Similar comparisons with the t-test or one-way Analysis of Variance (ANOVA) followed by the Student-Newman-Keuls test were also performed between the slopes of different study groups to detect whether these groups differ from each other. P values <0.05 were considered as statistically significant.

Results

There was a constant and statistically significant decrease in the annual number of visits to GPs in office-hour primary care health centres (−20.047 ± 2.625 visits/year/1000 [mean ± SEM], $P < 0.001$). This decrease was higher ($p < 0.05$) in females (−23.813 ± 3.076) than in males (−15.899 ± 2.230, Figure 1). Analogously, there was also a significant ($p < 0.001$) decrease in the annual number of visits in the age groups 0–19 (−21.946 ± 3.597) and 20–64 (−25.136 ± 2.258). This decrease in visits was even more prominent in the age group over 65 years (−41.787 ± 7.705, Figure 2) when compared with the two other age groups ($p = 0.020$ ANOVA: $p = 0.024$ and 0.026 respectively, Student-Newman-Keuls test).

The proportion of certain ICD-10 diagnosis groups tended to decrease clearly during the follow-up period. Such diagnosis groups were intestinal infectious diseases, bacterial infections and viral infections of the central nervous system (A), diseases of the respiratory system (J), injury, poisoning and certain other consequences of external causes and single body region (S, Table 1). There were also several diagnosis groups, such as malignant neoplasms (C), other neoplasms and carcinoma in situ (D), diseases of the circulatory system (I), diseases of the skin and subcutaneous tissue (L),

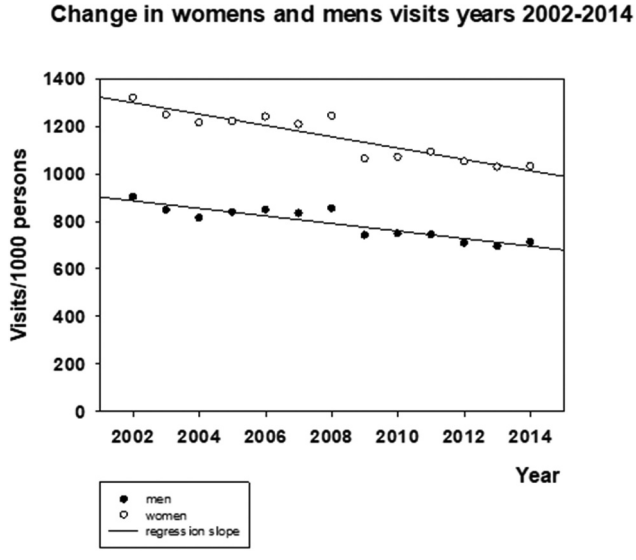

Figure 1. Development of visits of men and women to office-hours GPs in Vantaa 2002–2014.

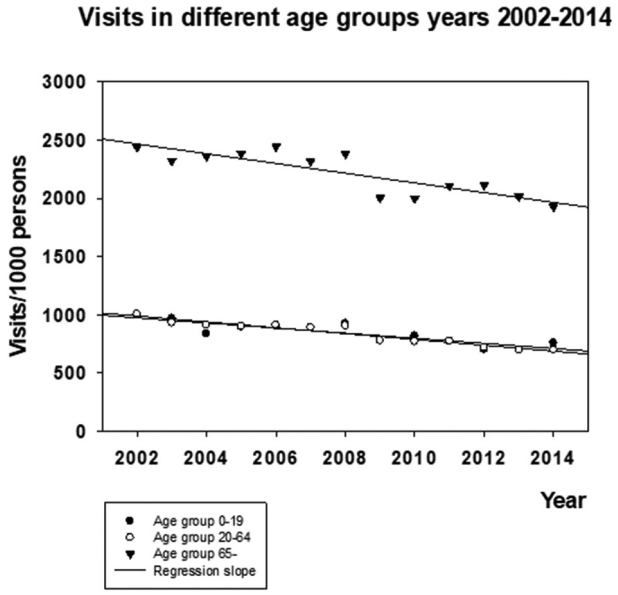

Figure 2. Development of visits in different age groups to office-hours GPs in Vantaa 2002–2014.

symptoms, signs and abnormal clinical and laboratory findings (not elsewhere classified; R) and factors influencing health and status and contact with health services (Z) whose proportion tended to increase similarly during the follow-up.

When we studied more carefully those twenty most commonly recorded diagnoses, we observed a decrease in the proportions of diagnoses related to mild infections such as acute upper respiratory infections of multiple and unspecified sites (J06), acute sinusitis (J06), acute bronchitis (J20), acute tonsillitis (J03), suppurative and unspecified otitis media (H66) and other gastroenteritis and colitis of infectious and unspecified origin (A09) (Table 2). The recorded diagnoses of the most common musculoskeletal problems such as dorsalgia (M54) and other dorsalgias, not elsewhere classified (M53) tended to decrease, too. Simultaneously, there was an increase in the proportions of recorded diagnoses of chronic diseases such as essential (primary) hypertension (I10) and Type 2 diabetes mellitus (E11). Proportions of some recorded musculoskeletal diagnoses such as other soft tissue disorders, not elsewhere classified (M79) and gonarthrosis (arthrosis of knee, M17) and mental problems like other anxiety disorders (F41.0) increased. Recordings of abdominal and pelvic pain (I10) also tended to increase.

There was a statistically significant increase ($p = 0.019$) in the total mortality rate (0.0450 ± 0.0164 deaths/year/1000 [mean ± SEM]; Figure 3(a)). However, when this was analysed in different age groups, there was no change in the mortality rate of the youngest age group 0–19 (−0.0135 ± 0.0091) and there were

Table 1. Development of proportions of main ICD-10 diagnosis groups in 2002–2014 in office-hours GPs. The arrows show the direction of the observed change.

ICD-10	Contents of diagnosis group	Rate of change (mean ± SEM)%/year)	p-value
A	Intestinal infectious diseases, bacterial infections and viral infections of the central nervous system	−0.0634 ± 0.0138	<0.001↓
B	Other infections	0.0002 ± 0.0056	n.s.
C	Malignant neoplasms	0.0226 ± 0.0029	<0.001↑
D	Other neoplasms and carcinoma in situ	0.0799 ± 0.0080	<0.001↑
E	Endocrine nutritional and metabolic diseases	0.182 ± 0.0592	0.011↑
F	Mental and behavioural disorders	0.0987 ± 0.0449	n.s
G	Diseases of the nervous systems	−0.0140 ± 0.0116	n.s
H	Diseases of the eye and the adnexa, and the ear and mastoid process	−0.169 ± 0.0571	0.013↓
I	Diseases of the circulatory system	0.208 ± 0.0328	<0.001↑
J	Diseases of the respiratory system	−1.215 ± 0.0886	<0.001↓
K	Diseases of the digestive system	0.0122 ± 0.0131	n.s.
L	Diseases of the skin and subcutaneous tissue	0.173 ± 0.0216	<0.001↑
M	Diseases of the musculoskeletal system and connective tissue	0.0560 ± 0.0541	n.s
N	Diseases of the genitourinary system	0.105 ± 00150	<0.001↑
O	Pregnancy, childbirth and puerperium	−0.0181 ± 0.0069	0.024↓
P	Certain conditions originating in the perinatal period	−0.0009 ± 0.0002	0.004↓
Q	Congenital malformations, deformations and chromosomal abnormalities	0.0007 ± 0.0015	n.s.
R	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	0.404 ± 0.0377	<0.001↑
S	Injury, poisoning and certain other consequences of external causes, single body region	−0.173 ± 0.0218	<0.001↓
T	Injuries to multiple or unspecified body regions as well as poisoning and certain other consequences of external causes	0.0258 ± 0.0122	n.s.
V	Transport accidents	−0.0003 ± 0.0002	n.s.
W	Other external causes of accidental injury	0.0103 ± 0.002	<0.001↑
X	Exposure to burning substances and related threads, venomous animals and plants, noxious substances and forces of nature. Intentional self-harm and assault	0.0004 ± 0.0003	n.s.
Y	Events of undetermined intent, legal interventions and operations of war, complications of medical care and sequelae of external causes of morbidity and mortality	0.0012 ± 0.0004	0.008↑
Z	Factors influencing health status and contact with health services	0.275 ± 0.0450	<0.001↑

decreases ($P < 0.001$) in mortality rates of age groups 20–64 (−0.0506 ± 0.0116) and 65+ years of age (−0.709 ± 0.168; Figure 3(b–d)). There was a strong increase of ageing in the population of Vantaa (Figure 4). During the follow-up, the number of people aged over 65 years doubled from 15,293 to 29,115. Thus, the increasing rate of this age group, which is

Table 2. Development of proportions of the twenty most common ICD-10 diagnoses in 2002–2014 in office-hours GPs. The arrows show the direction of the observed change.

ICD-Code	Diagnosis, Office-hours primary care physicians	Rate of change (mean ± SEM, %/year)	p-value
J06	Acute upper respiratory infections of multiple and unspecified sites	−0.00470 ± 0.000515	<0.001↓
M54	Dorsalgia	−0.00168 ± 0.000279	<0.001↓
H66	Suppurative and unspecified otitis media	−0.00162 ± 0.000336	<0.001↓
J01	Acute sinusitis	−0.00283 ± 0.000148	<0.001↓
J20	Acute bronchitis	−0.00246 ± 0.000306	<0.001↓
I10	Essential (primary) hypertension	0.000825 ± 0.000132	<0.001↑
R10	Abdominal and pelvic pain	0.000784 ± 0.0000637	<0.001↑
E11	Type 2 diabetes mellitus	0.00156 ± 0.000172	<0001↑
H10	Conjunctivitis	−0.000598 ± 0.000234	0.027↓
F32	Depressive episode	−0.000547 ± 0.000133	0.002↓
M79	Other soft tissue disorders, not elsewhere classified	0.00126 ± 0.000136	<0.001↑
M17	Gonarthrosis [arthrosis of knee]	0.00141 ± 0.000111	<0.001↑
M75	Shoulder lesions	−0.0000953 ± 0.0000600	n.s.
J45	Asthma	0.0000651 ± 0.0000586	n.s.
R05	Cough	0.000221 ± 0.0000819	0.021↑
M53	Other dorsalgias, not elsewhere classified	−0.000516 ± 0.0000903	<0.001↓
A09	Other gastroenteritis and colitis of infectious and unspecified origin	−0.000755 ± 0.000116	<0.001↓
F41	Other anxiety disorders	0.000341 ± 0.0000294	<0.001↑
H60	Otitis externa	−0.000249 ± 0.0000667	0.003↓
J03	Acute tonsillitis	−0.000689 ± 0.0000868	<0.001↓

most prone to die, was 1135 ± 49 persons/year (mean ± SEM; $p < 0.001$). This rate of increase was statistically significantly higher ($p < 0.001$, ANOVA) than the increase in age group 0–19 (227 ± 9; $p < 0.001$, Student-Newman-Keuls test) or in age group 20–64 (1016 ± 29; $p = 0.018$). Age group 20–64 also grew faster than age group 0–19 ($p < 0.001$).

Discussion

The number of visits to office-hour GPs decreased during the follow-up. This decrease was most prominent in the oldest age group and among women. Specifically, proportions of recorded infectious diseases (Groups A and J and especially diagnoses related to infections of respiratory airways) decreased. Proportions of visits according to chronic diseases tended to increase (Group I, cardiovascular diseases, diabetes and osteoarthrosis). However, we did not notice any association between these changes and mortality.

The decreased rate of the use of office-hours GPs in women is logical in primary health care. There are several former studies from other countries, suggesting that primary health care GP services are more often used by women than by men. In the Netherlands, women were reported to have increased their use of primary health care services. This gender difference in the prevalence of health problems was the most striking in the age group from 25 to 44 years [12]. This was also true in a population study in Poland in all age groups from 18 to 44 years [13]. Also, in Sweden, women visited their GPs more often than men in all age groups [6]. The reason for this difference is unknown, but speculatively, there may be symptoms or disease-specific reasons why women use primary health care more often than men. For example, in the Danish population, psychological stress was reported to be more prominent among women as a reason to consult GPs [14]. Women may also be objects of different primary care screenings and education programmes more often than men [12]. Thus, some of this decrease in the number of visits may also be related to decreases in the birth rate [15] although in the Finnish system, the majority of visits related to normal and complicated pregnancies and early months after childbirth are primarily taken care by specific GP-driven practices (maternity clinics), not by office-hour GPs. The situation is similar with routine cervical screening and contraception issues. We do not have data of these clinics. Nevertheless, the case can be made that if women use primary health care services more frequently than men, they are therefore affected more than men by restrictions in those services. The same applies to the elderly.

There are several earlier reports suggesting that primary health care GP services are more often used by the elderly. This has been shown in several European countries [6,16]. The reason is increased multimorbidity in aged people [16]. Thus, it is logical that if restrictions of access to primary health care occur, the elderly, who use these services more, also suffer more than younger people from reduced access.

The reason for the observed decrease in office-hours GP visits remains unknown. It is possible that part of the patients were redirected to nurses instead of GPs [1], but not during the whole follow-up period in Vantaa [17]. The private health care sector and specialised medical care also increased their share of patients in Vantaa in the follow-up time, but not in the numbers, which could have explained the observed decrease in the use of GPs [18]. Loss of GPs does not explain this phenomenon either as the number of GPs was 105 in 2002 and 114 in 2014 [4]. We do not know if there were barriers to access GPs or was there just better organisation of the functions of primary care, for example, improved use of technology, and the same level of care was achieved with lesser GP visits. Naturally, we cannot exclude the possibility that commitment of staff to the work, which is always important for success of

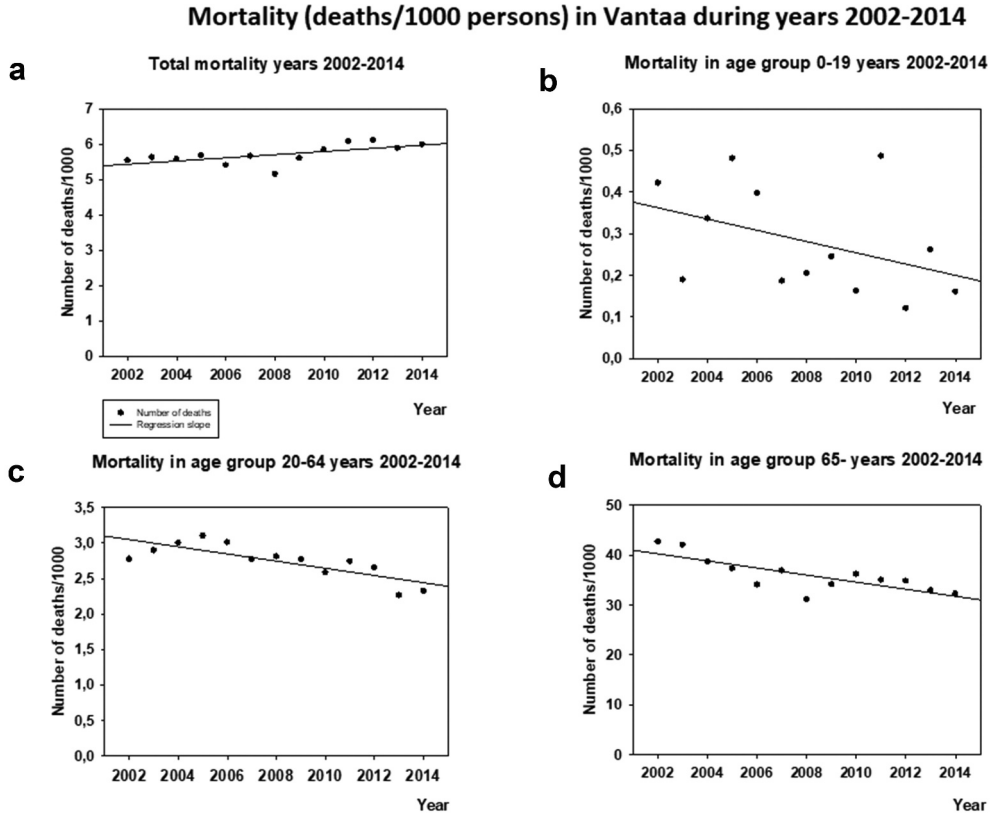

Figure 3. Development of a) total mortality rate and b) mortality rates in age groups 0–19, c) 20–64 and d) 65- in Vantaa 2002–2014. Note different scales in the y-axis.

various actions in primary health care [11,19], has altered during the follow-up. Therefore, further studies are needed to explain the observed phenomenon.

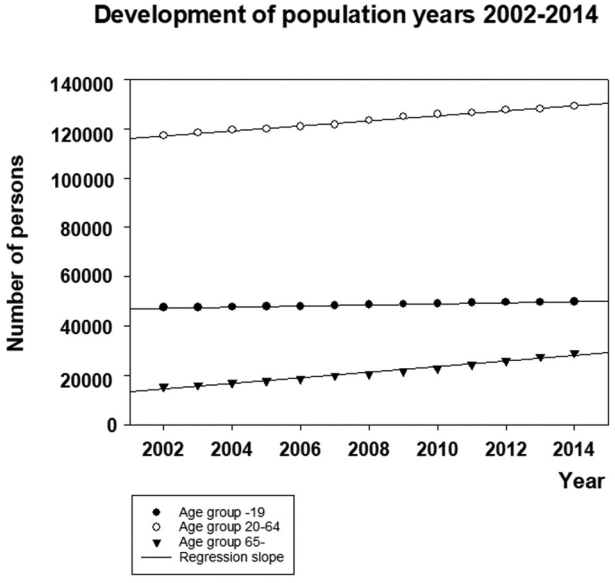

Figure 4. Development of populations in different age groups in Vantaa.

Mortality can be used as a definitive but insensitive measure of safety [20,21]. The observed decrease in office-hour GP activities did not reflect the increase of mortality in any of the studied age groups during the follow-up. The total mortality – and also the mortality rate – of the population increased because the proportion of people who were at least 65 years of age, and who therefore are prone to die, increased strongly during the follow-up period. This led to an increase in the total number of deaths and caused a proportional increase in the mortality rate of the total population whose main body was under 65 years of age. This illustrates that if mortality is used as a follow-up measure of population health, it should always also be examined in different age groups. As a summary, however, this observed decreasing trend in office-hour GP visits seemed not to be associated with long-term fatal side effects.

This study is purely a register study and the subjects have not been aware of their participation in the study. This was a strength of this retrospective study. There were no other major changes in the primary health care, which could have explained the observed changes in the use during the follow-up period. However, electronic reminders were taken into use

in the electronic patient information system in 2008 to enhance recording of diagnoses and that might have altered the observed proportions of different diagnoses during the present study (22). Thus, the present result reflects real clinical activity in this aspect. As a limitation, we should have been able to compare our results with a control city with a similar office-hours primary health care, demography and size. This would have strengthened our conclusions. However, such data from another city were not available for comparison. National statistics, however, confirm that a similar decreasing trend in the use of primary health care was observed in the whole country [1]. Data of possible changes in patient material or changes in ways to manage practices and diseases were not available. Furthermore, we had no access to the data about how much time the GPs used for actual patient work. These factors have a considerable effect on changes in the number of visits to GPs. Data concerning these putative changes could have been obtained if we had had access to information of individual patients, but that access we were unable to obtain. Furthermore, we had no hospitalisation data from secondary care, which would have allowed us to have more versatile analysis about safety aspects of care. As we have the mortality only from the years of the follow-up, we were able to study only early mortality effects. Due to this fact, it is possible that putative late mortality changes have been missed.

Conclusions

The reduction in the number of office-hours visits to GPs in primary health care seems to focus on women and the elderly. Specifically, visits due to respiratory diseases and mild infections were reduced. However, the observed decrease in the visits of office-hours GPs does not seem to be associated with the increase in mortality rates.

Acknowledgments

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Availability of data

The data are available from the authors with a reasonable request

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