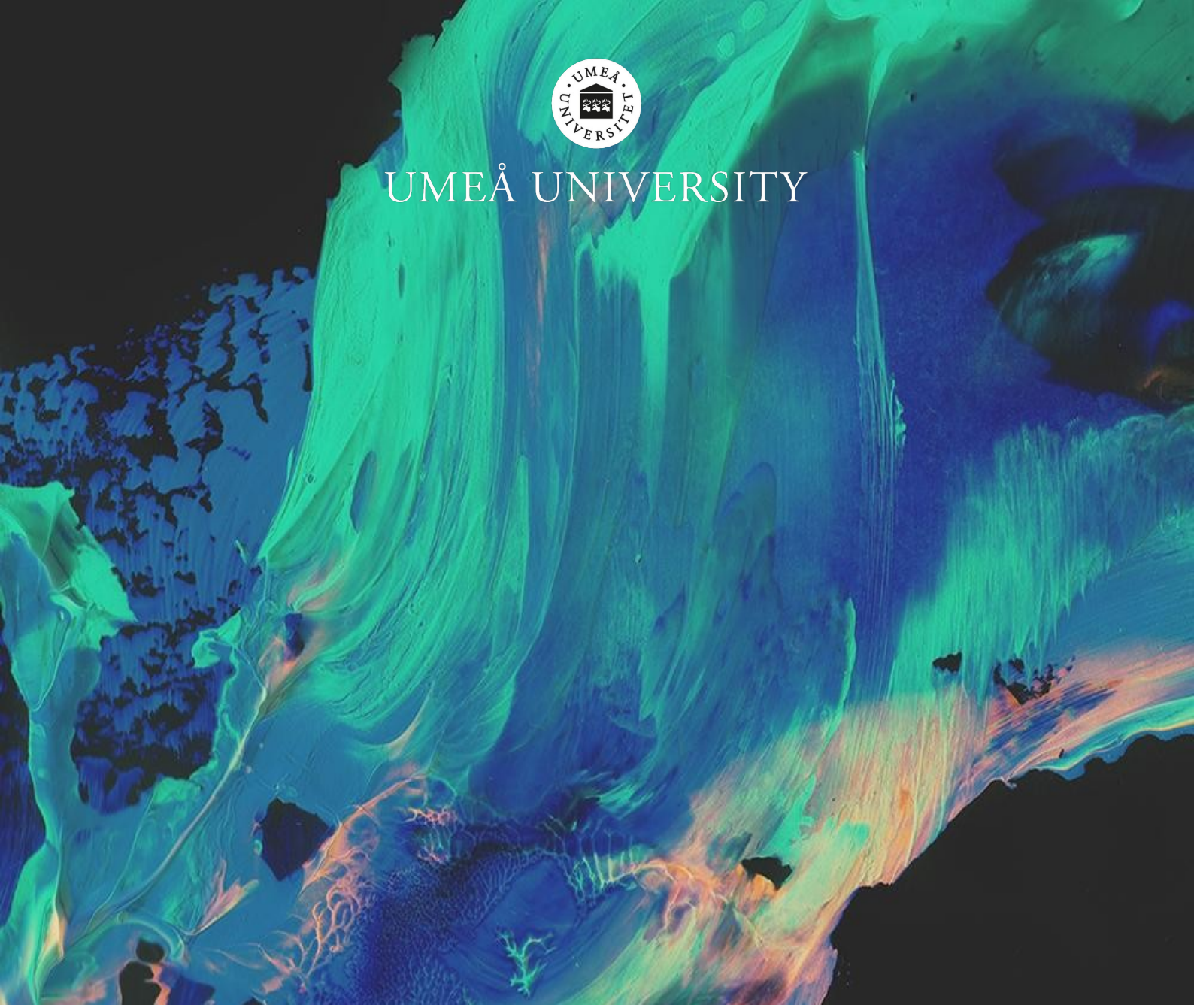

Morbidity among working class men and women in early twentieth century Sweden

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Lars-Fredik Andersson
Stockholm University, Economic History & Centre for Ageing and Demographic Research, Umeå University, Sweden

Lislotte Eriksson
Umeå Center for Gender Studies & Centre for Ageing and Demographic Research, Umeå University, Sweden

Bernard Harris
Social Work and Social Policy, University of Strathclyde, UK

Abstract

This paper investigates gendered morbidity patterns by employing micro data derived from sickness records and membership ledgers on working class men and women in the early 20th century Sweden. We find that the main reason for gendered morbidity differences - that woman faced fewer, but longer sickness episodes than men – reflects gendered productive and reproductive activities. Men suffered from the large number of work-place accidents as workers in the production sector, while women faced major risks due to pregnancy, childbearing and related sickness. Women also suffered more from for diseases of the blood, diseases of the digestive & metabolic system and diseases the genitourinary than men. Both men and women faced shorter, but longer, sickness episodes in urban areas attributed to the underlying differences in morbidity causes during the epidemiological transition.

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Lars-Fredrik Andersson, Stockholm University, Economic History & Centre for Ageing and Demographic Research, Umeå University. larsfredrik.andersson@ekohist.su.se;

Liselotte Eriksson, Umeå University, Umeå Center for Gender Studies & Centre for Ageing and Demographic Research, Umeå University. liselotte.eriksson@umu.se

Bernard Harris, University of Strathclyde, Social Work and Social Policy. bernard.harris@strath.ac.uk

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This paper investigates gendered morbidity patterns by employing micro data derived from sickness records and membership ledgers on working class men and women in the early 20th century Sweden. We find that the main reason for gendered morbidity differences - that woman faced fewer, but longer sickness episodes than men – reflects gendered productive and reproductive activities. Men suffered from the large number of work-place accidents as workers in the production sector, while women faced major risks due to pregnancy, childbearing and related sickness. Women also suffered more from for diseases of the blood, diseases of the digestive & metabolic system and diseases the genitourinary than men. Both men and women faced shorter, but longer, sickness episodes in urban areas attributed to the underlying differences in morbidity causes during the epidemiological transition.

Keywords: Social insurance, Health insurance; Accident insurance; Self-insurance; workplace accident; mutual aid; employers' welfare.

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1. Introduction

In recent years, historians have devoted increasing attention to the study of historical patterns of morbidity. However, much of this research has been focused on the UK and has provided relatively little information about the morbidity of past generations of women. Aggregated data based on sickness records suggest that women had fewer but longer sickness cases than men. The reason for these differences and how sickness might have affected men and women differently due to occupation, age and geographical location is however unknown.

This paper uses information obtained from the records of a large, nationwide Swedish health insurance society – *Svenska Folket* – to move beyond previous research and provide new insights into the morbidity experiences of urban and rural working-class men and women in Sweden during the period 1904-1914, an intense period of industrialization and urbanization in Sweden (Edvinsson and Nilsson, 1999). As a contrast to previous studies using health insurance morbidity data, we employ data that cover all counties and major occupational groups and can therefore consider the effect of sex, spatial area and occupation for individual morbidity. By investigating the morbidity experiences of individuals involved in the urban industrialized society as well as the morbidity of individuals still caught up in the agricultural, rural way of life, this paper wishes to provide a detailed account of the morbidity patterns and sickness causes that emerged with the industrialization process.

The paper begins by reviewing the existing literature on the measurement of morbidity. Section three present studies that may help understand the variation in morbidity patterns. Section four outlines the policy measures of *Svenska folket*. Section five describes the data and section six the membership structure in relation to census data. Section seven presents descriptives and analysis of morbidity pattern. Section eight presents cause-specific morbidity, and section nine concludes.

2. The measurement of morbidity

As Oddy (1982: 121) observed more than forty years ago, historians have often used mortality data to examine long-term changes in population health, even though there is much more to health than the avoidance of (premature) death. A large number of historians have sought to address this problem using height data, but these are primarily a reflection of the impact of environmental and nutritional conditions from birth to maturity (Harris 2021). A third approach has involved the use of sickness insurance records – and especially friendly society records – as measures of adult morbidity. As Riley (1987: 564) argued, 'friendly society records … provide information about the frequency and duration of sickness … a statistical picture of ill-health'.

The use of these records has served several debates. The records themselves provide information about the experience of a selected group of individuals – their members. In order for a claim to be recognized, a member had to decide that they had sufficient grounds to submit a claim and that they wished to do so, and the claim itself had to be approved by the organization that received it. All of these decisions involved behavioral elements, which implied that variation in morbidity is subject to individual incentives, but also formal and informal rules imposed by a society. As shown in previous studies on the different ways in which voluntary and compulsory organisations, but also societies excluding women sought to regulate sickness claims, that variation in morbidity is significantly affected by organizational differences when it comes to rules and regulations (Andersson and Eriksson, 2017; 2019; Murray 2003; 2006).

In addition to these difficulties, many of the available datasets also suffer from specific limitations. One obvious limitation is that the vast majority of friendly society members were men (see eg. Gottlieb 2007; Gorsky et al, 2011; Harris *et al.* 2012), and we therefore know relatively little about the sickness experience of past generations of women. One exception is a study by Castenbrandt, Revuelta-Eugercios and Torén (2019) using individual data from two societies – one with a predominantly male membership and the other with a predominantly female membership - located in the same city. Another exception is a study by Andersson and Eriksson (2019) using data on

individual sickness funds to compare male and female morbidity at an aggregated (society) level. While the former face difficulties in controlling for differences in rules and regulation at the level society, the latter overlook variation at the individual level by the use of aggregated data. Another limitation is the omission morbidity causes. As Riley (1987: 564) himself acknowledged, 'the sources seldom mention diagnoses'. One exception is Harris *et al.* (2012) that were able to provide a breakdown of cause-specific morbidity patterns in their analysis of male members in the Hampshire Friendly Society.

To provide a more inclusive contribution, and also acknowledge the need to identify morbidity causes, we use information on cause-specific morbidity patterns by both men and women in a nation-wide health insurance society. Our paper thereby represents the first attempt to compare male and female morbidity by causes under the same set of rules, considering variation in morbidity by members in different areas, occupation and age.

3. Understanding variation in historical morbidity

While improvements due to industrialization and economic growth caused declining mortality rates and improved life expectancy in the early 20th century in the Western world, the industrial society also generated diseases, accidents and invalidity that deteriorated and impaired lives, especially for the growing working classes. A wide variety of diseases and conditions were present that did not, at least directly, contribute to mortality but nevertheless affected the quality of life (Grob, 2002). In the early 20th century, especially infant and maternal mortality declined and women's life expectancy increased (Bengtsson & Ohlsson, 1994). The dramatic increase in life expectancy has been attributed to changes in the causes of death over the long term from a predominance of acute infectious diseases, e.g., epidemics, to chronic and human-caused diseases, named the epidemiological transition (Omran, 1971). This was, as argued by Fogel and others, an effect of improved access to nutritious food which in turn improved the resilience towards infectious disease mortality.

In the Swedish context, the turn of the twentieth century marks the most successful part of industrialization and economic growth. High demand of labour in emerging industries and in the service sector led to a rapid population growth in the major urban areas. In the capital of Stockholm, the population increased by more than three per cent per annum between 1870 and 1930. At the turn of the twentieth century Stockholm was similar in size with cities like New Orleans, Pittsburgh, and Washington DC, and was about twice as large as the country's next biggest city, Gothenburg, and five times as large as the third largest city Malmö (Molitoris and Dribe, 2016).[1] Although the population growth put pressure on living conditions, economic improvements, sanitary and housing reforms in the second half of the 19th century made urban life safer, more affluent and more comfortable. By the turn of the twentieth century, standards of living measured by real wages were higher in the major urban areas than in rural areas (Lundh et al. 2004; Söderberg 2010). Despite these improvements, mortality in urban areas did not converge with rural areas until the early 1920s (Molitoris and Dribe, 2016).

The more affluent, but also more fatal life in urban areas at turn of twentieth century raise the issue of well-being among labour workers by spatial areas. On the one hand, higher standards and fewer children might imply lower morbidity rates in major urban areas relatively rural areas. On the other hand, the higher mortality rate, if reflected an less favorable disease environment, might imply relatively higher morbidity rate in the major urban areas.

Another aspect of the urban-rural divide in living condition and sanitation is the disease environment. Being more sparsely populated than urban areas, the rural areas might have offered lower risk of food and water contamination. Lack of access to piped water of good quality in such areas might in turn adversely affect the sanitation and the health of its inhabitants. The lower incomes in rural areas than in the urban areas and the unhealthy working environments in less modernized manufacturing capital structures might have impaired health. A weak immune system

[1] Molitoris and Dribe (2016) report that, in the 1880s the city was growing substantially faster than American metropolises like New York City, Philadelphia, and Boston. Similar to other European cities, its growth was mainly due to rural–urban migration.

caused by physical hardship in manual work may have increased the risk of being infected with diseases such as influenza and tuberculosis. In her thesis on tuberculosis, Bi Puranen (1984: 162-63) showns that in mid-19th century, the southern part of Sweden, also holding the largest cities, had a significantly higher mortality in tuberculosis. This situation reversed in the first decades of the 20th century when mortality in the northern parts superseded the mortality in the southern part and the most urbanized regions; a situation mainly explained by poor living conditions in the north/rural areas. Considering the large rural and urban differences in living standard, it is however unclear whether the epidemiological transition and the decrease in infectious diseases reached the entire country equally and if the morbidity pattern in urban differed from that in rural areas.

In addition to changes in living conditions at the turn of the twentieth century, working conditions were highly affected by the rapid industrialization process. The wage-work especially in the emerging manufacturing industry was hazardous and workplace accidents caused by dangerous machines, explosives, piece rate and long working hours increase both the number of short- term absences and the long-term cases of working incapacity. Work-place accidents generated new demands for employers to take responsibility through collective action and agreements. Politicians also argued for the obligation of employers to compensate workers in the case of workplace accidents. (Andersson et al 2022; Aldrich, 1997; Fishback & Kantor, 1998; Lewchuk, 1991).

In a study of work-place accidents, Andersson et al. (2022) have shown that workers in the Swedish manufacturing industry faced an increasing above average risk of workplace accidents at the turn of the 20th century. Figures on work-place accidents show a general increase in the average risk, from a frequency of 1.8 accidents per 100 workers in 1885/6 to 4.3 accidents per 100 workers in 1917. The rise in workplace accidents was however skewed, with an emerging gap in accident frequency rates by sector over the period. While workers in the lower tail of the accident risk distribution faced much less of an increase over the period, workers in the most hazardous sectors (e.g. mining, metalworks) experienced a rise from 3.5 accidents per hundred workers in 1885/6 to 13.7 in 1917. The demands put on workers in manual labour, but also unhealthy workplace

environments related to exposure of chemicals or dust or natural substances, also implied work-related morbidity as later recognized in the 1925 ILO Workmen's Compensation (Occupational Diseases) Convention. Although the incidence of work-place accidents by occupation is expected to differ by sectors of employment, the potential impact of occupational diseases is less known. Considering the occupational diseases other than work-place accidents, it is unclear to what extent that working in different production activities had an unequal impact on morbidity, and if the working conditions had different implications for younger and older workers.

Previous studies on sickness claim records have recognized that especially older individuals were claiming benefits both more frequently and for longer periods. Harris et al. (2011) showed that recorded sickness among members in a British health insurance society tended to increase by age. Their findings suggest that male members faced a deterioration in health especially at higher ages. In a study of morbidity trends using micro data of two Swedish health insurance societies, Castenbrandt el al (2020) finds similar to Harris et al (2011) that sickness incidence per individual increased by age among men across all benchmark years between 1898/1907 and 1935/1950. Among women, foremost occupied as seamstresses, the results are more mixed, showing a higher sickness incidence for women at age interval 20-35 years of age than 35-50 years of age for the two benchmarks 1908/1918 and 1935/1950. For the benchmark years 1898/1907 and 1919/1934 sickness incidence increases from the age interval 20-35 years to the 35–50-year interval. For all benchmark years except 1935/1950, sickness incidence increases above the age interval 35-50 years of age. For both men and women, duration per sick case increase by age across all benchmark years.

Although the empirical findings show fairly consistent that morbidity by men increased in both incidence and duration by age, it remains unclear whether the cause of morbidity was different by age, and why women faced another incidence profile than men at different ages. An evident aspect of women's lives, especially in past societies was the risk of maternal mortality and complications due to childbirth. In the early 20th century, especially infant and maternal mortality declined, and women's life expectancy increased (Bengtsson & Ohlsson, 1994). Women's mortality risk only superseded

men's in the age group 30-40 years of age during the period 1900-1910 (Statistics Sweden). Previous research on women's morbidity using health insurance society data, indicate a similar trend for some benchmarks as aforementioned (Castenbrandt et al., 2020: 1280). It is however unclear whether the increase in incidence of morbidity among some women in the ages 20-35 (compared to the age 35-50 years of age) was related to sickness due to childbearing and/or reproductive diseases and what kind of diseases women contracted in relation to reproduction. It is further unknown if the long-term mortality gains that benefitted women to a higher extent than men meant that women also were healthier.

To summarize, the existing literature points to a variety of economic, social and demographic circumstances that may affect both the 'exposure' of, and the 'resistance' against, infections, accidents and non-communicable diseases. If the underlying causes of claiming sickness benefits differs, we also expect that the incidents and duration of such claim to be different by sex, age, occupation and location among members under the same set of rules.

4. Svenska folket

This study focuses on morbidity among male and female members of the nationwide health insurance society - *Svenska Folket* - that offered financial support to workers in the event of sickness, accident and death.[2] *Svenska folket* was founded by sawmill workers in 1903, in a rural industrial community in the northern part of Sweden (Järpen). Since most health insurance societies were local and located in the urban areas, the rationale behind *Svenska folket* was to target a wider area and provide the working classes, including agricultural workers outside urban centres, access to health insurance. While the two first nation-wide health insurance societies in Sweden were based on temperance and the social affinity that was experienced by teetotallers, *Svenska folket* was the first and largest nationwide health insurance society without demands of total abstinence (Andersson et al. 2022). The operation was run by a centralized administrative body that kept records of

[2] Burial insurance was replaced in 1911 by industry life insurance in response to the 1910 health insurance act. The life insurance line was separated from health insurance and administered in an independent body. (Svenska folket, 1928)

membership and sickness claims from hundreds of local sections (lodges) that interacted directly with members. Entry was conditioned by age (15-55) and 'good' health (attested by incumbent member). *Svenska folket* did not accept members with chronic disorders. No doubt, a wide variety of chronic disorders and conditions were present that did not, at least directly, contribute to mortality but nevertheless affected the quality of life of workers without the possibility to insure in a health insurance society. Membership had to be approved by the lodge body. Sickness claims were conditioned by a two-day qualifying period, a four-day duration period, and 90 day long waiting period for new member (except work-place accidents) and a 150-day maximum length of sick leave per annum. Four different premium/benefit classes were offered (*Svenska Folket*, F 2).

Most of the women went for the first or second class (67%, 31%) and only a few (2%) went or the third class. Compared with the daily wage rate of women in the manufacturing industry, the first class covered 43% of the average wage, the second 85%, and the third 130% of the wage average in 1913. Most men went to the second or third class (57%, 29%), and less to the first (13%) or fourth class (1%). The first class covered only 23% of the daily wage rate, the second 46%, the third 70%, and the fourth 93% of the daily average wage in the manufacturing industry in 1913[3].

The insurance contract offered attracted a large population of workers. Within the first ten years of operation, the number of members went from only a few to more than 10,000 members. Most of the members were men and many were workers occupied in the manufacturing industry. The vast majority of the female members were recorded as 'wives' and registered as performing unpaid 'domestic work' (*Svenska folket*, D 1:1a; D 1:1b). Wives' was the only category that was registered as performing 'domestic work' (hushållsgöromål). We have separated this category from women in paid domestic work. Women registered as 'maids in households' (hembiträde) are included in the tertiary sector while 'maids in agriculture' (piga) are included in the primary sector.

Both the supply and the demand for insurance differed between men and women. Before the expansion of nation-wide societies in early twentieth century, the supply of health insurance was

[3] The average daily wage for male workers was 4.32, and for female workers 2.34 SEK in 1913. Sociala meddelanden 1919.

more limited for women as many societies formally excluded them (Andersson and Eriksson, 2019). Although the nation-wide societies recognized that health differed by sex due to pregnancy, childbearing, and related sickness, the acceptance of women as members were generally adopted.[4] One reason for offering protection against loss of income due to pregnancy, was the labour protection acts. The first act of 1900 prohibited women occupied in the production sector to return to work earlier than four weeks after childbirth, and the second act in 1913 extended the period to six weeks. While other countries eventually compensated women affected by the act, Swedish women had to wait until 1931 when public maternity insurance was introduced (SOU 1954:4, *Moderskapsförsäkring m.m., Socialförsäkingsutredningens betänkande II,* pp. 14-16)

Svenska folket offered health insure to pregnancy related sickness already from the beginning. Childbirth was viewed as any other cause of inability to perform work and women received sickness benefits after the sixth day of childbirth where miscarriage also was viewed as childbirth (*Svenska Folket*, F 2). Not until 1913, health insurance societies that offered sickness benefits for pregnancy related sickness, received state subsidies, 0,60 SEK/day. In conjunction with this, *Svenska folket* introduced maternity benefits for 42 days (maximum) where mothers received 1 SEK per day despite premium class,[5] after a nine-month waiting period.[6] If not any other non-pregnancy-related sickness occurred, maternity insurance benefits were paid according to the premium class in which the member was insured. Additionally, pregnant women could receive maternity benefits up till 14 days before childbirth (*Vårt liv*, 1912:10-12). The motivation for receiving benefits before childbirth was that '[…] many pregnant women become incapable and are therefore in need to hire someone to

[4] In the nineteenth and early twentieth century, female membership was far from common. For the UK, Cordery (2003, p. 8) estimates that women constituted 5 % of all members in friendly societies around the year 1800. A century later however, the female membership rate had creased substantially, and Cordery (2003) considers the turn of the nineteenth century to be an historical high-water mark when it comes to female membership in friendly societies.
Murray (2007, p. 100) estimates that 9 % of all workers in the US covered by establishment funds, non-union, work-place based funds, were women in 1908. One fundamental reason for the low rates of female membership were due to exclusion of women from joining health insurance societies. Excluding women from health insurance membership was common in many countries and Clawson (1989); Carnes (1989) and Weinbren (2010) argue American fraternal societies created a context to confirm male dominance in a society where women had started to strengthen their positions.
[5] The benefit compensated 43% of the average wage rate of women in the manufacturing industry in 1913.
[6] The term 'sickness benefits' was changed to 'maternity insurance' with this change in insurance terms.

help them with their housework also before childbirth' (*Vårt liv*, 1916:2). Hence, not only women in wage-work, but also housewives in unpaid domestic work had incentives to become members in a health insurance societies such as *Svenska folket*. An article published in the monthly notice to members acknowledged that women's membership had increased over time, especially in Stockholm, but women still became members to a lesser extent than men. According to the writer, it was self-evident that women in wage-work should join a health insurance society, but it was also a necessity for women working in unpaid domestic work since: '[…] her work for husband and children represented a cash value which makes sickness a financial burden in the broader sense (Vårt liv, 1919:2). It was argued that a woman's inability to perform unpaid domestic work was at least as problematic as the man's inability to perform wage work, especially since housewives also often contributed to the household by some work outside the home (*Vårt liv*, 1919:2). The conditions for women in the case of pregnancy and childbirth were the most generous in relation to other health insurance societies that mainly offered maternity benefits for no more than 20-25 days and not allowed maternity benefits before childbirth (*Vårt liv*, 1916:2). Despite this, women to a higher extent joined the two other nationwide societies that were based on temperance (N*ykterhetsfolkets sjukkassa* and *Nykterhetsvännernas sjukkassa*). As temperance attracted women to a higher extent, the generous insurance conditions for pregnant women might have been a strategy by *Svenska folket* to attract more women as members.

5. Morbidity data

To examine historical morbidity pattern among men and women, we make use of sickness claim records compiled by *Svenska folket* in the early twentieth century. The sickness records provide information of sick claims by member and her occupation, specific cause of morbidity and number of days on sick leave. We have systemized the data for each sick claim by duration and cause. The duration for each sick case is measured by days, using information on start and end dates for each

case within a year. The cause of sickness is classified by ICD-codes for the major groups (20 groups). We are aware about the limitations with converting contemporary diagnoses to present-day ICD-standards. Nonetheless, we have after cleaning the data for differences in spelling and naming in total some 450 unique diagnoses, so without some classification the analysis of morbidity causes would be impossible. When coding the data, we find the manual to past and present names of death and morbidity causes helpful (DDSS, 2023). To access the population under risk, membership ledgers are gathered and systemized to provide detailed information of individual members by name, sex, date of birth, place of resident, occupation. Membership ledgers and sickness records are matched by a unique number for each individual. Since the insurance contracts and sickness claims were individually reported, the data enable us to identify differences in morbidity structure related to sex, age, occupation and place of residence (see Gorsky and Harris, 2005).

Selection of sample

The sampled records of ledgers and claims provide information about the experience of a select group of individuals, the members of *Svensk folket*, and not a random sample of individuals. The incentive to enroll as a member, given the contract offered by Svenska folket (and their acceptance of new members), were most unlikely equal to every individual in the economically active population. As noted in previous literature, there are reasons to expect the presence of an adverse selection and or propitious selection on behalf of members with respect to health, since societies imposed restrictions and gate keeping functions to circumvent the enrollment of unhealth members (Gorsky et al, 2011). A study of membership among male workers in the Swedish manufacturing industry shows that more tenured and married individuals typically enrolled (Stanfors et al, 2023). For the selection of members in *Svenska folket* specifically, a previous study on survival shows however no significant difference in longevity between members and non-members (Andersson et al, 2023).

As sex differentials, along with living and working conditions impact of morbidity is of interest, we have drawn a larger sample to include all female members (c. 3700 women) and a thirty per cent

share of the male members (c. 5300 men) that enrolled between 1904 and 1914. The male sample includes the forty largest lodges, located in urban, rural and industry districts. To illustrate how the members sampled relates to the population at large, the membership structure is compared with the 1910 population census. The census is a full population count including information on age distribution, spatial structure and occupation of all individuals in Sweden (IPUMS, 2022).

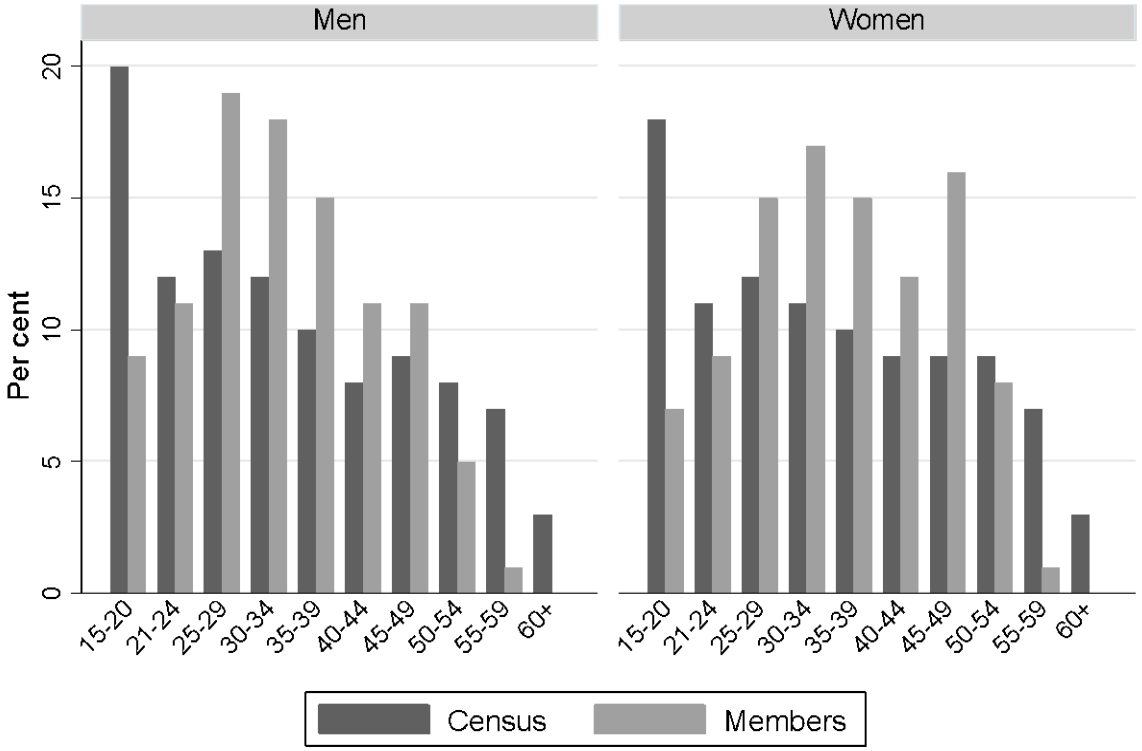
6. Membership structure

Age distribution

The census is sampled to reflect the eligible age of enrolment and the aging of members (15 to 61 years of age). Given the presence of local lodges, the census is also restricted to the parishes where lodgers of *Svenska folket* were present in our sample.

Figure 1 shows the age structure of the population in the census and the members in *Svenska folket*. The age structure in the census data is skewed to the right, with close to 30% of the individuals between the ages 15 and 25, and 17% between 45 and 55. The age structure is similar by sex, with at most a 1% difference by age group.

Figure 1. The age structure of workforce in census and male and female members in Svenska folket.



Source; Svenska folket, D 1:1a,D 1:1b; IPUMS, 2022.
Note; The age structure of the census is delimited by age restrictions (15-55) on entry and by years of operation (1910-1904). Census including only parishes with lodges of *Svenska folket* present.

The age structure of membership data is less skewed to right, if any, but rather centred around the core of the workforce by age. The youngest (<20) and oldest (>55) individuals eligible to enrol was much less likely members than those between 25 and 40 years of age. The age profile was fairly similar by sex. If anything, men were somewhat younger than women (33.5<35.6).

Since the society expanded rapidly, the aging of incumbent members was balanced by the entry of new (younger) members to the extent that the average age was similar for the first years of operation (35.7 for women, 34.3 of men) as in 1910, or in 1920 (34.4 for women, 34.9 of men). Between the years 1912 and 1914 the average age of entry was 30 among women, and 28 for men. For the same period, the average age of exit was 34 for women, and 32 for men. Within the ten first year of operation, the reason for exit was foremost voluntary (94%), followed by death (5%) and exclusion (1%) of members (Svenska folket, D 1:1a,D 1:1b).

Spatial structure

The spatial scope of *Svenska folket* expanded rapidly in the early years, and in 1910 a total of 425 lodges was established. *Svenska folket* was represented in all 24 counties by 1910, and the lodges were distributed across a total of 310 parishes. To capture the spatial distribution of its members in relation to the population, parishes are being categorized into four major groups to become comparable with the census data. Another motive behind the categories is to capture the health differences of ongoing urbanization and industrialization by differentiating between the major urban areas, industry districts, and rural areas highlighted in previous literature on health differences by area (Edvinsson and Nilsson, 1999).

The first group consists of the three major urban areas/cities having a population of close to or more than 100,000 inhabitants (Stockholm, Göteborg and Malmö) in 1910.[7] The second group consists of manufacturing areas, where half (or more) of the employed male population was occupied in secondary production. The third group consists of the rural areas where half (or more) of the employed male population was occupied in primary production. The fourth group consists of non-urban areas with a mix of employment in primary, secondary and tertiary production.

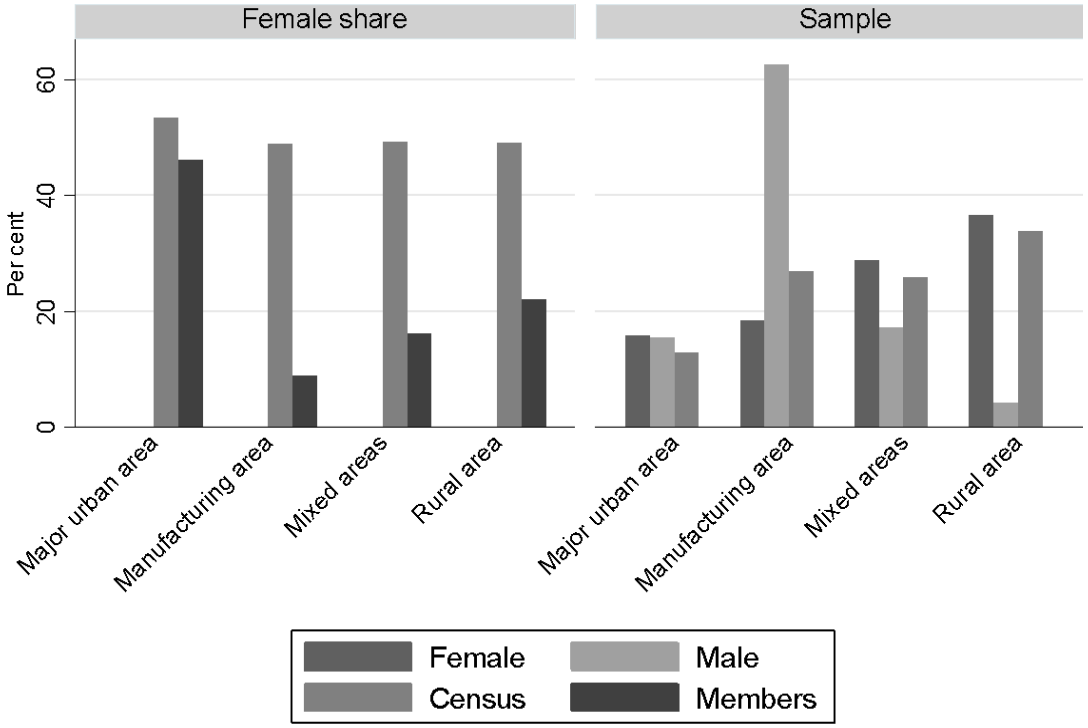
In the right panel of figure 2 the spatial structure of Svenska folket and the census is shown. According to the census, 13% of the economic active population (15-62 years of age) lived in the major urban areas, followed by 27% in manufacturing areas, 34% in rural areas and 26% in areas with a mix between primary, secondary and tertiary production. The presence of lodgers in Svenska folket was relatively small in urban areas (6%), whereas manufacturing (35%) and mixed (30%) areas was relatively large.

The structure of the female sample by spatial areas shows that the largest proportion was living in rural areas (37%), followed by mixed areas (29%), manufacturing areas (19%) and major urban areas (16%). The structure of the male sample (including the largest 40 sections sampled) by

[7] The number of cities in Sweden was relatively large given the size of the population. In total 128 areas was by in administrative terms defined as 'cities' of which some had only a few thousand inhabitants.

spatial areas shows that the largest proportion lived in manufacturing areas (63%), followed by mixed areas (17%), major urban areas (16%) and rural areas (4%). Compared with all males by lodgers, the sample of the 40 largest lodges give a larger weight to major urban areas (15% vs 4%), manufacturing areas (63% vs 39%), but a lower weight to rural areas (27% vs 4%) and mixed areas (31% vs 17%).

Figure 2. Spatial structure of membership by sex in sample and census (%).



Source; See Figure 1.
Note; *Spatial areas are defined as follows; (1) Manufacturing area holds >49 percent of male workers in secondary production; (2) Rural area holds >49 of male workers in primary production; (3) Major urban areas include Stockholm, Göteborg, Malmö; (4) Mixed areas is non-major urban areas with less than 50 agriculture/manufacturing workers. **The female sample includes all (female) members. of ***The male sample includes the 40 largest lodgers (the total sample has the following proportion by spatial areas; Manufacturing area (38,8%), Mixed areas (30,7%), Rural area (26,6%), Major urban area (3,8%).****Census is weighted to represent the gainfully employed male population (having an occupation in the age span between 15 and 61 years of age.

In the left panel of Figure 2, the female shares of members and in census is shown. It shows that relatively many women enrolled in the major urban areas. Compared with census, the gender gap was down at 7 per cent. In manufacturing areas, a relatively small number of women enrolled compared with census. Relatively more women were members in rural areas, but still less than in the major urban areas. In the other, mixed areas, the female share was smaller than in rural areas, but higher than in the manufacturing areas.

Occupational structure

Many of the male members in Svenska folket was blue-collar workers occupied in the manufacturing industry, while the largest share of female members was recorded as 'wives' and registered as performing unpaid 'domestic work'. To capture how the occupation of workers may have affected morbidity outcomes, including the variation of workplace by industries noted in previous literature (Andersson et al, 2023; Moses, 2018), the occupational structure is divided into four major sectors in accordance with the HISCO standard.[8] To compare with the census, weights based on the age and spatial structure of members is imposed.

After imposing weighted by the age and spatial distribution of members on the census, we find that a 56 per cent of the men was occupied in secondary production, but less in primary and tertiary production. Among the male members, the presence of workers in secondary production is relatively higher (80%), but the presence of workers in the tertiary sector relatively smaller (18 %) compared with the census. Compared with female members in *Svenska folket*, relatively more were registered as performing unpaid domestic work in the census (73% vs 79%). Most women were recorded as performing unpaid 'domestic work'[910], in this paper coded as 'domestic work'[11] (75%), followed by tertiary production (16%), secondary production and primary production (2%).

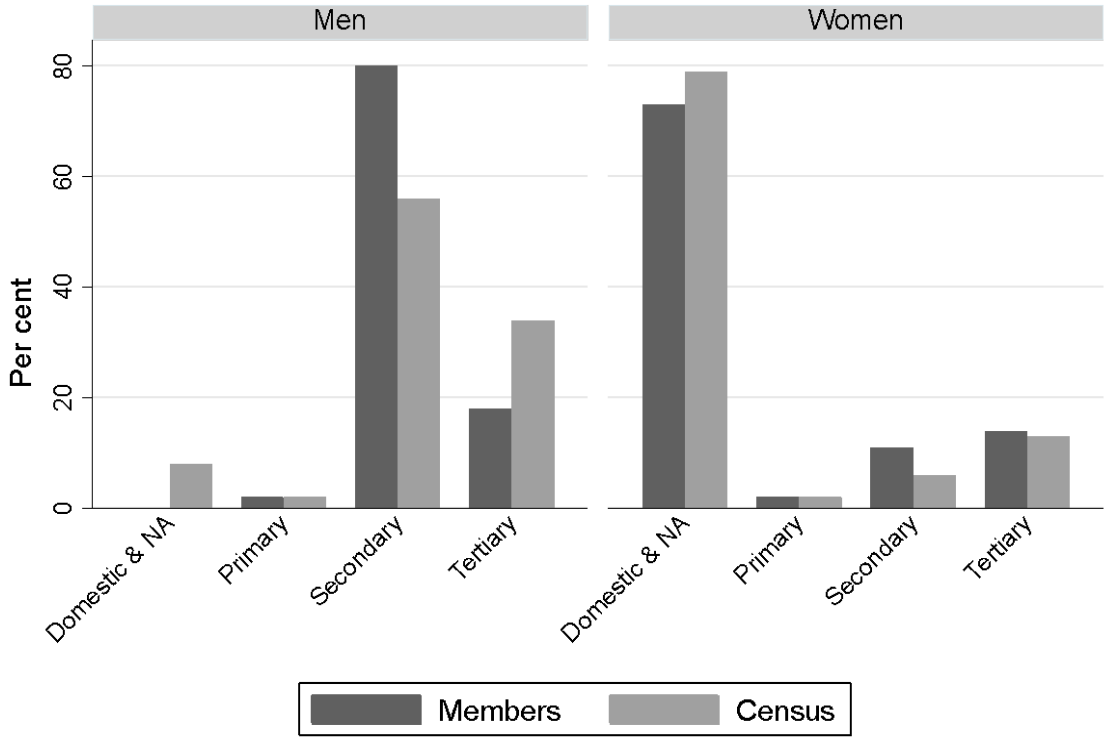
[8] Occupational titles in the 1910 census data has been coded and harmonized in the IPUMS project. The coding of the original titles of the census is used for the coding of occupational titles among members in Svenska folket.

[9]

[10] Only women recorded as 'wives' were also registered as preforming 'domestic work'.

[11] Married wife's without occupation titles as coded as employed in domestic service.

Figure 3. Occupation by women and men in Svenska folket and census by main sectors (%)



Source; See Figure 1.
Note: Census weighted by age and sample of lodges in Svenska folket.

There were relatively more female members occupied in secondary and tertiary production, than in the census (25% vs 19%). Hence, the incentives to enrol was stronger among salaried employed. For male members, the incentives to join was stronger among workers in secondary production (80 vs 56), but weaker among workers in the tertiary sector (18 vs 34).

7. Morbidity patterns

To examine historical morbidity patterns there are two main levels of analysis; (i) the aggregated level showing series of morbidity claims at nation or sub-national level, and (ii) micro data level data showing morbidity claims reported by individuals. The micro level data provides evidence on the individual members sickness trajectories within a single or a few societies, while records at the aggregated level provides information of the general trends for the population of societies. In the following section, we first present aggregated statistics on morbidity for men and women in rural and urban area to illustrate the overall differences in morbidity by sex and area, and secondly present

micro data descriptives and analysis to net out the effects of sex, age, place, occupation on morbidity outcomes.

We will examine morbidity between 1912 and 1914. We have selected a period for which the 1910 health insurance legislation (that prohibited multi-membership) is put into force (to have a uniform set of formal rules), but before the economic and social effect of WWI affect outcomes.

Aggregated descriptives of morbidity

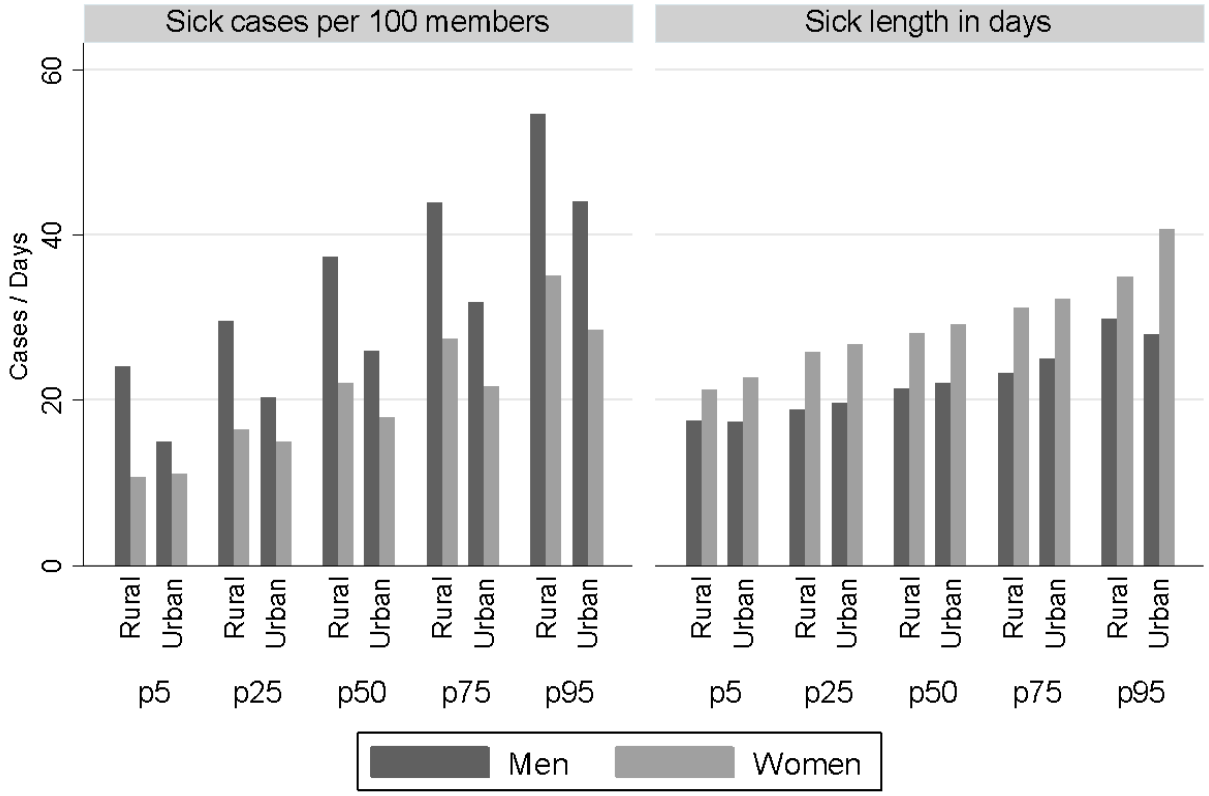
Under the 1910 health insurance legislation, the Swedish welfare board [*Socialsyrelsen*] collected morbidity data for all registered societies and published aggregated figures yearly. Between 1912 and 1914, these figures were aggregated at the sub-national county level (n=24), divided by sex and urban/rural areas. The data covers 1,985 societies and 1,422,744 members. Most members were male workers. Close to 30 per cent were women.

In figure 4 all-cause morbidity by sickness frequency (number of sick cases per member), sick days (number of sick days per member) and sick duration/length (number of sick days per sick case) is shown for all societies. It shows that women had significant (t = 10.887) fewer sick days, but longer sick duration (t = 14.230) than male members. The difference by sex holds across the whole distribution from the 5^{th} percentile (p5) up till the 95^{th} percentile (p95).

The figures by rural and urban area shows that male members had significant (t = 6.797) lower sickness frequency in urban areas, but a similar (non-significant difference) duration in both types of area (t = 1.2515). The duration varies somewhat across the distribution, with longer episodes of sick leave in rural areas at the tails, but shorter duration at the core of the distribution. Women in urban areas had significant fewer sickness episodes (t = 3.3211), but somewhat longer sickness episodes, although less significant (t = -2.1320). Seen across the distribution, the differences in duration are small in the lower tail of the distribution, but greater at the higher end of the distribution. Although urban and rural morbidity figures at the aggregated level gives an indication of a potential systematic

underlying difference in morbidity pattern by place of residence, there are limitations with the aggregated figures.

Figure 4. Morbidity in urban and rural areas aggregated



Source; Socialstyrelsen, 1915; Socialstyrelsen, 1920.

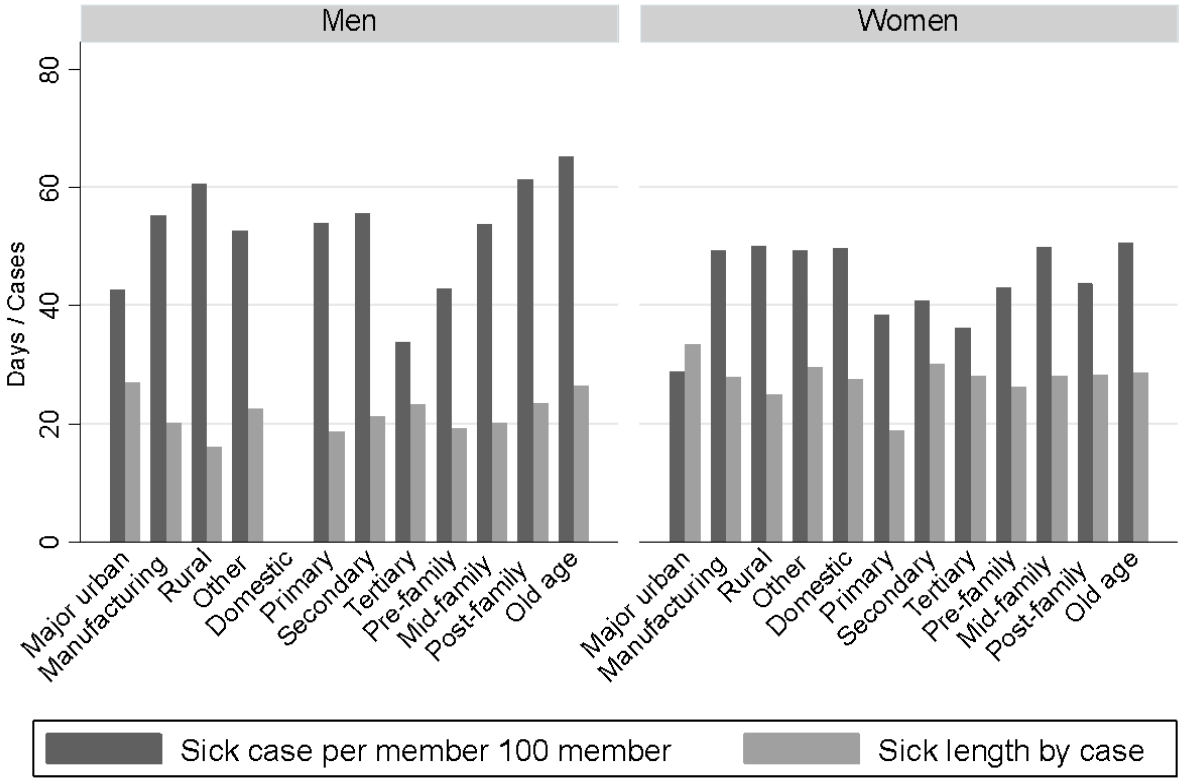
One shortcoming is that the societies are categorized either as 'urban' or 'rural' by registered office. For societies with many lodges, members could be living at different places including both urban and rural areas but categorized either as urban or rural. Another limitation is that the urban/rural morbidity differences may reflect occupation rather than place of residence. In the following section, micro descriptives will be compared with the aggregated figures to provide a more nuanced picture of morbidity patterns by area and sex.

Micro descriptives of morbidity

In figure 5 summary statistics of all-cause morbidity among female members in *Svenska folket* is shown. On average, the number of sick cases equalled 47 per 100 members, the number of sick days

equalled 12 per member and the duration per sick case was 28 days.[12] If sick leave due to pregnancy and childbirth is excluded, the morbidity figures drop to 42 cases, 10 sick days and 27 days of length. Compared with the aggregated figures, the number and duration of sick cases are at the higher end of the distribution.

Figure 5. Morbidity among male and female members of Svenska folket.



Source; Svenska folket, H I c:15, H I c:23, H I c:32.

The morbidity figures by spatial area show that women in the major urban areas faced fewer (29 vs 50) sick cases, but longer periods of sick leave (28 vs 25) than women in non-urban areas. The finding fits with aggregated figures on urban and rural morbidity difference (see figure 4).

Women in domestic work faced more sick cases (50 vs 45), but similar sick length (25 vs 25) as non-domestic workers on average. Women in tertiary production had the least frequent number of sick cases, followed by women in primary and secondary production. Women in primary production had the shortest sick leave, and the smallest number of sick days per member.

[12] The distribution of cases by members were right-skewed, with most being single cases (64%). The proportion experiencing two, three and four cases per annum was 27, 8 and 1 respectively in 1912.

Morbidity by age, organized into four intervals[13], shows that women in pre-family age faced fewer and shorter sick cases than on average. In the mid-family age, the frequency and length start to rise, and the number of sick days increases by two days per annum. In the post-family age, morbidity drops close to that of women in pre-family ages. At ages over fifty (old age) both frequency and length rise, and the number of sick days is the highest on average.

In figure 6 summary statistics of all-cause morbidity among male members are reported. On average, the number of sick cases equalled 53 per 100 members, the number of sick days equalled 10 per member and the duration per sick case was 19 days. Compared with the aggregated figures, the frequency of sickness and number of sick days per member is at the higher end of the distribution. In relation to women in Svenska folket, men faced more sick cases but shorter sickness episodes. The latter fits with the aggregated figures on sex differentials in morbidity (see figure 4).

The morbidity figures by spatial area show that men in the major urban areas faced fewer (43 vs 55) sick cases, but longer periods of sick leave (27 vs 21) than men in non-urban areas. The finding fits with aggregated figures on urban and rural morbidity difference (see figure 4).

The morbidity figures by occupation shows that men in secondary production faced more sick cases, and a longer duration of sick leave. Men in tertiary production experienced both fewer and shorter sick cases. Morbidity tended to increase by age, as both the frequency of sick cases and the length per sick case increase by age. The number of sick days were almost twice as high between the oldest and youngest age group.

Multivariate analysis of morbidity

To examine the face-value difference in morbidity by spatial area, sector of occupation and age of member, we have employed a multivariate analysis. The analysis is intended to identify if area, occupation and age mattered for morbidity, and if so individually and or jointly. For this purpose, we have applied linear probability models (LPM) to estimate how area of residence, sector of

[13] The age intervals consist of; 'Pre-family age' (16-27) where the majority were unmarried; 'Mid-family age' (28-41) when most individuals were married, and more likely childbearing in case of women; Post-family age' when fertility rates drop; 'old-age' when morbidity is expected to increase due to old age.

employment and age for men and women affected all-cause morbidity outcomes (sick case, sick days and sick length). We use pooled LPM model as the estimates are more straightforward to interpret than those from logit models. It is also more straightforward to compare these estimates across different subsamples (e.g., by men and women) than is the case for odds ratios from logit models. We have added the variables stepwise (by area, sector, age), before taking all factors into account in the full model. In the full model we control for year and class (see footnote 2) effects by dummies.

In figure 6a coefficient estimates for female members are illustrated. For each set of outcomes and determinants, most of the variation shown in the descriptives (figure 5) is repeated. Women in urban areas faced fewer morbidity episodes, but for longer periods, while women in rural areas faced shorter episodes relative to women in mixed areas (reference category). The number of sick days was significantly lower in urban and rural areas relative to mixed areas.

Women occupied in secondary, tertiary production, and primary production, faced fewer sick cases relative to women occupied in domestic work (reference category). However, the length of sick leave was less clearly different from domestic production except primary production where length was significant shorter as shown in 6b.

Figure 6a. Coefficient estimate of area, sector and age on all-cause sick cases among female members

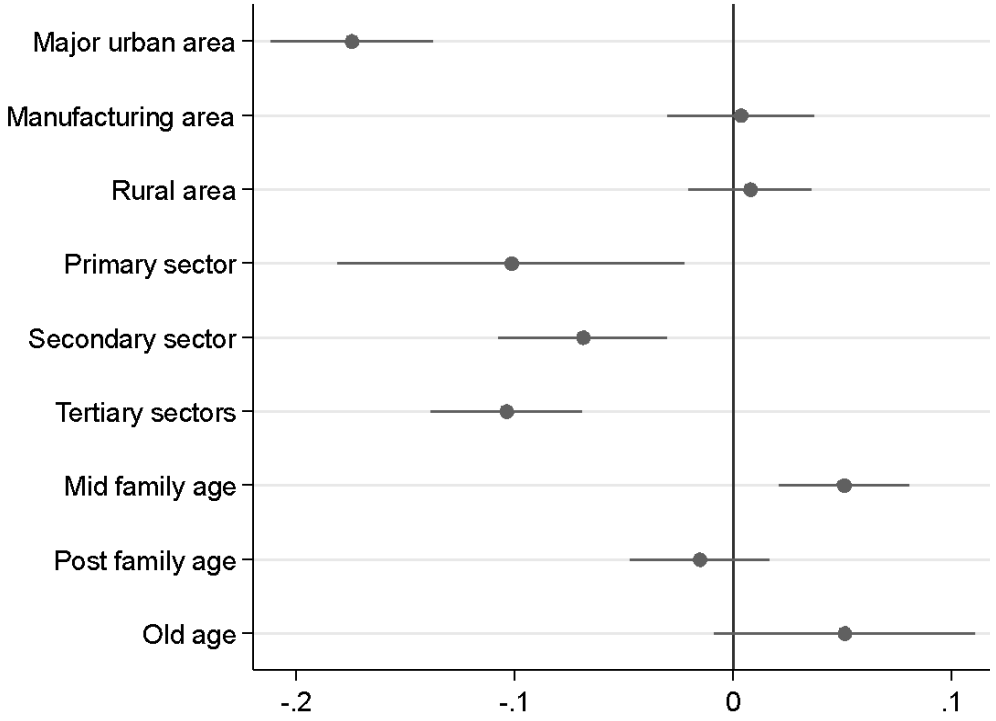
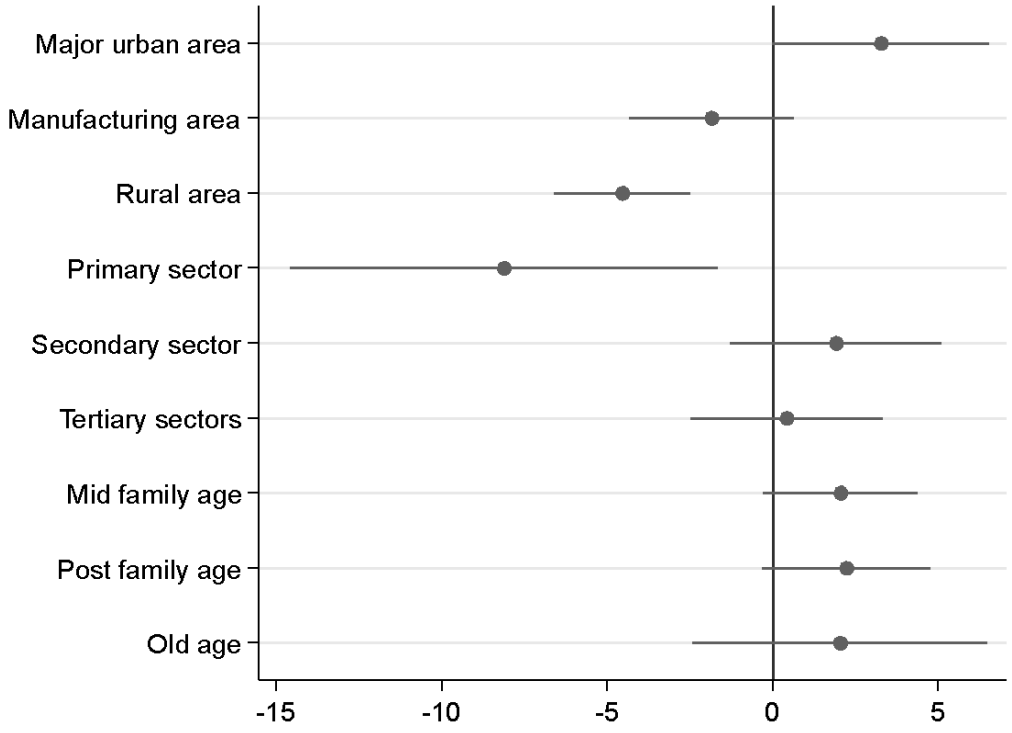


Figure 6b. Coefficient estimate of area, sector and age on all-cause sick length among female members



Source: See figure 5.
Note: Year- and class effects controlled.

To capture the non-linear relationships between age and morbidity (see figure 1), we entered age-intervals (see footnote 12) as a categorical variable with pre-family age as the reference. Women at family age faced significantly more sick cases, and significantly more sick days. Women at post-family age faced no more sick days, but significant longer sickness cases. Woman at older ages experienced significantly more, but not significant, longer sick cases.

In figure 7a&b coefficient estimates of morbidity causes among male members are reported. The multivariate analysis confirms largely the variations by area, sector and age groups, reported in the summary statistics (see figure 5). Men in urban areas faced significant less, but longer sick cases than in other areas (reference category). Men in rural areas faced significant more, but shorter sick cases. Men in manufacturing areas faced more, if significant, but shorter sick cases.

Male occupied in the tertiary sector (reference category) faced significantly fewer sickness cases relative to those occupied in the primary and secondary sectors. Especially men occupied in secondary production faced significantly more sick cases and sick days, than members occupied in the tertiary sector. In terms of sick length, coefficient on length turns insignificant on occupation.

Figure 7a. Coefficient estimate of area, sector and age on all-cause sick cases among male members

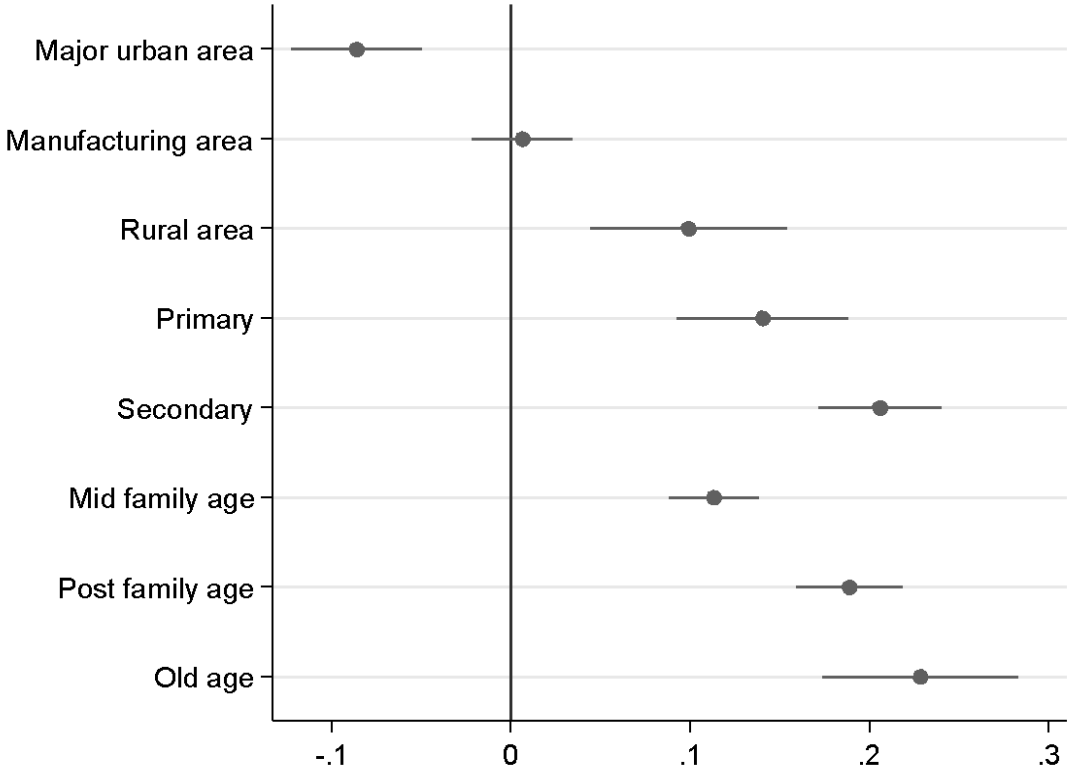
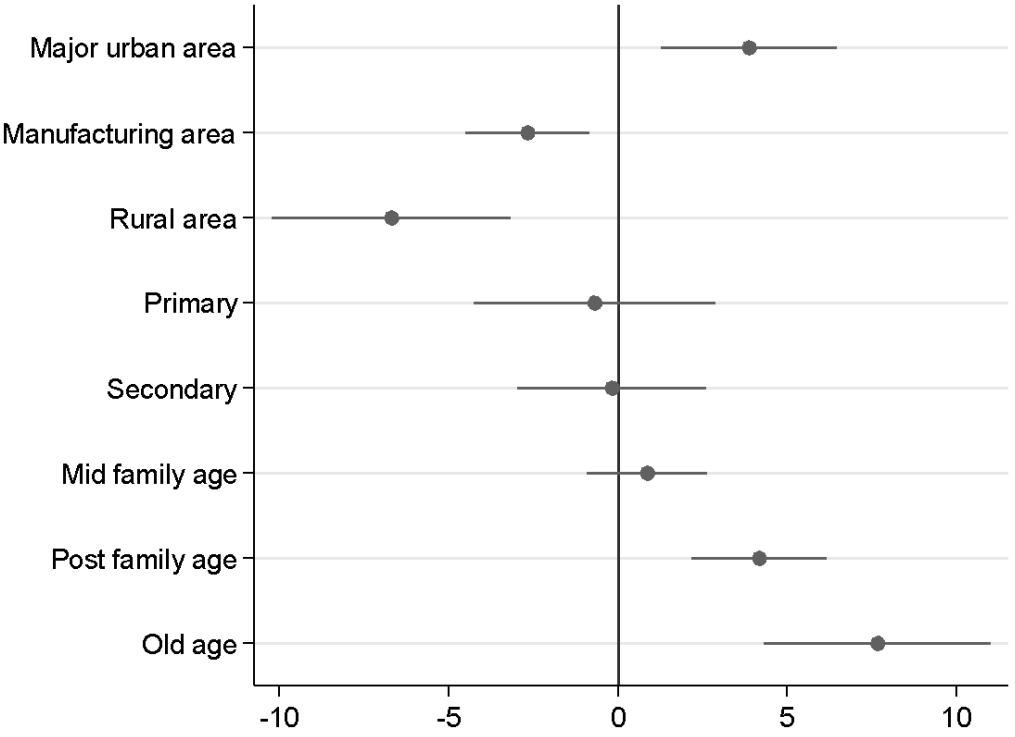


Figure 7b. Coefficient estimate of area, sector and age on all-cause sick length among male members



Source: See figure 5.
Note: Year- and class effects controlled.

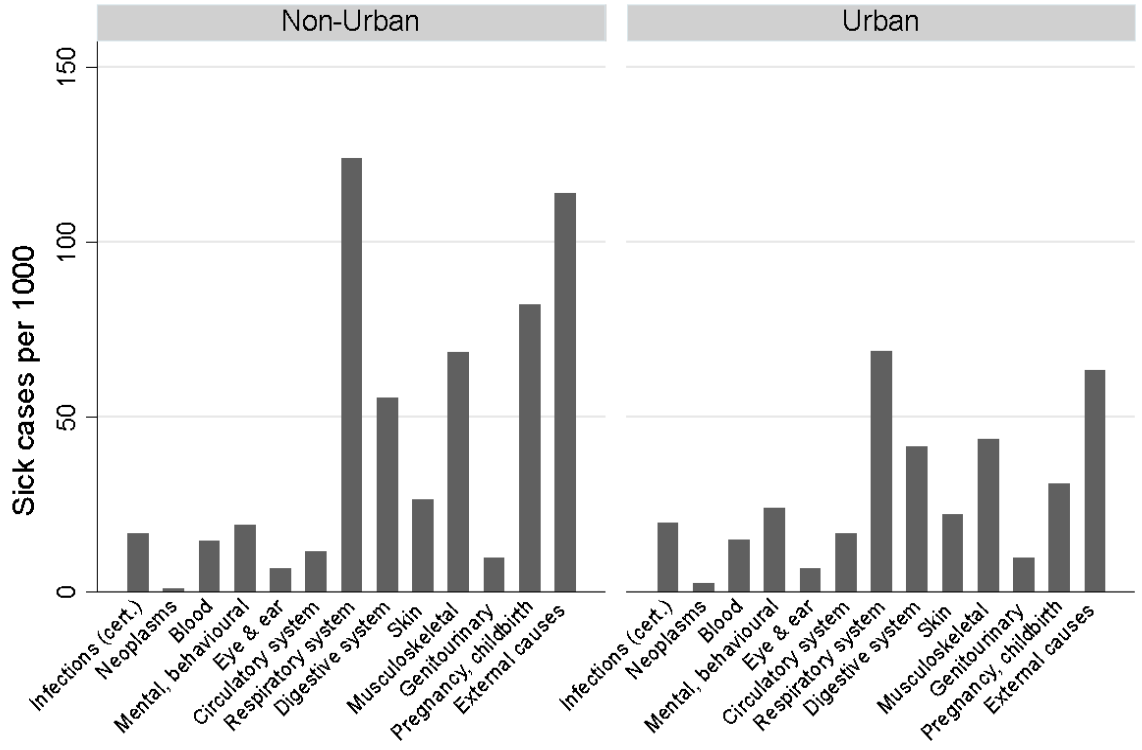
The coefficient estimates by age groups show that morbidity was significantly higher among the older members. Compared with the youngest members (reference category), the oldest faced close to nine days more of sick leave per annum. The rise in morbidity is driven both by a higher sickness frequency and a longer sickness length per sick case.

8. Morbidity by causes

The causes behind the morbidity figures have been coded by ICD chapters (see section 5) and reported by area, sex, occupation and age in figures 8-12 (see appendix 1 for a more detailed account). To first establish if the causes differs systematically by these groups (area, sex, occupation and age), we have run non-parametric test. Estimates of Pearson chi^2 is in the range between 140 and 400, and p-value is below the 1 % level of significance. We conclude that there are systematically differences in morbidity causes by groups.

In figure 8 the sickness cases are reported by major urban, and non-urban areas, for men and women jointly. Most of the difference in location is made up by diseases of the respiratory system (foremost infectious diseases in respiratory system), followed by digestive and musculoskeletal diseases. We also find gendered differences morbidity by area, most apparent pregnancy/childbirth for women and external causes for men by location.

Figure 8 Sick cases ICD-10 classified morbidity causes in major urban and non-urban areas



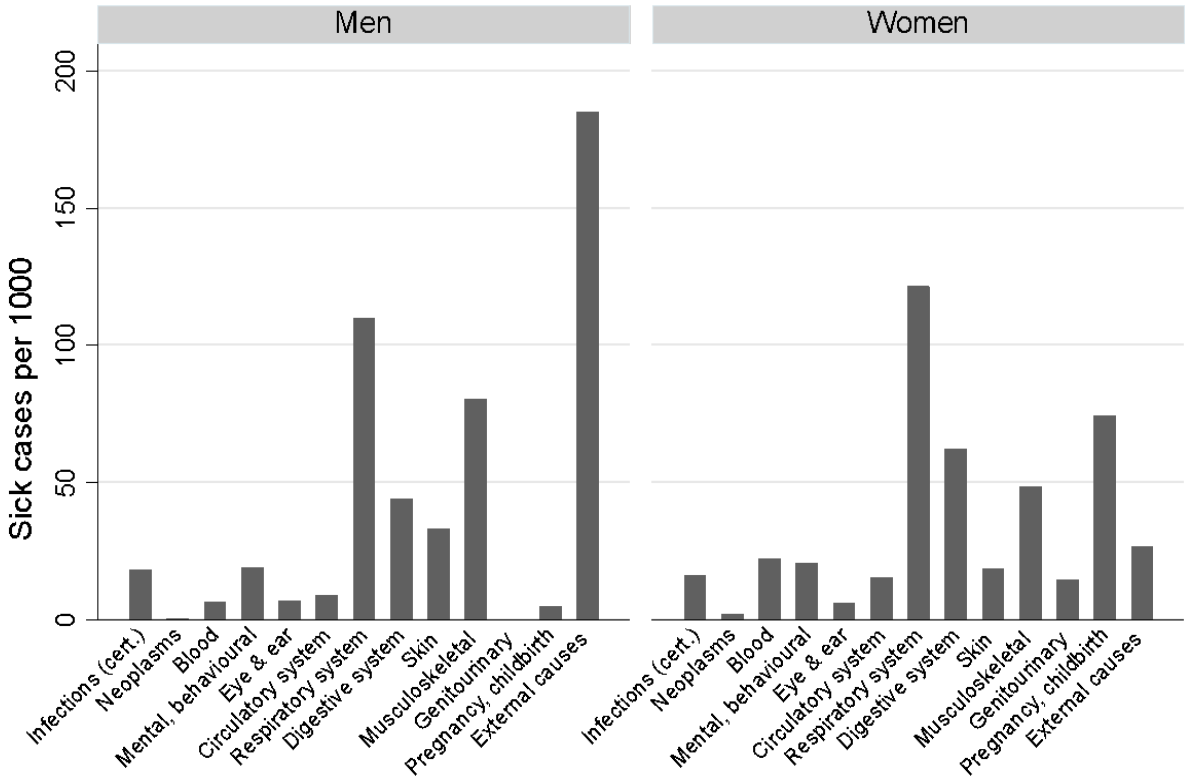
Source: See figure 5.
Note; Male and female members are weighted equally except for pregnancy, childbirth where only women are included.

In greater detail we find that women in urban areas faced a relatively lower morbidity risk related to pregnancy, childbirth (ICD 15), diseases of the respiratory system (ICD 10) than in all other areas. In turn, women in urban areas were relatively more exposed to neoplasms (ICD 3), mental disorders and diseases of the nervous system (ICD 5 & 6) and diseases of the circulatory system. Being more exposed to the latter, less frequent but longer episodes of sick leave, than the more frequent but shorter diseases make up part of the urban and non-urban divide of morbidity..

Male workers in urban areas were more exposed to certain infections diseases, neoplasm, mental disorders/ diseases and diseases of the circulatory system; all with an above average sickness duration. In relation to women living in urban areas, we find a similarity in that neoplasms, mental disorders/diseases and diseases of the circulatory system where more common and that diseases of the respiratory system and diseases of the musculoskeletal system than in all non-urban areas.

Compared to women, the most striking difference except pregnancy and childbirth is the large share of external causes of morbidity (ICD 20), foremost work-place accidents (95%). For another four major ICD chapters, we find systematic differences between men and women. Women faced both more frequent and longer (duration) for diseases of the blood, diseases of the digestive & metabolic system and diseases of the respiratory system. Women suffered more from diseases in the genitourinary system, but for less lengthy periods than men.

Figure 9 Sick cases ICD-10 classified morbidity causes, women and men

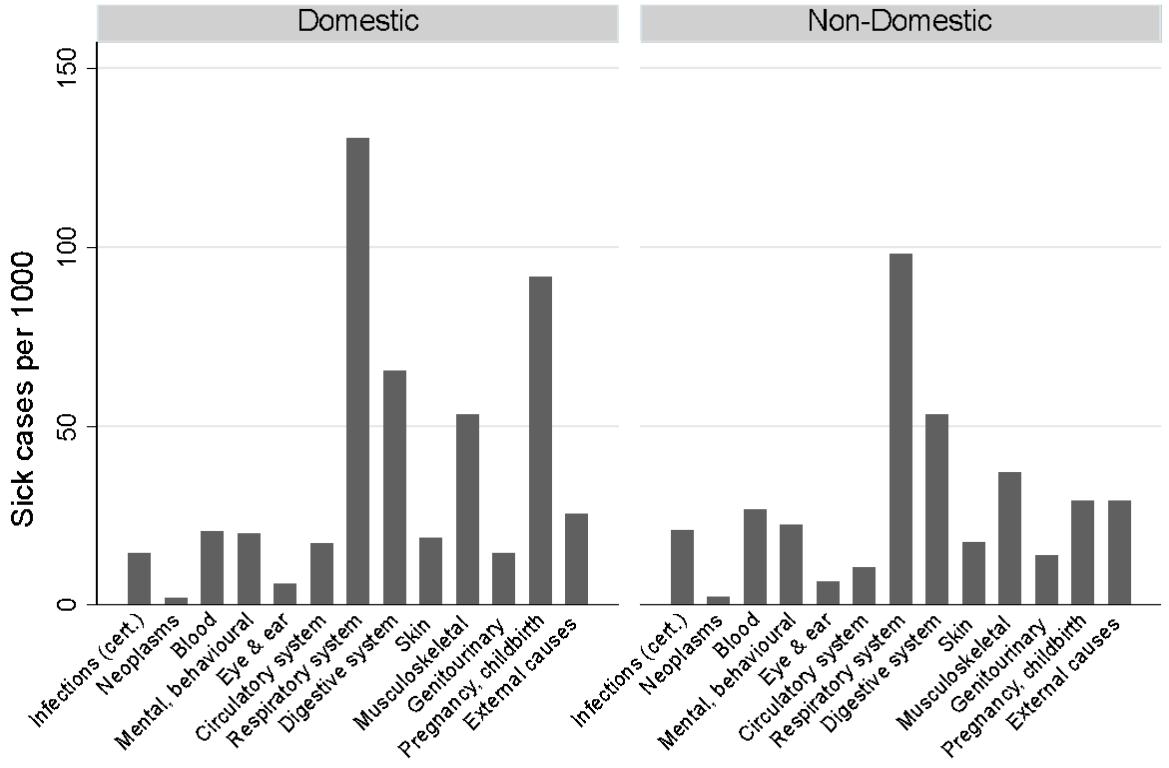


Source: See figure 5.

For women in unpaid domestic work, childbearing occurred more frequently, contributing to major difference in the number of sickness cases in relation to women employed in the non-domestic work. Women in unpaid domestic work faced an additional risk of suffering from infectious diseases to the respiratory system, resulting in more frequent but shorter periods of sick leave. Diseases of the musculoskeletal system was also more common among women in domestic work, as well as diseases of the digestive system. Women in non-domestic work faced however a greater risk of suffering from

some certain infectious diseases (tuberculosis), diseases of the blood and mental, behavioural disorders.

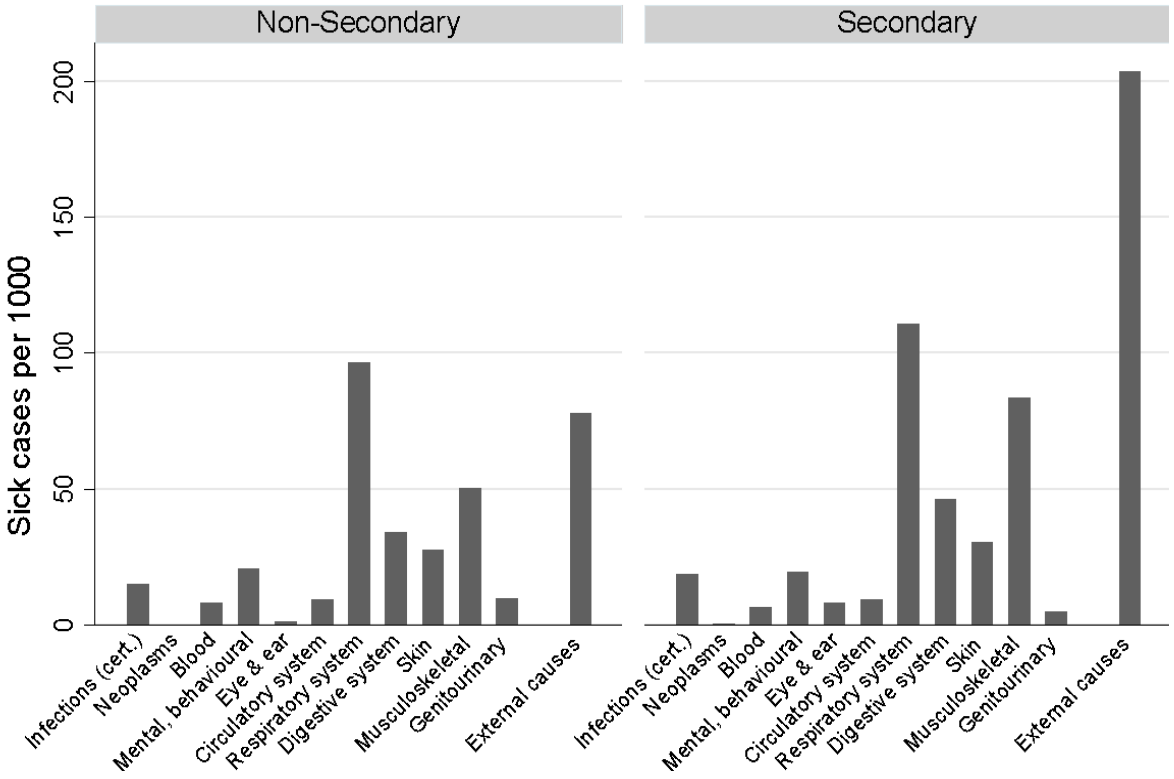
Figure 10 Sick cases ICD-10 classified morbidity causes, women in domestic and non-domestic work.



Source: See figure 5.

Turing to male workers by occupation, figure 11 shows that a major difference exists between workers in secondary production and those in the non-secondary sectors. For workers in the former, external causes (work-place accidents) were the most frequent reason for sick leave both absolute and relative other sectors. Workers in the secondary sector also suffered also more from diseases to the musculoskeletal and the respiratory system than workers elsewhere.

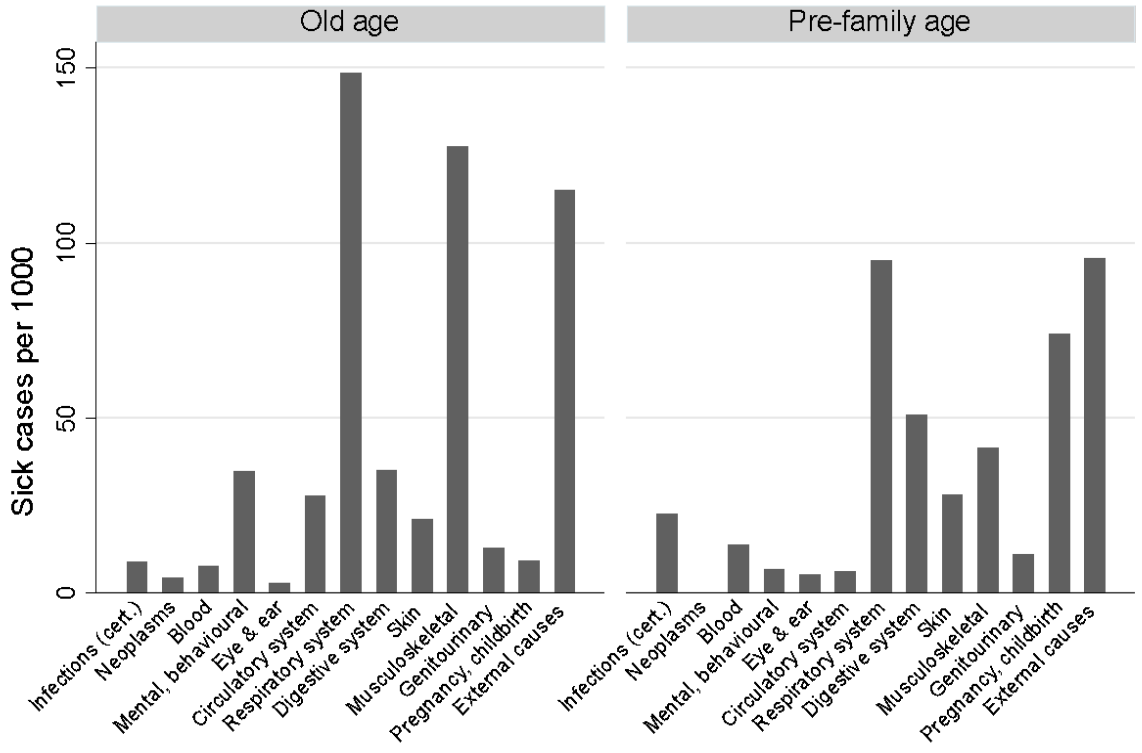
Figure 11 Sick cases ICD-10 classified morbidity causes, men in secondary and non-secondary work.



Source: See figure 5.

In figure 12 morbidity causes is compared between members at old age, with those in younger (pre-family age) including both man and women. Diseases to the respiratory system and musculoskeletal system make up a major health disadvantage for the older members. Older also suffer more from external causes (work place accidents), along with mental and behavioural disorders. Unless women in pre-family age gave birth, an even greater difference in sick leave by would be observed.

Figure 12 Sick cases ICD-10 classified morbidity causes, men and women in pre-family and old age



Source: See figure 5.
Note; Male and female members are weighted equally except for pregnancy, childbirth where only women are included.

9. Concluding remarks

While improvements due to industrialization and economic growth caused declining mortality rates, the industrial society generated diseases that deteriorated and impaired lives. The sickness patterns of *Svenska folket* shows that location, occupation, age and sex all mattered for frequency, duration and cause/diagnoses of morbidity. In that regard, our study underlines the importance to consider not only sex and age, but also the place of resident and occupation.

After examining the cause/diagnoses of sickness cases we find that the main reason for the gendered morbidity differences - that woman faced fewer, but longer sickness episodes than men – reflects underlying productive and reproductive activities. In addition to previous findings on morbidity differences by sex (Andersson, 2019; Castenbrandt el al (2020), we can show that male morbidity was connected to the workplace/occupation where men in comparison to women more

often were afflicted by occupational accidents and also conditions related to the respiratory and musculoskeletal system that might be caused by inferior working environments. As a contrast, women's morbidity in relation to men's, to a higher extent, was related to reproduction, conditions that also explain women's less frequent but longer sickness episodes in relation to men. Women naturally experienced pregnancy related sickness but also sicknesses of the genitourinary system and also had a higher share of the morbidity related to blood- and blood forming e.g., anemia.

After examining urban areas in relation to non-urban areas, at both an aggregated and individual level, we find that members in urban areas faced a different morbidity pattern than in rural areas. Members of *Svenska folket* in the major urban areas experienced fewer but longer sickness cases than members in rural, manufacturing and mixed areas. The fewer sickness cases reflect that members in urban areas experienced less sickness conditions related to occupational accidents and physical exploitation leading to musculoskeletal diseases; a specific morbidity that in turn is explained by less manufacturing industries and in general better working conditions in the large cities. The longer sickness cases in urban areas might instead reflect a later stage of the epidemiological transition, where members had longer sickness episodes in non-communicable diseases such as cancer, mental disorders and cardiovascular diseases. In that regard, our findings suggest that improved living conditions relative to the rest of the country as reflected in previous literature (Long 2005; Silvestre 2005; Lundh 2012) made pattern of morbidity different.

The improved working conditions and living standards in the major urban areas, put forward by Molitoris and Dribe (2016), might contribute to explaining another difference between members in the largest cities and members in the rest of the country, that is the considerably lower rates of diseases of the respiratory system. A weak immune system caused by physical hardship increased the risk of being infected with influenza. In *Svenska folket*, especially men and women in non-urban areas were heavily contracted and this cannot be explained by a single outbreak a specific year. Although living standard and knowledge about hygiene might have played a part, the reason for the large difference in influenza sickness is hard to establish. Puranen (1984) has shown that fatal outcomes of

tuberculosis in the northern parts superseded that in the southern part and the most urbanized regions in the early twentieth century. Whether our observed higher respiratory morbidity in the rural parts of Sweden might be related to the simultaneously high tuberculosis morbidity is however difficult to access.

In addition to previous studies on the frequency and duration of sickness by age, our study shows that the age-pattern of morbidity is related to changes in underlying causes-specific morbidity. We find that older men typically faced more workplace accidents and were more exposed to diseases of the musculoskeletal and respiratory system than younger workers. Older men also suffered more frequent from mental, nervous and behavioural diseases than younger men. In difference, women faced a major risk due to pregnancy, childbearing and related sickness, and a high morbidity rate – most apparent among women in mid-family age. Women immediately before and after reproductive age faced lower frequency of morbidity. At higher ages women suffered relatively more from diseases of the respiratory and musculoskeletal system and mental/behavioural disorders than younger women.

Literature

Andersson, L. F., Eriksson, L., & Nystedt, P. (2022). Workplace accidents and workers' solidarity: mutual health insurance in early twentieth-century Sweden. *The Economic History Review*, 75(1), 203–234. https://doi.org/10.1111/ehr.13088

Andersson, L.-F., Eriksson, L. and Harris, B. (2022). Did statutory insurance improve the welfare of Swedish workers? The statutory workplace accident insurance act of 1916. *Labor history*. 63(2), pp.210–233.

Andersson, L-F. and Eriksson, L. (2017). Sickness absence in compulsory and voluntary health insurance: the case of Sweden at the turn of the twentieth century. *Scandinavian Economic History Review*, 65 (1), 6-27.

Andersson, L-F. and Eriksson, L. (2019). Exclusion of women and occupational characteristics: Swedish mutual health insurance, 1901-10. *Business History*, 61 (8), 1352-78.

Andersson, L., Eriksson, L., & Lilljegren, J. (2023). Pre-welfare state provision and adverse selection: Enrolment in a Swedish nationwide health insurance society. *Financial History Review*, 30(1), 74-99. doi:10.1017/S0968565022000130 .

Castenbrandt, H. (2018), Trends in morbidity: national statistics on sickness claims among the working population in Sweden, 1892-1954, *Economic History Review*, 71 (1), 213-35.

Castenbrandt, H., Revuelta-Eugercios, B., & Torén, K. (2020). Differences in health: the influence of gender and institutional settings on sickness claims in Gothenburg, Sweden (1898-1950). *Social History of Medicine*, 33 (4), 1259-81.

Demografisk Databas Södra Sverige (DDSS) Hjälpmedel - Dödsorsaker och sjukdomsnamn - förr och nu. http://ddss.nu/means/causeOfDeath?stat=1

Edvinsson, S. and Nilsson, H. 1999. Migration and Mortality. Swedish Towns During Industrialization. *Annales de démographie historique*. 2, p.63–.

Gorsky, M., Guntupalli, A., Harris, B. and Hinde, A. (2011). The 'cultural inflation of morbidity' during the English mortality decline: A new look. Social science & medicine 73(12), pp.1775–1783.

Gottlieb, D. 2007. Asymmetric information in late 19th century cooperative insurance societies. Explorations in economic history. 44(2), pp.270–292.

Harris, B. (2021). Anthropometric history and the measurement of wellbeing', *Vienna Yearbook of Population Research*, 19, 91-126.

Harris, B., Gorsky, M., Guntupalli, A. and Hinde, A. (2012), 'Long-term changes in sickness and health: further evidence from the Hampshire Friendly Society', *Economic History Review*, 65 (2), 719-45.

Karlsson, T. (2016), Gender differences in absence from work: lessons from two world wars. *IFAU Working Papers*, 2016:26.

Moses, J. (2018). *The first modern risk: Workplace accidents and the origins of European social states*. Cambridge University Press.

Molinder, J. (2022). Historical roots of the dual-earner model: Women's labour force participation in Sweden, 1870–1960. *Lund Papers in Economic History*, 244, 1-46.

Molitoris, J., & Dribe, M. (2016). Industrialization and inequality revisited: mortality differentials and vulnerability to economic stress in Stockholm, 1878—1926. *European Review of Economic History*, 20(2), 176–197.

Murray, J.E. 2003. Social Insurance Claims as Morbidity Estimates: Sickness or Absence? Social history of medicine : the journal of the Society for the Social History of Medicine. 16(2), pp.225–245.

Murray, J.E. 2006. Worker Absenteeism Under Voluntary and Compulsory Sickness Insurance: Continental Europe, 1885–1908 In: Research in Economic History. United Kingdom: Emerald Group Publishing Limited, pp.177–207.

Oddy, D. (1982). The health of the people. In T. Barker and M. Drake, eds., *Population and society in Britain, 1850-1980*, London: Batsford, 121-39.

Riley, J. (1987), Ill-health during the English mortality decline: the friendly societies' sickness experience. *Bulletin of the History of Medicine*, 61, 563-88.

SOU 1954:4, *Moderskapsförsäkring m.m., Socialförsäkingsutredningens betänkande II,* 14–16.

Stanfors, M., Karlsson, T., Andersson, L.-F., & Eriksson, L. (2023). Between voluntarism and compulsion: Membership in mutual health insurance societies in Swedish manufacturing, c. 1900. *The Economic History Review*. https://doi.org/10.1111/ehr.1327

Vårt liv, tidskrift för svensk folkhygien: organ för Svenska folkets sjukkassa och understödsförening: 1912:10-12; 1916:2; 1919:2.

IPUMS Minnesota Population Center. Integrated Public Use Microdata Series, International: Version 7.3 [dataset]. Minneapolis, MN: IPUMS, 2020.

https://doi.org/10.18128/D020.V7.3

Archival material (Svenska folket)

SVENSKA FOLKET, Archival material by ref., volume, NAD, URL and archive:

Ref.	Volume	NAD Code	URL	Archive
D 1:1a	Medlemsmatrikel, 1903-1910	SE/ÖLA/10480/D 1/1	https://sok.riksarkivet.se/arkiv/W6qzqdkaQeZJTe018W43t3	Landsarkivet i Östersund
D 1:1b	Medlemsmatrikel och försäkringsansökningar 1911-1916	SE/ÖLA/10479/D I/1	https://sok.riksarkivet.se/arkiv/usmzqdkaQeZJTe018W43t3	Landsarkivet i Östersund
F 2	Handlingar angående stadgar och registreringar	SE/ÖLA/10480/F 2	https://sok.riksarkivet.se/nad?postid=Arkis+8817eb15-48f7-11d5-a6ed-0002440207bb&prependUrl=%2fnad&vol=n%2cn%2cn&s=Balder	Landsarkivet i Östersund
H I c:15	Sjukdomsfallsförteckningar, 1912	SE/RA/420234/05/H I c/15	https://sok.riksarkivet.se/arkiv/pyX4O4JDweZJW8018W43t3	Riksarkivet i Stockholm/Täby (depå: Arninge)
H I c:23	Sjukdomsfallsförteckningar 1913	SE/RA/420234/05/H I c/23	https://sok.riksarkivet.se/arkiv/ryX4O4JDweZJW8018W43t3	Riksarkivet i Stockholm/Täby (depå: Arninge)
H I c:32	Sjukdomsfallsförteckningar 1914	SE/RA/420234/05/H I c/32	https://sok.riksarkivet.se/arkiv/uD28m8cRrH6d0G02H087k3	Riksarkivet i Stockholm/Täby (depå: Arninge)

Appendix 1. Summary of ICD-10 classified morbidity causes

Table 1 Summary of ICD-10 classified morbidity causes by area, occupation and age among women (per thousand)

Code	Description	Major urban area	Manu-facturing area	Other areas	Rural area	Domestic sector	Primary sector	Secondary sector	Tertiary sector	Pre-family age	Mid-family age	Post-family age	Old age	Total	Duration in days (mean)
0	Unclassified & findings not classified elsewhere	8.0	8.2	15.7	20.7	15.6	6.9	19.1	9.5	18.3	9.4	19.6	18.6	14.9	15.3
1	Certain infectious &parasitic diseases	16.8	23.1	16.2	13.2	14.6	6.9	25.0	19.9	25.8	19.1	6.7	12.4	16.4	39.8
2	Neoplasms	3.5	3.7	1.9	1.1	2.1	0.0	1.2	3.8	0.0	0.6	5.4	6.2	2.2	48.7
3	Diseases of the blood &blood-forming	23.0	24.6	24.3	19.9	20.8	34.5	33.4	20.8	22.7	30.5	12.9	12.4	22.5	37.9
5_6	Mental, nervous & behavioural diseases	24.8	22.3	23.3	16.2	20.0	20.7	15.5	28.4	8.8	19.1	30.3	27.9	20.7	40.9
7_8	Diseases of the eye & ear	8.0	6.0	4.3	7.5	6.2	0.0	9.5	5.7	3.1	6.8	8.5	3.1	6.4	22.1
9	Diseases of the circulatory system	16.8	12.7	18.1	14.7	17.5	6.9	8.3	13.2	7.6	15.6	19.6	27.9	15.6	35.9
10	Diseases of the respiratory system	52.2	134.8	130.4	137.5	130.7	103.4	104.9	92.7	102.6	127.2	122.3	157.9	121.6	17.7
11	Diseases of the digestive & metabolic system	35.4	75.2	60.9	68.0	65.7	55.2	57.2	50.1	69.2	58.1	67.4	31.0	62.2	32.5
12	Diseases of the skin &subcutaneous tissue	17.7	17.1	18.1	19.9	18.9	20.7	23.8	12.3	22.7	19.8	12.0	31.0	18.5	19.4
13	Diseases of the musculoskeletal system	26.5	52.9	54.3	51.9	53.3	48.3	35.8	36.9	34.0	38.0	66.5	102.2	48.8	30.1
14	Diseases of the genitourinary system	8.8	17.9	15.7	14.3	14.6	0.0	14.3	16.1	20.1	11.7	15.2	9.3	14.5	36.6
15	Pregnancy & childbirth	31.0	61.1	88.1	88.7	92.0	48.3	32.2	24.6	74.3	120.1	21.0	9.3	74.4	33.2
20	External causes of morbidity &mortality	17.7	35.0	23.3	28.9	25.6	34.5	28.6	29.3	22.7	22.7	32.6	43.3	26.7	21.6
0_20	Total	290.3	494.4	494.5	502.4	497.7	386.2	408.8	363.3	431.7	498.7	440.0	492.3	465.5	27.9

Source; Svenska folket, H I c:15, H I c:23, H I c:32.

Table 2 Summary of ICD-10 classified morbidity causes by area, occupation and age among men (per thousand)

Code	Description	Major urban area	Manu-facturing area	Other areas	Rural area	Primary sector	Secondary sector	Tertiary sector	Pre-family age	Mid-family age	Post-family age	Old age	Total	Duration in days (mean)
0	Unclassified & findings not classified elsewhere	9,9	11,1	18,4	22,3	16,1	13,2	6.5	12.0	13.0	13.2	14.0	12.8	18.2
1	Certain infectious &parasitic diseases	22.8	15.5	21.1	26.7	16.1	19.0	15.2	19.6	17.5	20.6	5.6	18.2	39.2
2	Neoplasms	1.5	0.4	0.0	0.0	0.0	0.6	0.0	0.0	0.2	1.1	2.8	0.5	85.5
3	Diseases of the blood &blood-forming	6.8	7.9	2.6	4.5	5.4	6.5	8.7	4.9	7.0	8.4	2.8	6.6	21.6
5_6	Mental, nervous & behavioural diseases	23.5	17.5	22.4	11.1	12.9	19.4	21.7	4.9	20.2	28.5	41.9	18.9	40.9
7_8	Diseases of the eye & ear	5.3	8.1	5.3	6.7	5.4	8.1	1.1	7.6	7.0	7.4	2.8	7.1	20.6
9	Diseases of the circulatory system	16.7	7.9	7.9	4.5	6.4	9.3	9.8	4.9	8.0	12.7	27.9	9.1	40.5
10	Diseases of the respiratory system	85.7	114.0	95.5	184.9	119.1	110.9	94.5	87.8	108.4	134.1	139.7	110.0	16.3
11	Diseases of the digestive & metabolic system	47.8	44.7	40.2	44.5	39.7	46.5	33.7	32.5	48.5	50.7	39.1	44.4	26.4
12	Diseases of the skin &subcutaneous tissue	26.6	34.2	25.7	66.8	61.2	30.6	23.9	33.9	35.5	31.7	11.2	33.2	16.3
13	Diseases of the musculoskeletal system	60.7	84.2	76.4	113.6	94.4	83.7	45.6	49.0	77.0	112.5	153.6	80.7	19.6
14	Diseases of the genitourinary system	10.6	3.8	5.3	0.0	0.0	4.8	10.9	1.8	4.0	8.4	16.8	4.9	41.1
20	External causes of morbidity &mortality	109.3	203.4	207.4	120.3	164.2	204.2	68.4	169.0	195.2	182.7	187.2	185.1	19.3
0-20	Total	427.2	349.5	528.0	605.8	540.8	556.9	339.8	428.0	541.5	611.9	645.3	531.6	21.2

Source; Svenska folket, H I c:15, H I c:23, H I c:32.