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

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Abstract

Economic growth has led to higher incomes and improved wealth since the industrial breakthrough, and mortality has declined on a large scale. Following the turn of the 20th century, a considerably larger share of the population came to experience old age. Longer lives were not, however, necessarily healthier lives. In fact, previous findings suggest much less improvement in morbidity then mortality. Clearly, a decline in mortality is not the same as a decline in morbidity and mortality, in itself, tells us nothing about the incidence of non-fatal illnesses in adulthood. In this paper, we address this issue by studying morbidity differences both among and between working class men and women in Sweden during the early twentieth century. By using a rich archival material of morbidity records from one of the largest national health insurance societies, we seek to examine how age-related health-deterioration indicated in previous literature interacted with causes of illness, work life and living condition.

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

Funding agencies: *Marianne och Marcus Wallenbergs Stiftelse [MMW 2016.0028]*

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 or differences in sickness rates between types of area. This paper uses information obtained from the records of a large, nationwide Swedish sickness insurance society – *Svenska Folket* – to address both of these limitations.

This paper aims to 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). We employ micro data derived from sickness records and membership ledgers including working class men and women, living in major urban areas, manufacturing industry districts and rural areas to net out the effects of sex, place, occupation and age on morbidity outcomes. As a contrast to previous studies using health insurance morbidity data, we employ data that cover all geographical areas and major occupational groups and can therefore consider the effect of gender, 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 history of morbidity in Sweden and elsewhere. Section three outlines the policy measures of *Svenska folket*. Section four describes the data and section five the membership structure in relation to census. Section six presents frequency and duration of morbidity. Section seven presents cause-specific morbidity, and section seven concludes.

2.The measurement of morbidity: literature review

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) mortality. 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 faced several criticisms. The records themselves provide information about the experience of a select 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 subjective elements which meant that a person's sickness record could only be an imperfect measure of the incidence, duration and prevalence of sickness within society as a whole. Some of these problems remain also today with the use of official statistics on sickness leave. Nevertheless, despite these limitations, a growing number of historians have concluded that the data are sufficiently valuable to merit further investigation.

In addition to these general limitations, many of the available datasets also suffer from specific weaknesses. One obvious limitation is that the vast majority of friendly society members were male, and we therefore know relatively little about the sickness experience of past generations of women. We also know relatively little about the breakdown of sickness patterns in different types of area, occupation or the proximate causes of sickness claims. As Riley (1987: 564) himself acknowledged, 'the sources seldom mention diagnoses', although Harris *et al.* (2012) were able to provide a breakdown of cause-specific morbidity patterns in their analysis of the Hampshire Friendly Society.

As Andersson and Eriksson (2019: 1353) have explained, past generations of women were less likely to be in paid employment and were also less likely to belong to sickness insurance societies. However, whilst many countries discriminated against women both in relation to the labour market and provision of sickness insurance, a higher proportion of women were 'gainfully employed' in

Sweden and the proportion of women who belonged to sickness insurance societies was also greater (Molinder, 2022; Andersson and Eriksson, 2019). This helps to explain why Swedish historians have been at the forefront of efforts to use these records to investigate female morbidity.

Historians have used sickness insurance records to reconstruct the history of absenteeism in general alongside that of sickness-related absenteeism more specifically. Karlsson (2016) looked at the ways in which economists and other writers sought to explain differential patterns of general absenteeism during the First and Second World Wars. Andersson and Eriksson (2017; 2019) examined the different ways in which voluntary and compulsory organisations sought to regulate sickness claims and also compared the volume of claims in mixed societies with those which included men only. Castenbrandt (2018) scrutinised the aggregate returns compiled by all registered societies between 1892 and 1954, and Castenbrandt, Revuelta-Eugercios and Torén (2019) compared the sickness claims submitted by members of two different societies – one with a predominantly male membership and the other with a predominantly female membership – in Gothenburg between 1898 and 1950.

These investigations have generated a variety of conclusions. Karlsson (2016: 18) showed that earlier studies had generally reported higher rates of female absenteeism without – in his view – articulating a clear framework for understanding this. Castenbrandt and her coauthors found that women tended to report fewer cases of sickness-related absence, even though they received benefits for longer periods (Castenbrandt 2018: 228-9; Castenbrandt *et al.* 2019: 1280). Andersson and Eriksson (2019) found that male-only societies failed to report lower rates of sickness absence than societies which admitted both men and women. All of these studies tended to reinforce the view that institutional contexts had at least as much influence on reported sickness rates as 'objective' sickness experience.

Only one of these studies – the paper by Castenbrandt *et al.* (2019) – was based on an analysis of individual-level data. However, that study was based on a comparison of two different societies – one largely male and the other largely female – with different regulatory approaches and the fact

that both societies were located in the same city makes it difficult to draw conclusions about sickness rates in different types of spatial areas. Moreover, none of these studies was able to examine differences in the proximate causes associated with individual sickness claims. Our paper therefore represents the first attempt to use nationwide individual-level data to compare male and female sickness rates by cause in different types of area and occupation under the same set of rules. By examining variation in morbidity by a larger set of proximate factors, we also seek to advance our understanding of environmental impacts on health put forward in studies on economic standards, living conditions, and sanitary conditions (Lundh et al. 2004; Molitoris and Dribe, 2016) of residents in urban and non-urban areas, and the impact of working conditions on work absence (Andersson et al, 2023).

Svenska folket

The turn of the twentieth century marks the most successful part of industrialization and economic growth in Sweden and by 1900, living conditions varied largely between rural and urban areas. 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.[1] The first health insurance societies usually established before 1890 were small, local and often connected to a workplace and/or occupation. The members in these societies usually consisted of men exclusively and sometimes formally excluded women. De primary motive for exclusion was that women were perceived as higher risks. *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. The two first nation-wide health insurance

[1] 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)

societies were based on temperance and the social affinity that was experienced by teetotallers (Andersson et al. 2022). A reason for the establishment of temperance health insurance societies was to avoid the health risk caused by alcohol (Andersson et al. forthcoming). Svenska folket was the first and largest nationwide health insurance society without demands of total abstinence. The operation was run by a centralized administrative body that kept records of 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). 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).[2]

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 wageworkers occupied in the manufacturing industry. The vast majority of the female members were recorded as 'wives' and registered as performing 'domestic work' (*Svenska folket*, D 1:1a; D 1:1b).[3]

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 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,

[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] '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.

childbearing, and related sickness, the acceptance of females of 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 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] The maximum number of days to receive If 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 help them with their housework also before childbirth' (*Vårt*

[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.

liv, 1916:2). Hence, not only women in wage-work, but also housewives in unpaid domestic work had incentives to become members in 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 services 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 domestic work was at least as problematic as the man's inability to perform wage work, especially since housewives also often contribute 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 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 (N*ykterhetsfolkets sjukkassa* and *Nykterhetsvännernas sjukkassa*), that were based on temperance. 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 female members.

3.Morbidity data

To examine historical morbidity pattern among men and women, we make use of sickness claim records compiled by *Svenska folket* in early twentieth century. The sickness records provide information of sick claims by member and her occupation, 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). 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 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 of survival shows no significant difference in longevity between members and non-members (Andersson et al, 2023).

As gender differentials, along with living and working conditions impact of morbidity is of interest we have drawn a larger sample where we 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 in relation 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).

4.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 restricted in a second step to the parishes where lodgers of *Svenska folket* were present in our sample.

Table 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. When imposing the restriction of present parishes, a 2% difference is reported at most (compared with the age restricted sample).

[Table 1. The age structure of workforce in census and male and female members in Svenska folket.]

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.

[Table 2. Spatial structure of ledgers in Svenska folket and in population census, percent of members/individual in each spatial area]

Table 2 shows the spatial structure of Svenska folket and the census. According to the census, 13% of the employed male population 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 female share of all members varied by spatial areas, where most women relatively to men lived in the major urban

[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.

areas (46% of all members). In manufacturing areas, relatively few women were members (9% of all members). Relatively more women were members in rural areas (22% of all members), but less in the mixed areas (16% of all members). 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 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%).

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 'domestic work'. To capture how the occupation of workers may have affected morbidity incomes, 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 stepwise.

When imposing age-weights on the census, we find that most males in the population is occupied in secondary production (39%), followed by primary production (34%), tertiary production (16%) and other/NA (11%). Most women were recorded as performing 'domestic work'[i9], in this

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

paper coded as 'domestic service'[10] (75%), followed by tertiary production (16%), secondary production and primary production (2%).

[Table 3. Occupation among women and men in Svenska folket and 1910 population census by major hisco groups]

In a second step, when the census is weighted by the age and spatial distribution of members, we find that a larger share of men in the census is occupied in secondary production, but less in primary and tertiary production. For women, the spatial distribution of lodges in Svenska folket reflects a larger proportion of women performing work in the domestic sector in the census data. Compared with female members in Svenska folket, relatively less were registered as performing domestic work in the census (73% vs 79%). 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 service (10 vs 17) or primary (10 vs 19) production.

5.Morbidity patterns

To examine historical morbidity patterns there are two 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

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

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 table 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).

[Table 4. Morbidity in urban and rural areas aggregated

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 less significant duration than in rural areas (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. 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 table 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.[11] 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.

[Table 5. Variable definitions and summary statistics of female members and morbidity (sick leave, work-place accident, maternity leave), 1912-14]

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 table 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

[11] 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.

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.

Morbidity by age, organized into four intervals[12], 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 table 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 sick and number of sick days per members 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 table 4).

[Table 6. Summary statistics of male members and morbidity (sick leave, work-place accident) 1912-14]

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

[12] 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.

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 resident, sector of 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 table 7 coefficient estimates for female members are reported. For each set of outcomes and determinants, most of the variation shown in the descriptives (table 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. The number of sick days was significantly lower in urban and rural areas relative to mixed areas. Results from the independent models (1-3) differ only slightly from the full models (10-13). If anything, the significance level drops somewhat.

[Table 7. Coefficient estimate of area, sector and age on all-cause morbidity outcomes among female members]

Women occupied in secondary, tertiary production, and primary production, faced fewer sick cases relative to women occupied in domestic work. However, the length of sick leave was less clearly

different from domestic production except primary production where length was significant shorter. Results from the independent models (4-6) and the full models (10-13) were fairly similar.

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 table 8 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 table 6). Men in urban areas faced significant less, but longer sick cases than in other areas (reference). Men in rural areas faced significant more, but shorter sick cases. Men in manufacturing areas faced more, if significant, but shorter sick cases.

[Table 8. Coefficient estimate of area, sector and age on all-cause morbidity outcomes among male members]

Male occupied in the tertiary sector 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, the independent models suggest a weak negative relation relatively tertiary. However, the coefficient on length turns insignificant in the full model.

The coefficient estimates by age groups show that morbidity was significantly higher among the older members. Compared with the youngest members, 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.

6.Morbidity by causes

Table 9 shows the reported morbidity cause for each sick case by area, sector and age for women. Women in urban areas faced a relatively lower morbidity risk related to pregnancy, childbirth (ICD 15), and diseases of the respiratory system (ICD 10) than in all other areas. In turn, women in urban areas were relatively more exposed to infectious diseases (ICD 1) mental disorders (ICD 5), and diseases of the nervous system (ICD 6). Being more exposed to the latter, less frequent but longer episodes of sick leave, than the more frequent but shorter diseases in the respiratory system make up part of the urban and non-urban divide of morbidity. Women in the domestic sector was childbearing more frequently, contributing to major difference in the number of sickness cases in relation to women employed in the non-domestic sector. Pregnancy and childbirth make up a substantial difference between women in pre- and mid-family age.

[Table 9 Summary of ICD-10 classified morbidity causes by area, occupation and age among women]

Table 10 summarize the morbidity causes for male member by ICD-10 main chapters. 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. For male workers in urban areas and other areas, the external causes are much less present, and even less compared to than in manufacturing. We also observe that workers in the secondary sector experienced more external causes than in the tertiary sector. The external causes are the most frequent among younger workers, than among older ones. However, it seems that the older workers suffer from hard labour earlier in life given the large share of diseases of the musculoskeletal system.

[Table 10 Summary of ICD-10 classified morbidity causes by area, occupation and age among men]

In addition, we find that the male workers in urban areas were more exposed to infectious, and diseases of the digestive system, metabolic disorders, mental disorders and diseases of the nervous system; all with an above average sickness duration. In relation to women living in urban areas, we

find a similarity in that infectious diseases, diseases of the blood, mental disorders and diseases of the nervous system where more common than in all non-urban areas.

7.Conclusions

The paper demonstrates that women experienced fewer sickness episodes than men, even though the duration of these episodes was often longer. It also shows that both men and women reported fewer, but longer, sickness episodes in urban areas. Male workers occupied in the productivity leading manufacturing industry, the backbone of the industrialization process, faced a major risk of work-place accidents especially at younger ages. Women faced a major risk due to pregnancy, childbearing and related sickness, which resulted in higher morbidity rates among women between 28 and 40, than women between 41 and 52 years of age. We find that men and women in urban area faced less, but longer sickness episodes, related to the underlying differences in morbidity causes by place of residence

8.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.

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.

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.

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)

Tables

Table 1. Age structure of workforce in census and male and female members in Svenska folket.

Age intervall	Women			Men		
	Census*	Census**	Members	Census*	Census**	Members
15-20	18	18	7	18	20	9
21-24	12	11	9	12	12	11
25-29	14	12	15	14	13	19
30-34	12	11	17	13	12	18
35-39	10	10	15	11	10	15
40-44	9	9	12	8	8	11
45-49	9	9	16	8	9	11
50-54	8	9	8	7	8	5
55-59	7	7	1	6	7	1
60+	2	3	0	2	3	0
Total	100	100	100	100	100	100

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 all parishes nation-wide. ** Census including only parishes with lodges of *Svenska folket* present.

Table 2. Spatial structure of ledgers in Svenska folket and in population census, percent of members/individual in each spatial area.

Spatial area*	Svenska folket				Census****
	All members	Female share	Female sample**	Male sample***	
Major urban area[3]	5.9	46.3	15.9	15.6	13.0
Manufacturing area[1]	35.3	9.0	18.5	62.7	27.0
Rural area[2]	28.4	22.2	36.7	4.4	34.0
Mixed areas[4]	30.4	16.3	28.9	17.3	26.0
Total	100.0	17.2	100.0	100.0	100.0

Source; See table 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.

Table 3. Occupation among women and men in Svenska folket and 1910 population census by major hisco groups

Sector	Code	Occupation (Hisco)	Female					Male				
			Svenska folket	Census ****	Census ***	Census**	Census*	Svenska folket	Census ****	Census ***	Census**	Census*
Tertiary	1	Professional, technical and related workers	1	2	2	3	2	1	3	2	4	3
	2	Administrative and managerial workers	3	0	0	0	0	2	3	3	3	2
	3	Clerical and related workers	2	1	1	2	1	3	4	2	4	3
	4	Sales workers	2	1	1	3	2	2	4	3	5	4
	5	Service workers	6	9	9	13	11	2	3	3	4	4
Primary	6	Agricultural, animal husbandry and forestry workers, fishermen and hunters	2	2	2	2	2	10	19	34	23	34
Secondary	7	Production and related workers, transport equipment operators and laborers	11	6	6	9	7	80	56	43	47	39
Domestic	10	Housewife/domestic work or NA	73	79	79	69	75	0	8	9	9	11
	1_10	Total	100	100	100	100	100	100	100	100	100	100

Source; See table 1.

Note: * Census weighted by age of members in Svenska folket; **Census weighted by age including parishes with spatial representation of members in Svenska folket; *** Census weighted by age and spatial structure of members in Svenska folket; **** Census weighted by age and sample of lodges in Svenska folket. Please note that the latter step only affects the sample of male members that include the 40 largest local sections. Women in all sections are included which make Census**** = Census***.

Table 4. Morbidity in urban and rural areas aggregated

		Sick case per 100 member		Sick days per member		Sick duration by case	
AREA	Statistics	Men	Women	Men	Women	Men	Women
Urban	p5	15.0	11.1	3.3	3.4	17.5	22.8
Rural	p5	24.2	10.8	5.4	3.6	17.6	21.3
Total	p5	16.2	11.1	4.0	3.5	17.6	22.8
Urban	p25	20.4	15.0	4.7	4.5	19.7	26.9
Rural	p25	29.6	16.5	6.8	5.0	19.0	25.9
Total	p25	24.2	15.5	5.6	4.6	19.3	26.3
Urban	p50	26.0	18.0	5.9	5.4	22.1	29.2
Rural	p50	37.5	22.2	7.8	6.3	21.5	28.2
Total	p50	31.3	19.0	6.7	5.7	21.8	28.6
Urban	Mean	27.2	18.8	5.9	5.5	22.4	30.1
Rural	Mean	37.5	22.6	7.9	6.3	21.7	28.3
Total	Mean	32.1	20.6	6.9	5.9	22.1	29.3
Urban	p75	31.9	21.8	6.7	6.2	25.1	32.4
Rural	p75	44.0	27.5	8.8	7.4	23.4	31.3
Total	p75	39.1	23.9	8.1	7.0	24.0	31.9
Urban	p95	44.1	28.6	8.8	8.3	28.0	40.8
Rural	p95	54.7	35.2	11.5	9.5	30.0	35.0
Total	p95	51.9	34.8	9.9	9.2	28.5	37.5

Source; Socialstyrelsen, 1915; Socialstyrelsen, 1920.

Table 5. Variable definitions and summary statistics of female members and morbidity (sick leave, work-place accident, maternity leave), 1912-14.

			Sick case per 100 member		Sick days per member		Sick length by case	
	Variables	Description	Mean	St,dev,	Mean	St,dev,	Mean	
Area	Major urban area	Parish in one of the three major urbarn areas*	29.0	45.4	9.4	20.6	33.5	27.9
	Manufacturing area	Parish with >=50% male employment in manufacturing	49.4	50.0	13.3	22.0	28.0	26.9
	Other areas	Parish not in manufacturing, rural, major urban areas	49.5	50.0	14.1	23.5	29.6	26.6
	Rural area	Parish with >=50% male employment in agriculture	50.2	50.0	12.0	20.1	25.1	23.4
			46.6	49.9	12.4	21.6	27.9	25.7
Sector	Domestic	Unpaid domestric work	49.8	50.0	13.2	21.7	27.7	25.4
	Primary	Paid work in primary sector	38.6	48.9	6.8	14.3	19.0	18.1
	Secondary	Paid work in secondary sector	40.9	49.2	11.9	23.5	30.3	29.2
	Tertiary	Paid work in tertiary sector	36.3	48.1	9.9	20.1	28.2	25.0
			46.6	49.9	12.4	21.6	27.9	25.7
Age	Pre-family age	Age interval 16-27	43.2	49.5	11.0	20.1	26.3	23.5
	Mid-family age	Age interval 28-41	49.9	50.0	13.5	22.2	28.2	25.2
	Post-family age	Age intervall 42-53	43.8	49.6	11.7	21.6	28.3	27.6
	Old age	Age intervall 54+	50.8	50.1	14.0	23.6	28.7	26.8
	Total		46.6	49.9	12.4	21.6	27.9	25.7

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

Table 6. Summary statistics of male members and morbidity (sick leave, work-place accident) 1912-14.

	Variables	Description	Sick case per member 100 member		Sick days per member		Sick length by case	
			Mean	St.dev.	Mean	St.dev.	Mean	St.dev.
Area	Major urban area	Parish in one of the three major urban areas*	42.7	49.5	10.8	21.5	27.1	27.4
	Manufacturing area	Parish with >=50% male employment in manufacturing	55.3	49.7	10.2	18.0	20.2	22.9
	Other areas	Parish not in manufacturing. rural. major urban areas	52.8	49.9	10.7	19.8	22.6	24.2
	Rural area	Parish with >=50% male employment in agriculture	60.6	48.9	8.2	13.1	16.2	15.1
		Total	53.2	49.9	10.3	18.7	21.2	23.5
Sector	Primary	Paid work in primary sector	54.1	49.9	8.8	16.9	18.8	21.3
	Secondary	Paid work in secondary sector	55.7	49.7	10.9	19.1	21.4	23.6
	Tertiary	Paid work in tertiary sector	34.0	47.4	7.1	17.1	23.3	25.6
		Total	53.2	49.9	10.3	18.7	21.2	23.5
Age	Pre-family age	Age interval 16-27	42.9	49.5	7.5	16.4	19.4	21.8
	Mid-family age	Age interval 28-41	53.9	49.9	9.9	17.6	20.2	22.0
	Post-family age	Age intervall 42-53	61.4	48.7	13.2	21.7	23.5	26.7
	Old age	Age intervall 54-	65.3	47.7	16.1	23.2	26.5	25.3
		Total	53.2	49.9	10.3	18.7	21.2	23.5

Source; See table 5.

Table 7. Coefficient estimate of area, sector and age on all-cause morbidity outcomes among female members.

		1	2	3	4	5	6	7	8	9	10	11	12
	Variables	Sick cases per member	Sick days per member	Sick length by case	Sick cases per member	Sick days per member	Sick length by case	Sick cases per member	Sick days per member	Sick length by case	Sick cases per member	Sick days per member	Sick length by case
Area	Major urban area	-0.204***	-4.727***	3.908**							-0.175***	-4.120***	3.262*
		(-0.0182)	(-0.796)	(-1.618)							(0.0190)	(0.833)	(1.673)
	Manufacturing area	-0.000111	-0.839	-1.604							0.00346	-0.858	-1.914
		(-0.0172)	(-0.754)	(-1.27)							(0.0172)	(0.755)	(1.274)
	Rural area	0.00792	-2.138***	-4.439***							0.00774	-2.145***	-4.546***
		(-0.0144)	(-0.63)	(-1.057)							(0.0144)	(0.630)	(1.058)
	Other areas	*REF*	*REF*	*REF*							*REF*	*REF*	*REF*
Sector	Domestic				*REF*	*REF*	*REF*				*REF*	*REF*	*REF*
	Primary				-0.0821**	-5.779***	-8.930***				-0.102**	-6.195***	-8.121**
					(0.0409)	(1.780)	(3.288)				(0.0406)	(1.782)	(3.302)
	Secondary				-0.110***	-1.951**	2.670*				-0.0688***	-1.270	1.933
					(0.0187)	(0.814)	(1.526)				(0.0197)	(0.866)	(1.634)
	Tertiary				-0.141***	-3.283***	0.976				-0.104***	-2.828***	0.440
					(0.0168)	(0.730)	(1.411)				(0.0178)	(0.780)	(1.485)
Age	Pre-family age							*REF*	*REF*	*REF*	*REF*	*REF*	*REF*
	Mid-family age							0.0670***	2.494***	1.877	0.0507***	2.054***	2.032*
								(0.0154)	(0.668)	(1.179)	(0.0153)	(0.670)	(1.191)
	Post-family age							0.00631	0.752	1.927	-0.0154	0.170	2.204*
								(0.0163)	(0.708)	(1.277)	(0.0163)	(0.715)	(1.300)
	Old age							0.0763**	3.041**	2.384	0.0509*	2.199	2.037
								(0.0308)	(1.337)	(2.260)	(0.0306)	(1.340)	(2.275)
	Constant	0.495***	14.09***	29.58***	0.500***	13.23***	27.68***	0.432***	10.98***	26.35***	0.470***	12.74***	27.49***
		(-0.0108)	(-0.471)	(-0.793)	(0.00685)	(0.298)	(0.500)	(-0.0125)	(-0.542)	(-0.98)	(0.0180)	(0.788)	(1.389)
	Year-dummies	-	-	-	-	-	-	-	-	-	Yes	Yes	Yes
	Class-dummies	-	-	-	-	-	-	-	-	-	Yes	Yes	Yes
	Observations	7.235	7.235	3.368	7.235	7.235	3.368	7.235	7.235	3.368	7.235	7.235	3.368
	R-squared	0.023	0.005	0.011	0.013	0.004	0.003	0.004	0.002	0.001	0.033	0.011	0.014

Source; Table 1 & 5.

Table 8. Coefficient estimate of area, sector and age on all-cause morbidity outcomes among male members.

		1	2	3	4	5	6	7	8	9	10	11	12
	Variables	Sick cases per member	Sick days per member	Sick duration by case	Sick cases per member	Sick days per member	Sick duration by case	Sick cases per member	Sick days per member	Sick duration by case	Sick cases per member	Sick days per member	Sick duration by case
Area	Major urban area	-0.101***	0.0563	4.547***							-0.0863***	0.248	3.870***
		(0.0187)	(0.705)	(1.284)							(0.0186)	(0.707)	(1.321)
	Manufacturing area	0.0247*	-0.516	-2.434***							0.00634	-1.012*	-2.677***
		(0.0145)	(0.546)	(0.932)							(0.0144)	(0.546)	(0.936)
	Rural area	0.0778***	-2.462**	-6.400***							0.0990***	-1.835*	-6.697***
		(0.0267)	(1.006)	(1.638)							(0.0281)	(1.066)	(1.803)
	Other areas	*REF*	*REF*	*REF*							*REF*	*REF*	*REF*
Sector	Primary				0.201***	1.766**	-4.524***				0.140***	2.259**	-0.694
					(0.0230)	(0.868)	(1.689)				(0.0245)	(0.931)	(1.818)
	Secondary				0.217***	3.829***	-1.926				0.206***	4.235***	-0.177
					(0.0174)	(0.657)	(1.382)				(0.0175)	(0.665)	(1.423)
	Tertiary				*REF*	*REF*	*REF*				*REF*	*REF*	*REF*
Age	Pre-family age							*REF*	*REF*	*REF*	*REF*	*REF*	*REF*
	Mid-family age							0.111***	2.395***	0.828	0.113***	2.404***	0.863
								(0.0130)	(0.490)	(0.908)	(0.0129)	(0.490)	(0.904)
	Post-family age							0.185***	5.697***	4.121***	0.189***	5.830***	4.167***
								(0.0154)	(0.579)	(1.019)	(0.0152)	(0.578)	(1.019)
	Old age							0.224***	8.594***	7.075***	0.228***	9.077***	7.665***
								(0.0279)	(1.047)	(1.692)	(0.0279)	(1.059)	(1.715)
	Constant	0.528***	10.70***	22.59***	0.340***	7.077***	22.44***	0.429***	7.496***	17.56***	0.280***	5.495***	22.55***
		(0.0127)	(0.480)	(1.172)	(0.0163)	(0.616)	(1.886)	(0.0104)	(0.392)	(1.073)	(0.0255)	(0.967)	(2.750)
	Year-dummies	-	-	-	-	-	-	-	-	-	Yes	Yes	Yes
	Class-dummies	-	-	-	-	-	-	-	-	-	Yes	Yes	Yes
	Observations (sum over all years)*	8.497	8.497	4.517	8.497	8.497	4.517	8.497	8.497	4.517	8.497	8.497	4.517
	R-squared	0.009	0.001	0.011	0.018	0.005	0.001	0.020	0.016	0.006	0.046	0.023	0.020

Source; See table 1 & 5.

Table 9 Summary of ICD-10 classified morbidity causes by area, occupation and age among women

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
0	Unclassified	0.0	0.8	0.7	0.5	0.6	0.0	0.6	0.3	0.7	0.4	0.8	0.0	0.6
1	Certain infectious &parasitic diseases	8.5	7.8	8.0	5.8	6.5	10.7	9.9	8.6	9.8	7.4	4.9	6.9	7.1
2	Neoplasms	1.2	0.8	0.4	0.2	0.4	0.0	0.3	1.0	0.0	0.1	1.2	1.3	0.5
3	Diseases of the blood &blood-forming	7.9	5.0	4.9	4.0	4.2	8.9	8.2	5.7	5.2	6.1	2.9	2.5	4.8
4	Endocrine nutritional &metabolic	0.0	0.9	0.9	1.4	0.9	0.0	2.9	0.5	2.3	0.8	0.6	0.0	1.0
5	Mental &behavioural disorders	3.0	0.9	2.1	1.5	1.5	3.6	0.3	4.2	0.1	1.9	2.5	1.9	1.7
6	Diseases of the nervous system	5.5	3.6	2.6	1.7	2.5	1.8	3.5	3.6	1.9	2.0	4.4	3.8	2.7
7	Diseases of the eye &adnexa	2.7	1.2	0.8	1.5	1.2	0.0	2.3	1.6	0.7	1.4	1.8	0.6	1.3
8	Diseases of the ear &mastoid process	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
9	Diseases of the circulatory system	5.8	2.6	3.7	2.9	3.5	1.8	2.0	3.6	1.7	3.1	4.5	5.7	3.4
10	Diseases of the respiratory system	15.2	24.1	21.7	24.2	22.7	17.9	21.9	22.4	20.0	21.9	24.4	27.7	22.5
11	Diseases of the digestive system	12.2	14.3	11.5	12.1	12.3	14.3	11.1	13.3	13.7	10.9	14.7	6.3	12.4
12	Diseases of the skin &subcutaneous tissue	6.1	3.5	3.7	4.0	3.8	5.4	5.8	3.4	5.2	4.0	2.7	6.3	4.0
13	Diseases of the musculoskeletal system	9.1	10.7	11.0	10.3	10.7	12.5	8.7	10.2	7.9	7.6	15.1	20.8	10.5
14	Diseases of the genitourinary system	3.0	3.6	3.2	2.8	2.9	0.0	3.5	4.4	4.7	2.3	3.4	1.9	3.1
15	Pregnancy childbirth &t puerperium	10.7	12.3	17.8	17.7	18.5	12.5	7.9	6.8	17.2	24.1	4.8	1.9	16.0
18	Symptoms signs & abnormal clinical findings	2.7	0.9	2.5	3.6	2.5	1.8	4.1	2.3	3.5	1.5	3.7	3.8	2.6
19	Injury poisoning &certain other consequences	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.6	0.0
20	External causes of morbidity &mortality	5.8	7.1	4.7	5.8	5.1	8.9	7.0	7.8	5.2	4.6	7.4	8.2	5.7
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source; Table 5

Table 10 Summary of ICD-10 classified morbidity causes by area, occupation and age among men

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
0	Unclassified	0.4	0.5	1.0	0.7	0.8	0.5	0.6	0.4	0.7	0.5	0.4	0.6
1	Certain infectious &parasitic diseases	8.0	4.2	5.1	4.8	4.2	4.8	6.4	5.7	5.0	4.6	1.3	4.8
2	Neoplasms	0.4	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.4	0.1
3	Diseases of the blood &blood-forming	1.6	1.4	0.5	0.7	1.0	1.2	2.6	1.1	1.3	1.4	0.4	1.2
4	Endocrine nutritional &metabolic	0.9	0.5	0.0	0.0	0.0	0.4	1.3	0.6	0.2	0.5	0.9	0.4
5	Mental &behavioural disorders	1.8	0.5	0.6	0.4	0.2	0.8	0.0	0.7	0.5	0.9	0.9	0.6
6	Diseases of the nervous system	3.7	2.7	3.6	1.5	2.2	2.7	6.4	0.4	3.3	3.8	5.6	2.9
7	Diseases of the eye &adnexa	1.2	1.4	1.0	1.1	1.0	1.4	0.3	1.5	1.3	1.2	0.4	1.3
8	Diseases of the ear &mastoid process	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.1
9	Diseases of the circulatory system	3.9	1.4	1.5	0.7	1.2	1.7	2.9	1.1	1.5	2.1	4.3	1.7
10	Diseases of the respiratory system	17.4	19.3	17.0	30.1	20.8	18.5	25.9	19.4	18.3	20.7	21.2	19.3
11	Diseases of the digestive system	10.3	7.6	7.6	7.4	7.3	8.0	8.6	7.0	8.8	7.8	5.2	7.9
12	Diseases of the skin &subcutaneous tissue	6.2	6.2	4.9	11.0	11.3	5.5	7.0	7.9	6.6	5.2	1.7	6.2
13	Diseases of the musculoskeletal system &connec	14.2	15.2	14.5	18.8	17.5	15.0	13.4	11.5	14.2	18.4	23.8	15.2
14	Diseases of the genitourinary system	2.5	0.7	1.0	0.0	0.0	0.9	3.2	0.4	0.7	1.4	2.6	0.9
18	Symptoms signs &abnormal clinical &laborat	2.0	1.5	2.5	2.9	2.0	1.8	1.3	2.4	1.7	1.6	1.7	1.8
20	External causes of morbidity &mortality	25.6	36.8	39.3	19.9	30.4	36.7	20.1	39.5	36.0	29.9	29.0	34.8
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source; Table 5

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