

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Trends in age at first hospital admission in relation to trends in life expectancy in Swedish men and women above the age of 60
AUTHORS	Karampampa, Korinna; Drefahl, Sven; Andersson, Tomas; Ahlbom, Anders; Modig, Karin

VERSION 1 - REVIEW

REVIEWER	<p>Sir Denis Pereira Gray OBE MA HonDSc FRCP FRCGP FMedSci Professor Emeritus, University of Exeter; Honorary Professor University of Exeter Medical School</p> <p>I confirm that I have an interest in the subject of admissions for older people to hospital and have had an article published on that subject this year. I do not know any of the authors and I have no conflict of interest.</p>
REVIEW RETURNED	24-Jul-2013

GENERAL COMMENTS	<p>These authors have studied increased life expectation, timing of the first admission to hospital, and life-expectation after that admission for a large cohort of older people in Sweden. They believe that age of first admission over 60 can be taken as a proxy for health status and can therefore illuminate the presence or absence of improved health as well as life expectation in Sweden. They use a data base for the whole of Sweden and have been able to follow people over time.</p> <p>Strengths</p> <p>This article has considerable strengths. First, the question of identifying the age at which older people have their first admission to hospital and relating this to their life expectation is as far as I know new. I cannot be sure it is an original approach, but I certainly do not know of any other similar research.</p> <p>Secondly, they have access to and have well exploited a large all-nation database in Sweden, including the important ability to research longitudinal data.</p> <p>The question of compression of morbidity was raised as long ago as 1980 (Fries, 1980) and is an important public policy issue across the western world. As stated, it is unclear if and how much it is occurring and any clarification would be most welcome.</p> <p>This research showed that the life expectation of Swedish nationals rose progressively and this is line with findings in other developed countries. They also found that the age of first admission to hospital rose over time with the life expectation following the first admission. They interpret this as indicating reduced morbidity in the elderly arguing that it reflects the general morbidity.</p> <p>Weaknesses</p> <p>The definition of a hospital admission was one which lasted for two nights. This however creates a substantial difficulty in that elective and emergency admissions are not differentiated by this definition.</p>
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	<p>This omits any reference to the fact that technical advances have made it possible to carry out reparative/replacement work and many more elective procedures on older people are now undertaken with low risk. Work in a team in Exeter UK has shown that even at age 85, a substantial number of hospital admissions are for such elective procedures.</p> <p>The authors make it clear that the commonest reparative/replacement procedure is cataract replacement and that they have excluded these as they do not involve a two night stay. However, they have not clarified and appear not to have excluded other reparative surgical processes such as hip or knee replacements which are now regularly provided across the western world as elective procedures. The authors refer to various changes in medical practice but make no reference to elective surgery. It is therefore hard to see how this group of hospital admissions can be ignored in the discussion.</p> <p>Conclusions</p> <p>Nevertheless, this finding on the age of admission is new and important. It offers another approach to the analysis of compression of morbidity.</p> <p>The authors could consider expanding the concept of compression of morbidity which began with Fries (1980).</p> <p>It has also recently been shown by Chenore et al. (2013) that age itself is a factor influencing emergency admission to hospital, so much so that by age 85 in the UK there are 420 hospital admissions per thousand people. Thus their findings re longer life expectation and age of first admission are interlinked.</p> <p>RECOMMENDATION</p> <p>I recommend that this article be accepted for publication subject to a redrafting of the discussion section so that:</p> <ol style="list-style-type: none"> 1. There is discussion about the increasing number of elective procedures which take old people into hospital and which are not necessarily of themselves an indication of reduced overall health. 2. Expansion of the history of the concept of the compression of mortality on which their article focuses. <p>References</p> <p>Chenore T Pereira Gray DJ Forrer J Wright C and Evans P (2013) Emergency hospital admissions for the elderly : insights from the Devon Predictive Model Journal of Public Health doi:10.1093/pubmed/fdt009</p> <p>Fries JF (1980) Ageing, natural death and the compression of morbidity New Eng J Med, 303, 130-5</p>
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REVIEWER	Dr Sally Inglis Senior Research Fellow Faculty of Health University of Technology Sydney
REVIEW RETURNED	30-Jul-2013

GENERAL COMMENTS	It is unclear why the age of 60 years was selected for examination. There may be a socio-cultural rationale for this but this is not explained to justify this methodology. Similarly, the use of 16 nights in the sensitivity analysis is not explained or justified. Why not more
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	<p>or less nights? Can the authors please provide more detail on the record linkage methodology? Details on the cause of admission and how these have changed over time would be very interesting and would add value to the analyses currently reported. Do these data include all hospital admissions in Sweden, are these to both public and private hospitals? Are any other data available in Sweden to provide context to the general health state of the population aged 60+ years and how this has changed overtime?</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer # 1, Sir Denis Pereira Gray OBE MA HonDSc FRCP FRCGP FMedSci Professor Emeritus, University of Exeter; Honorary Professor University of Exeter Medical School

I confirm that I have an interest in the subject of admissions for older people to hospital and have had an article published on that subject this year. I do not know any of the authors and I have no conflict of interest.

Summary

These authors have studied increased life expectation, timing of the first admission to hospital, and life-expectation after that admission for a large cohort of older people in Sweden.

They believe that age of first admission over 60 can be taken as a proxy for health status and can therefore illuminate the presence or absence of improved health as well as life expectation in Sweden.

They use a data base for the whole of Sweden and have been able to follow people over time.

Strengths

This article has considerable strengths. First, the question of identifying the age at which older people have their first admission to hospital and relating this to their life expectation is as far as I know new. I cannot be sure it is an original approach, but I certainly do not know of any other similar research. Secondly, they have access to and have well exploited a large all-nation database in Sweden, including the important ability to research longitudinal data.

The question of compression of morbidity was raised as long ago as 1980 (Fries, 1980) and is an important public policy issue across the western world. As stated, it is unclear if and how much it is occurring and any clarification would be most welcome.

This research showed that the life expectation of Swedish nationals rose progressively and this is line with findings in other developed countries. They also found that the age of first admission to hospital rose over time with the life expectation following the first admission.

They interpret this as indicating reduced morbidity in the elderly arguing that it reflects the general morbidity.

Weaknesses

The definition of a hospital admission was one which lasted for two nights. This however creates a substantial difficulty in that elective and emergency admissions are not differentiated by this definition. This omits any reference to the fact that technical advances have made it possible to carry out reparative/replacement work and many more elective procedures on older people are now undertaken with low risk. Work in a team in Exeter UK has shown that even at age 85, a substantial number of hospital admissions are for such elective procedures.

The authors make it clear that the commonest reparative/replacement procedure is cataract replacement and that they have excluded these as they do not involve a two night stay.

However, they have not clarified and appear not to have excluded other reparative surgical processes such as hip or knee replacements which are now regularly provided across the western world as elective procedures. The authors refer to various changes in medical practice but make no reference to elective surgery. It is therefore hard to see how this group of hospital admissions can be ignored in the discussion.

Conclusions

Nevertheless, this finding on the age of admission is new and important. It offers another approach to the analysis of compression of morbidity.

The authors could consider expanding the concept of compression of morbidity which began with Fries (1980).

It has also recently been shown by Chenore et al. (2013) that age itself is a factor influencing emergency admission to hospital, so much so that by age 85 in the UK there are 420 hospital admissions per thousand people. Thus their findings re longer life expectation and age of first admission are interlinked.

RECOMMENDATION

I recommend that this article be accepted for publication subject to a redrafting of the discussion section so that:

1. There is discussion about the increasing number of elective procedures which take old people into hospital and which are not necessarily of themselves an indication of reduced overall health.

Response: We thank the reviewer for a kind summary of our paper. Indeed, the number of individuals undergoing elective procedures like, e.g. hip replacement or eye surgery to remove cataract is increasing in all countries, including Sweden. In our study we have not removed any inpatient care related to surgery, since from our data was very unclear whether it was elective surgery or necessity. However, we do not believe that this affects our results in any substantial way for two reasons; first, if individuals would have had a truly elective surgery (e.g. hip replacement), for most cases it would have taken place after they have been hospitalized for the first time since they were 60, i.e. somebody undergoing a hip replacement is very likely to be hospitalized first due to a hip fracture, pain, etc. Therefore, this type of elective surgery would not have been included in our analyses since we only analyze how the time to first hospital admission has changed. Second, the causes that individuals are hospitalized for the first time after they are 60 are dominated by cardiovascular diseases (ICD 10 codes: I00-I99, ICD 9 codes: 390-459), neoplasms (ICD 10 codes: C00-C97 and D00-D48, ICD 9 codes: 140-239), injury, poisoning and certain other consequences of external causes (ICD 10 codes: S00-S99 and T00-T98, ICD 9 codes: 800-999), diseases of the musculoskeletal system and connective tissue (ICD 10 codes: M00-M99, ICD 9 codes: 710-739), and diseases of the digestive system (ICD 10 codes: K00-K93, ICD 9 codes: 520-579). These causes stand for around 67% of all initial hospital admissions. Even if elective procedures have become more common they constitute a very small part of all hospital admissions for inpatient care in Sweden (e.g. hip replacement stands for less than 0.1% of all hospital admissions, and is very rare as a cause of first admission to the hospital after the age of 60, less than 0.01% of all first hospitalizations). Nevertheless, we do discuss in the article the possible impact the changes in the organization of healthcare in Sweden have on our results; elective procedures like eye surgery are included in this discussion. We have extended this part a little bit and hope that the reviewer finds this satisfying (please see the first paragraph of the discussion of the paper).

2. Expansion of the history of the concept of the compression of mortality on which their article focuses.

Response: Thank you. We have now added some information regarding the compression of morbidity in our article, please see the first paragraph of the introduction of the paper (we believe that the reviewer mentioned mortality by mistake since as it is explained in the summary of the comments that was provided to us, the focus of our study is the possible compression of morbidity).

Reviewer # 2, Dr Sally Inglis

Senior Research Fellow
Faculty of Health
University of Technology Sydney

It is unclear why the age of 60 years was selected for examination. There may be a socio-cultural rationale for this but this is not explained to justify this methodology.

Response: Thank you. Indeed, the reason why the age of 60 years was chosen as a cut-off is not very clear in the article. We did focus on the ages after 60 years, since we were interested to capture hospital admissions related to morbidity in the older population; our assumption was that the old-age morbidity starts approximately after the age of 60 years. We have now added an explanation in the discussion of the article so that the readers can better understand why this assumption was made. Please see the addition in the first paragraph of the discussion.

Similarly, the use of 16 nights in the sensitivity analysis is not explained or justified. Why not more or less nights?

Response: Our intention with the sensitivity analysis was to see if the fact that a hospital admission was defined as inpatient care of minimum two nights had an impact on our results. Therefore we analyzed our data altering the assumption of minimum care between one and sixteen nights. The cut off at 16 nights was decided after having looked at the data. Hospital stays that are longer than sixteen nights are rare and constitute only a minor part of all admissions. We have now better clarified this in the paper; please see the first paragraph under the title Sensitivity analysis.

Can the authors please provide more detail on the record linkage methodology?

Response: Thank you. In Sweden, all individuals have a unique personal identification number which makes it possible to identify individuals in all the registries in Sweden. The actual linkage was not done by us but by Statistics Sweden. After having linked the population register with all inpatient care and death dates they sent us a de-identified file with reference number instead of the unique ID-numbers. This is explained in the article; please see the first paragraph under the section Study Cohort.

Details on the cause of admission and how these have changed over time would be very interesting and would add value to the analyses currently reported.

Response: Thank you. From a report that is already available in Sweden (ref: <http://www.socialstyrelsen.se/publikationer2012/2012-10-18>, partly in English) we know that the proportion of hospitalizations for causes like CVD, neoplasms, etc. remained rather stable between 1987 and 2010, with only a little variation. However, the report analyzes all admissions and all ages. We have checked in our data which causes constitute the majority of first time inpatient care for the ages 60 and above (which is what we study). On average, between 1987 and 2010, the most frequent admissions to the hospital were for the following five disease categories: cardiovascular diseases (ICD 10 codes: I00-I99, ICD 9 codes: 390-459), neoplasms (ICD 10 codes: C00-C97 and D00-D48, ICD 9 codes: 140-239), injury, poisoning and certain other consequences of external causes (ICD 10 codes: S00-S99 and T00-T98, ICD 9 codes: 800-999), diseases of the musculoskeletal system and connective tissue (ICD 10 codes: M00-M99, ICD 9 codes: 710-739), and diseases of the digestive system (ICD 10 codes: K00-K93, ICD 9 codes: 520-579). We have observed that this order remained fairly stable between 1987 and 2010 (tables with the proportion of first time hospitalizations after the age of 60, divided by disease category and calendar year, were constructed and the order of disease categories was analyzed for each calendar year between 1987 and 2010). Further these top five causes constitute around 67% of all first admissions. This is now briefly discussed in our paper;

please see the fourth paragraph of our discussion.

Do these data include all hospital admissions in Sweden, are these to both public and private hospitals?

Response: Yes, both public and private hospitals are included in the registers (even if private hospitals are rare in Sweden, especially for inpatient care); in fact the great advantage of our study is that we capture the entire Swedish population, irrespective of where in Sweden they received inpatient care. We have better clarified this in the discussion; please see the last paragraph in the discussion.

Are any other data available in Sweden to provide context to the general health state of the population aged 60+ years and how this has changed overtime?

Response: Thank you. This is a tricky question since the definition of the “general health state” of individuals and what measures can be used to capture this outcome is part of the research itself. Previous studies have used survey data and there is one using the drug registry in Sweden. This is however a new registry that did not start until 2005. The same is true for the outpatient register which is a fairly new register. In addition, there are smaller registers focusing on specific diseases (e.g. cancer register) that can be used for studying specific outcomes. However, using the National Inpatient Register gives us a longer follow-up period and allows us to capture all admissions to hospitals, regardless of the diagnosis, which we believe is an interesting general aspect of health.