LONG-TERM TRENDS IN MARITAL STATUS MORTALITY DIFFERENCES IN THE NETHERLANDS 1850–1970

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Summary. This article describes the long-term trends in marital status mortality differences in the Netherlands using a unique dataset relating to the period 1850–1970. Poisson regression analysis was applied to calculate relative mortality risks by marital status. For two periods, cause-of-death by marital status could be used. Clear differences in mortality by marital status were observed, with strongly increasing advantages for married men and women and a relative increase in the mortality of widowed compared with non-married people. Excess mortality among single and formerly married men and women was visible in many cause-of-death categories, and this became more widespread during the last decades of the nineteenth century. Hypotheses are formulated that might explain why married men and women underwent a stronger decrease in mortality up until the end of World War II.

Introduction

'A remarkable series of observations, extending over the whole of France, enables us to determine for the first time the effect of conjugal condition on the life of a large population.' So reads the introduction by the English physician and statistician William Farr (1807–1883) to the first nationwide study on the relationship between marital status and health (Farr, 1858). Less than a decade after Farr's publication, life tables by marital status relating to the period 1850–1859 were published for the Netherlands, for all provinces separately and for the most important towns (Von Baumhauer, 1867). The Netherlands was not only one of the first countries to publish these data (Bertillon, 1877, p. 43), it is the only country that has continued to collect and publish data on mortality by marital status ever since.

Particularly in the last few decades, numerous studies in many countries have looked at mortality differences between marital status groups. Studies on long-term trends in mortality differences between marital status groups have been very scarce,

however, and do not allow satisfactory examination of the changing patterns of mortality among the married, single, widowed and divorced. Usually, the available studies relate to short periods and do not distinguish between the various groups of non-married males and females (Livi-Bacci, 1985; Kisker & Goldman, 1987; Murphy, 1992). Dutch data, on the other hand, do make it possible to examine time trends in marital status mortality differences for a period stretching from 1850 to the end of the twentieth century.

The changes in the size of the mortality differences between the various groups and the changing rank order of the marital status groups might give clues about the specific group characteristics to which mortality differences can be attributed. During a large part of the nineteenth century, the absence of state intervention made men and women much more dependent on family members to produce the goods and services essential for survival. As the economic role of the family became less important over time, the adverse effects of being non-married must have diminished and may have led to relatively lower mortality risks.

For historians of marriage and the family, long-term trends in marital status mortality differences might be interesting as well as they point to shifts in the social, cultural and economic position of the various marital status categories. An essential characteristic of nineteenth century Western society was the high proportion of men and women who never married, and the high number of widows and widowers, who had sole responsibility for their children. By comparing the mortality of single, widowed, married and divorced men and women, it might become clear what effect differences in income, housing, social support, etc. had on the social, cultural and economic position of the various marital status categories.

The main objective of this paper is to describe the time trends in total marital status mortality and to relate these to the changes in the position of the various marital status groups. For that purpose information is also used on mortality by cause of death and marital status collected at the end of the nineteenth and the beginning of the twentieth centuries. These unique data (Bertillon, 1877, p. 50) present an excellent opportunity to add to the knowledge of the historical causes of the health differences between single, married, divorced and widowed men and women. Although, in principle, this study could also have been extended to include the period 1970–1995 (Joung, 1996), is was restricted to the period 1850–1970 since after then, in a growing number of cases, legal marital status misrepresents the real domestic situation as a consequence of increased cohabitation.

Explaining mortality differences by marital status

In contemporary epidemiological research the association between marital status and mortality is explained by three mechanisms (Joung, 1996, pp. 3–12): the association might be a statistical artefact due to chance or systematic defects in the data, it might be caused by marital selection, or it might be explained by social causation. For the second half of the nineteenth and the first few decades of the twentieth centuries, all these factors might have played a role (van Reesema, 1882).

Statistical artefacts

Misreporting of marital status on death certificates and differential undercounting of the population by marital status may distort mortality differences between marital status groups. Especially when population data on marital status are based on census outcomes derived from self-reporting, while mortality data are derived from death certificates, numerator/denominator bias might cause a spurious correlation between marital status and mortality. Mortality statistics are accepted by Dutch historians as being complete and trustworthy from 1840 on. Death registration was introduced in the Netherlands in 1811, and from 1842 onwards annual information on the numbers of deaths by sex and age became available. Information on the marital status of the deceased was published from 1850 on. Even when death registration first started, the number of deaths of persons whose age or marital status was unknown was very small, though misreporting of marital status on death certificates did take place. Data from a sample survey for the Dutch city of The Hague for the period 1850–1930 showed that the actual marital status at the time of death of married and widowed men was stated correctly in 99·3% of cases, whereas for divorced men the correct marital status at the time of death was given in 84·8% of cases. For women, the respective percentages were 99·6% and 92·7% (van Poppel, 1998). Such a pattern of misreporting of marital status on death certificates might have caused an underestimation of the death rate of the divorced. There might also have been a differential undercounting of the population by marital status. According to the nineteenth century Dutch statistician Sandberg (1867) many divorced persons had reported themselves as never-married in the censuses of 1849 and 1859. Such a bias would have led to an underestimation of the death rates of the married and the single and to an overestimation of the death rates of the divorced and widowed.

For more recent periods data for the divorced are considered to be more reliable, due to the use of the personal card as the basis for death and population registration and as a consequence of increased tolerance of divorce. Biases in the estimation of both the numerator and the denominator of death rates have therefore decreased over time. In conclusion, although data errors might explain some of the mortality differences, they are insufficient to account for the observed association between marital status and mortality.

Marital selection

According to the marital-selection theory the better health of married persons is the result of the selection of 'healthy' persons into, and 'unhealthy' persons out of, marriage. In the case of direct selection health itself would be the selection criterion; in the case of indirect selection determinants of health (factors associated with health, such as alcohol consumption) would be the selection criteria. The process of marital selection could occur with regard to first marriages as well as other marital transitions (divorce, bereavement, remarriage): 'unhealthy' persons might be less attractive marriage partners, the illness of one of the partners could contribute to divorce – nineteenth century social commentators suggested insanity should be a ground for divorce – and the healthiest of the divorced and the widowed might be more likely to find a partner and remarry, leaving a higher percentage of unhealthy persons in the

group of divorced or widowed remaining. Nineteenth century observers assumed that selection processes operated and influenced marriage opportunities. Lubach, a physician, argued that the never-married were to be found only among those 'who for very special reasons (physical handicaps, mental sufferings, infamy) or for religious reasons had to abstain from marriage,' (Lubach, 1872, pp. 542–544, 559), and others argued that 'those with the least vitality, hardly able to provide for themselves, are almost all obliged to spend their life unmarried,' (Turksma, 1898, pp. 9–12). Empirical indications for direct marital selection on the basis of health are scarce. A local Dutch study based on conscription registers for the period 1818–1861 showed that among men categorized on the basis of a physical examination as 'hunchbacked', 'crippled', 'too small', or with 'dilated backbone', marriages were less frequent and took place at higher ages (van Poppel, 1999).

More evidence is available on indirect selection on the basis of health. Research has shown that in the nineteenth century marriage was more frequent among men in jobs renowned for their job security and their more advanced social and labour conditions (the civil service, public transport) than among men in low-paid industrial sectors or the unemployed. The same factors that increased one's marriage prospects were also positively related to survival (Frinking & van Poppel, 1979, pp. 75–89, 139–160; van Solinge & van Poppel, 1995).

During the period 1850–1970 an ever-increasing proportion of the population was able to contract a marriage and to do so at lower ages. The proportion of men and women living in a state of widowhood decreased; the proportion living as divorcés or divorcées increased. Remarriage among the divorced or widowed decreased. Socio-economic differences in marriage frequency generally decreased, thereby lowering the effect of indirect selection. Yet inferences regarding selection processes based on these demographic patterns are very problematic as selection mechanisms can result in strongly contrasting mortality patterns (Goldman, 1993).

Social causation

According to the social-causation theory, marital status might affect the aetiology of health problems, as well as the course and outcome of the disease. The effect of marital status on health is generally assumed to be intermediated by psychosocial factors (e.g. stress and social relationships) and material circumstances (e.g. financial situation, housing conditions). Psychosocial factors might have a direct effect on health or might affect health through changes in health behaviours (e.g. increases in psychosocial stress might increase alcohol consumption). Material circumstances might have a direct effect on health, adversely affect psychosocial factors (material deprivation increases psychosocial stress) or affect health through changes in health behaviours (material deprivation might necessitate the purchase of cheaper, unhealthy food products).

Detailed historical information on the psychosocial and material situation of single, married, widowed and divorced people in the Netherlands is not available. This makes it difficult to identify the changes in the factors directly or indirectly affecting the mortality of these groups. Nonetheless, an attempt has been made to sketch the psychosocial factors and material circumstances characterizing the different

marital status groups and the changes that occurred in these psychosocial and material factors in the period 1850–1970 (van Poppel, 1992).

Psychosocial stress is causally related to illness and mortality and varies between marital status groups. Bereavement and divorce are stressful life events in themselves and the many concurrent changes in the lives of the bereaved or divorced, such as lowered income, change in parental responsibilities, being forced to move to other housing, or the loss of familiar activities and habit systems, also contribute greatly to the total amount of stress experienced.

Negative societal attitudes towards marital status can also be a source of stress. Nineteenth century medical professionals considered it essential for the physical and mental well-being of men that they were able to satisfy their sexual instincts. Marriage was considered to be the appropriate place for this. Marriage and motherhood were regarded as the norm for women too. Although some women chose never to marry (Watkins, 1984), the spinster was usually the despised, pitied and avoided woman. In a society that put an emphasis on sexual restraint and chastity, divorced people were associated with adultery, infidelity and disagreeable behaviour. In particular the attitude of the Church towards divorcées was rigorous and punitive. Widows on the other hand were treated with sympathy and respect since they had been unwillingly confronted with the end of a successful marital relationship. Societal stigmatizing of the never-married and, particularly, the divorced was thus general during the greater part of the period under study.

Another relevant psychosocial factor is social support. The availability and quality of social support differs by marital status, both with regard to instrumental support – assistance in housekeeping, childcare and care during illness – and emotional support. Whereas married and widowed women had legal and moral claims to the resources of their husband and his family, and mothers could expect to be supported by their children, spinsters could look only to other relatives. The situation of divorced women was even worse as conflicts, which were usually the cause of the divorce, made contact with children and the family of the former spouse difficult. Housing conditions also played a role. Single women who had been supported by relatives or had been housekeeping for them faced increasing problems as their kin began to die, and for them, as well as for many older widows and divorced women, institutionalization was the only alternative.

In the period studied here, there was a decrease in the degree of psychosocial stress experienced by divorced men and women, although this change was relatively small before World War II. Opting for divorce rather than continuing an unsatisfactory relationship became easier over time: legal changes took place with respect to the division of goods, to the right to alimony and the question of child custody. This made divorce a more tempting alternative, especially for women with children. Simultaneously, the social stigma attached to divorce lessened. Attitudes towards the never-married and the attitude of the never-married towards themselves also changed, but the direction of this change was not unequivocal. On the one hand an increase in self-confidence and a growing awareness of the advantages of spinsterhood would be expected due to policy changes that ended the legal discrimination against unmarried people. On the other hand, until very recently, marriage was more and more viewed as the necessary condition for human happiness, security, safety,

sexuality, reproduction and status. Only after the 1960s can a change in attitudes towards spinsterhood on the part of society, characterized by a decline in the idealization of marriage, be discerned.

Differences in the material position of the various marital status groups constitute another intermediary of the relationship between marital status and health. It is important to note that in the nineteenth and early twentieth centuries short-term economic fluctuations were very frequent and state intervention almost absent. People were therefore much more dependent on other adult members of the household for a decent standard of living and protection of their health. As both husband and wife played key roles, the loss of one of them had a greater potential for adversely affecting the material and health situation of the surviving partner. The loss of a husband could result in serious economic problems as most families were strongly dependent on the male head to provide the family income, and that made the risk of having to move to other, poorer housing or of having to cut consumption to a level detrimental to health greater than today. Yet the precise economic consequences of remaining single, or living as a widow or divorcée, were strongly dependent on social class, as this determined whether or not one could find alternatives for the economic support now forfeited. Single men were over-represented in low-paid, unstable jobs, whereas single women were disproportionately represented among better-educated women working in higher-status jobs. Differences in socioeconomic position between formerly and currently married men were relatively small. Compared with married women, many spinsters, widows and divorcées had an occupation, often in low-paid, home-based employment such as washing and sewing, which enabled them to combine work with childcare and domestic duties. All three groups encountered problems in maintaining themselves, as female wages were generally insufficient to support an independent existence. In general, widows had access to more sources of financial assistance than single women, and in particular divorced women. Whereas divorced women seldom had a legal entitlement to their former husband's business or trade, and provisions for alimony were made only in a limited number of cases, widows had access to other – albeit modest – financial resources, such as pensions provided by life insurance companies, state-sponsored widows' schemes, or the wages of their children. Widows, particularly those with children, were considered poor and helpless, and thus eligible for assistance from institutions, and for many elderly widows and widowers the poor relief system provided free institutional care. Divorced women on the other hand were not seldom denied assistance from church-based charitable institutions.

After 1910, the economic situation gradually improved, particularly for the non-married. The gradual extension of the system of widows' pensions to an ever-increasing group of widows and the changes in the system of inheritance law culminated in 1965 in the realization of the National Assistance Act, which provided a guaranteed minimum income to everyone who was either temporarily or permanently unable to earn an income. As a result of this act widows and divorced women no longer had to depend on charity; they had guaranteed minimum incomes. Discrimination against non-married people as regards housing, tax and social security gradually decreased from the 1950s on. The building of smaller apartments for single people and for non-family households and changes in the housing allocation policy

improved the housing situation of those who had never married or who were no longer married. Increased educational levels and the growth in labour force participation among women also contributed to the improvement in the position of divorced, widowed and single women.

Data

The two main data sources used in this study are the mortality statistics and the population censuses of the Dutch Central Bureau of Statistics. In addition, for two periods information was available on the number of deaths by age, sex, marital status and underlying cause of death, published by the Department of Home Affairs and the Central Bureau of Statistics.

The mortality data consisted of information about the marital status, age and sex of all deceased persons in the Netherlands in the period 1850–1969. Information about the population by age, sex and marital status for the period before 1948 was available only for census years. Population censuses usually took place at 10-year intervals. The 1859 census was the first to distinguish within the formerly married between widowed and divorced men and women. In 1849 the divorced had been included with the never-married (Vereeniging voor de statistiek in Nederland, 1873, p. 35). Between 1930 and 1947 no census was held. To estimate the age–sex and marital status distribution around 1940, it was assumed that the distribution for 1940 was the same as that in 1930. This seems plausible as it was only in the second half of the 1940s that real changes took place in the age at marriage, divorce rates, proportions remarrying and migration rates. The proportions never-married, married, divorced and widowed for each sex as observed in each age group in 1930 were applied to the population by age and sex for 1940. From 1948 on, data on the population by age, sex and marital status on 1st January were available on an annual basis.

The analysis is restricted to the Dutch population of 25 years and older (for cause-of-death data age 20 was the lower limit). As the numbers of deaths in certain categories and periods were very small, random fluctuations in age-specific and marital-status-specific mortality might be expected. To reduce these and to facilitate the identification of trends, age at death was re-coded into 10-year categories, starting with ages 25–34 and ending with ages 85 and over. For the same reasons, the data were aggregated into 10-year periods for every ten consecutive years from 1850 to 1969.

For two periods, 1869–1872 and 1901–1904, information was available on cause of death by marital status, age and sex. Cause-of-death information on a national scale had become available in the Netherlands in 1866 as a consequence of new medical legislation. When one of their patients died, doctors were required to submit to the registrar a medical certificate, in which they were to state as accurately as possible the cause of death. Between 1869 and 1899, 94–95% of all deaths in the Netherlands were reported by doctors, and both 'cause of death unknown' and 'death without medical treatment' declined in importance (van Poppel & van Dijk, 1997).

During 1869–1872, 55 causes of death and some nineteen supplementary causes were distinguished. Shortly after 1900 the cause-of-death nomenclature was revised to

meet internationally developed standards. For the period 1901–1904, causes of death were classified according to the first edition of the International List of Causes of Death (Bertillon, 1900). This classification distinguished 181 causes of death and in all respects was more reliable and accurate than the 1869–1872 data.

Methods

In order to describe the trends in mortality differences by marital status Poisson regression was used (Kleinbaum, Kupper & Muller, 1988). Poisson regression models are particularly suited for data that are simple counts of events, such as the number of deaths by age, marital status or sex in a given period. The parameter estimates of the Poisson regression can be used for comparing rates between groups by calculating incidence-rate ratios. Separate Poisson models have been fitted for total mortality (period 1850–1969), and for the periods 1869–1872 and 1901–1904 for mortality from the selected causes of death.

Since the divorced and widowed clearly consisted of people far older than those who were single, the underlying ages need to be controlled for. For total mortality this required the creation of six 10-year categories and a residual category for the oldest age group (25–34, 35–44, . . . , 85+ years of age).

The trends in total mortality are estimated using an interaction term for marital status and period:

$$\ln(Y_{ijx}) = \ln(P_{ijx}) + \alpha + \sum_{i=1}^{3}(\beta_i ms_i) + \sum_{j=1}^{11}(\gamma_j per_j) + \sum_{x=1}^{6}(\delta_x age_x) + \sum_{i=1}^{3}\sum_{j=1}^{11}(\lambda_{ij} ms_i per_j)$$

where Y_{ijx} is the number of deaths in marital status group i of age group x during period j; P_{ijx} is the number of person years in marital status group i of age group x during period j; a is the intercept; β_i is the regression coefficient of marital status group i; ms_i is the dummy variable of marital status group i (there are three dummy variables for marital status: for the never-married, the divorced and the widowed; the married are the reference category); γ_j is the regression coefficient of period j; per_j is the dummy variable of period j (there are eleven dummy variables for period; period 1850–1859 is the reference category); δ_i is the regression coefficient for age group x; age_x is the dummy variable of age group x (there are six dummy variables for age group; age group 25–34 is the reference category); λ_{ij} is the regression coefficient of the interaction term for marital status group i and period j.

The number of person years per 10-year period was approximated by assuming that all events affecting the distribution of marital status by age were uniformly distributed over the 10-year interval. The number of person years is then assumed to be five times the sum of the populations at time t and $t+10$.

The regression coefficients and standard errors of marital status (β_i) and the interaction term for marital status and period (λ_{ij}) have been used to calculate relative mortality risks (RR) (with 95% confidence intervals for the marital status groups) as a measure of mortality differentials by marital status. It is the estimated death rate of a single or widowed or divorced population, adjusted for period and age. With the introduction in the model of the term for the interaction of marital status and period

it is possible to see whether the RRs of the never-married and the formerly married with respect to the married have changed over time. Models have been fitted using the Poisson procedure in the statistical package STATA (StataCorp, 1995).

As far as mortality by cause of death is concerned, Poisson regression models were applied separately for the periods 1869–1872 and 1901–1904 for specific causes of death. Age was controlled for using six 10-year age groups and a group for the very elderly for the years 1869–1872 (20–29, 30–39, etc., 70–79, and 80+). For 1901–1904, the age groups used in the tabulations of deaths by cause of death and marital status were 20–29, 30–39, 40–49, 50–64, 65–79 and 80+. For each of the selected causes of death and for each of the two periods separately, the following model was estimated for males and females.

$$\ln(Y_{ix}) = \ln(P_{ix}) + \alpha + \sum_{i=1}^{2} (\beta_i ms_i) + \sum_{x=1}^{6} (\delta_x age_x)$$

where Y_{ix} is the number of deaths in marital status group i of age group x; P_{ix} is the number of person years in marital status group i of age group x; a is the intercept; β_i is the regression coefficient of marital status group i; ms_i is the dummy variable of marital status group i (there are two dummy variables for marital status: for the never-married, and for the divorced and widowed; the married are the reference category); δ_I is the regression coefficient for age group x; age_x is the dummy variable of age group x (there are six dummy variables for age group in 1869–1872 and five in 1901–1904; age group 20–29 is the reference category).

Results

Total mortality

The relative risks of dying for the never-married and the formerly married compared with the married population in each period are given in Table 1. The values for the married population in each period are set to 1·00: values greater than 1·00 indicate that the marital status has a higher mortality risk, and values less than 1·00 indicate that the marital status has a lower mortality risk.

Relative mortality differences between married males on the one hand, and single and widowed men on the other, increased between 1850 and 1920. After that period, the trend is less clear: among the widowed, excess mortality at first stabilized and later on increased further; for never-married men excess mortality decreased, after an interruption during World War II. The trend of increasing differences was most distinct among the widowed, where it continued until the 1960s. Whereas in the middle of the nineteenth century mortality among widowers was 10% higher than among married males, excess mortality reached 60% in the 1950s and '60s. In the 1850s never-married males had 50% higher mortality; after an initial period of declining excess mortality, values of RR returned to this earlier level. After 1910–1919 RR decreased, but peaked again during World War II, after which a steep decline in RR took place as a consequence of which excess mortality decreased to around 20% by the 1960s. For divorced men, figures for the period 1860–1869 are rather low, the result perhaps of incomplete registration. No clear trend is visible in this group, and

Table 1. Relative mortality risks (RR) by marital status (95% confidence intervals), controlled for age, with the married as reference category

	Never-married	Widowed	Divorced
Males			
1850–59	1·51 (1·50–1·53)	1·11 (1·10–1·12)	—
1860–69	1·45 (1·43–1·47)	1·11 (1·09–1·12)	1·16 (0·91–1·40)
1870–79	1·45 (1·43–1·47)	1·17 (1·15–1·18)	1·75 (1·32–2·19)
1880–89	1·42 (1·40–1·44)	1·18 (1·16–1·19)	1·76 (1·35–2·16)
1890–99	1·47 (1·45–1·49)	1·22 (1·21–1·23)	1·65 (1·31–1·99)
1900–09	1·48 (1·46–1·50)	1·31 (1·29–1·32)	1·74 (1·38–2·09)
1910–19	1·54 (1·51–1·56)	1·36 (1·35–1·38)	1·94 (1·53–2·36)
1920–29	1·45 (1·42–1·47)	1·51 (1·49–1·53)	1·55 (1·26–1·83)
1930–39	1·38 (1·36–1·40)	1·49 (1·47–1·51)	1·86 (1·48–2·25)
1940–49	1·62 (1·60–1·65)	1·46 (1·44–1·47)	1·97 (1·55–2·39)
1950–59	1·28 (1·27–1·30)	1·66 (1·64–1·68)	1·56 (1·28–1·84)
1960–69	1·24 (1·23–1·26)	1·59 (1·57–1·61)	1·63 (1·32–1·93)
Females			
1850–59	1·04 (1·03–1·05)	0·91 (0·90–0·91)	—
1860–69	1·00 (0·99–1·01)	0·88 (0·88–0·89)	0·82 (0·68–0·96)
1870–79	1·04 (1·03–1·05)	0·88 (0·88–0·89)	1·32 (1·16–1·49)
1880–89	1·05 (1·04–1·06)	0·96 (0·95–0·97)	1·12 (0·98–1·26)
1890–99	1·07 (1·06–1·08)	1·02 (1·01–1·03)	1·16 (1·04–1·28)
1900–09	1·12 (1·10–1·13)	1·12 (1·11–1·14)	1·32 (1·18–1·47)
1910–19	1·19 (1·18–1·21)	1·14 (1·13–1·16)	1·19 (1·09–1·30)
1920–29	1·16 (1·15–1·18)	1·28 (1·27–1·30)	1·12 (1·04–1·20)
1930–39	1·15 (1·14–1·16)	1·30 (1·29–1·31)	1·32 (1·19–1·44)
1940–49	1·35 (1·34–1·37)	1·43 (1·42–1·45)	1·42 (1·28–1·57)
1950–59	1·28 (1·26–1·30)	1·66 (1·65–1·68)	1·37 (1·23–1·50)
1960–69	1·38 (1·36–1·40)	1·70 (1·68–1·71)	1·47 (1·32–1·63)

the level of excess mortality fluctuated between 55% and 97%. World War II (in particular the Hunger Winter) strongly affected divorced men, as it did single men. High excess mortality in both these groups was also observed in the period 1910–1919 (in particular as a consequence of the Spanish flu). In the 1950s and '60s, excess mortality bottomed out, though even then divorced males had around 60% higher mortality than married males.

The relative mortality differences by marital status among women (married women in each period being the reference category) differ from those among men. First of all, during part of the second half of the nineteenth century married women had higher mortality than widows. Until 1890, the mortality of widows was around 10% lower than that of married women. A second difference is that whereas single males over the period as a whole were characterized by slightly decreasing excess mortality, among women the opposite tendency can be observed. Among both men and women, the RRs of the widowed increased. After 1900 mortality among widows became higher

than that of married women, and the excess mortality increased continuously. In the 1950s and '60s, the RR of widowed women was as much as 60% higher than that of married women. World War II also affected single and divorced women more than the widowed, but the effect was smaller than among men. The RRs of single and divorced women more or less followed the pattern observed among widows. Values of RR for single women differed significantly from those of married women, with the exception of the period 1860–1869, but differences were not large in the middle of the nineteenth century. They increased almost incessantly after 1870 and reached values above 1·20 after 1920–1929. From the 1940s on, mortality among single women was 28–38% higher than among married women. For divorced *women* too, excess mortality fluctuated, but after World War II a slight increase in RRs can be observed.

Age-specific mortality rates by marital status (not shown) clearly show that in all age groups married males in all periods had by far the lowest mortality. All age groups showed a decrease in the differences in mortality by marital status over time; yet in the highest age groups, 65–74 and 75+, the excess mortality compared with married males remained relatively high. A further point worth mentioning is that in all age groups except the youngest the never-married and widowed changed position: this usually happened between 1910 and 1930. Mortality rates among the divorced are higher than in any other marital status category in all age groups above 35. In general, during the nineteenth and twentieth centuries they approached the values observed for the never-married and the widowed.

Among women a different pattern is observed. During the nineteenth century and the first few decades of the twentieth century married women aged 25–34 and 35–44 had higher mortality rates than the never-married and the divorced. The widowed had by far the highest mortality rate among the youngest age group, and this situation continued well into the twentieth century. Differences among women aged 35–44 were very small and decreased even further during the course of the period 1850–1969. At ages 45–54, 55–64, 65–74 and 75+ married women had the lowest mortality rates. Differences with other marital status categories decreased; in general, divorced women had the highest mortality, while differences between never-married and widowed women were fairly small.

Relative differences in mortality between married and never-married men and women were highest for the age groups 25–34 and 35–44. In addition, the excess mortality increased over time for those aged 25–34 and 35–44, whereas for ages above 55 the relative differences decreased. More or less the same pattern was observed for widowed men and women; for this category too, relative differences were highest among the two youngest age groups and increased over time, in particular after 1940. For divorced men and women, the pattern was slightly different. Again the youngest age group was characterized by the highest differences in mortality among men, but among women relative differences were highest among the divorced elderly (75+). For men too, this age group showed very high relative differences in mortality compared with married men. These relative differences increased over time among the divorced too.

The role of specific causes of death in the periods 1869–1872 and 1901–1904

Cause-specific mortality rates by marital status could be calculated for two periods: 1869–1872 and 1901–1904. Given the small numbers of deaths in each

cause-of-death and marital status category some kind of reclassification is unavoidable. At the same time, sufficient detail has to be preserved to make it possible to study cause-specific dynamics and meaningful categories. To regroup the causes of death use was made, for the most part, of the classification scheme developed by Wolleswinkel-van den Bosch, van Poppel & Mackenbach (1996). A detailed overview of the classifications used is available on request.

The data were aggregated over the years 1869 to 1872 (data for 1901–1904 were available only in aggregated form). As the number of deaths among the divorced was so small that hardly any figure reached the 5% level of significance, information was grouped on the widowed and divorced together. Data on the population at risk for the selected periods were available from the censuses. The number of person years was estimated simply by multiplying the population at these dates by a factor 4. The RRs per cause of death are given in Tables 2 and 3.

In the period 1869–1872 never-married and formerly married males had higher mortality than married males for almost all causes of death. Overall, never-married men ran a 30% higher death risk, and formerly married men a 42% higher risk. Relative risks of single men were significantly higher for fifteen of the 25 causes of death. For the formerly married, this was the case for 24 causes of death. Some findings will now be discussed in more detail.

Suicide mortality among the never-married was 41% higher, and that among the formerly married more than three times higher than that of married men. For other external causes (violence, drowning, burning), excess mortality among both groups amounted to 60%. The assumption that suicide is inversely related to close interpersonal ties is a standard one in the sociological literature and is confirmed for this period too. As far as other forms of external causes of death are concerned, a lack of close interpersonal ties resulting in carelessness leading to death has been suggested as an important factor in contemporary research. Married men are less likely than unmarried men to engage in risky behaviours, may find these behaviours less appealing once they are married, and social pressures may lead them to curb these behaviours, or their wives may encourage them to adopt healthier lifestyles.

By far the most important cause of death was tuberculosis of the lung and larynx, and high excess mortality of both single and formerly married men was characteristic of this cause-of-death group. The available treatment of tuberculosis in the periods concerned required careful scheduling of one's life: poor diet, lack of rest and psychological stress were related to initial infections and/or could activate latent tuberculosis. High rates for the unmarried are consistent with this fact.

Cancer and diseases of the circulatory system were not the important causes of death that they now are. For diseases of the circulatory system the highest RRs were observed among the never-married. For cancer only the formerly married had increased RRs.

For other diseases and for unknown and ill-defined causes of death the RRs among the never-married were highest, but the formerly married also exhibited higher mortality than married males. It should also be noted that this first category includes mental disorders and diseases of the nervous system, for which normally large mortality differences between marital statuses are reported. Of those widowed and divorced males whose cause of death was ill-defined or unknown, a large proportion

Table 2. Relative mortality risks (RR_{ix}) by marital status (95% confidence intervals), controlled for age, with the married as reference category, 1869–1872

	Men			Women		
	Never-married	Widowed and divorced	As % of all deaths	Never-married	Widowed and divorced	As % of all deaths
Suicide	1·41 (1·08–1·84)	3·17 (2·39–4·20)	0·4	0·86 (0·50–1·48)	1·50 (0·83–2·69)	0·1
Other external causes	1·66 (1·50–1·83)	1·60 (1·39–1·84)	2·9	2·15 (1·79–2·59)	1·67 (1·37–2·04)	0·8
Complications of pregnancy, delivery and the puerperium				0·07 (0·06–0·09)	0·19 (0·13–0·28)	2·9
Tuberculosis of lung and larynx	1·38 (1·32–1·43)	1·57 (1·47–1·68)	16·5	0·83 (0·80–0·87)	1·17 (1·11–1·24)	16·2
Other types of tuberculosis	1·84 (1·64–2·06)	1·49 (1·30–1·71)	2·2	1·45 (1·30–1·62)	1·31 (1·17–1·46)	2·4
Other infectious diseases	1·68 (1·50–1·89)	1·37 (1·17–1·59)	2·1	1·23 (1·10–1·38)	1·05 (0·91–1·21)	2·0
Cancer of female genital organs				0·75 (0·60–0·95)	1·06 (0·88–1·27)	0·8
Other types of cancer	0·95 (0·85–1·07)	1·17 (1·07–1·29)	3·4	1·15 (1·03–1·28)	1·12 (1·02–1·22)	3·1
Croup, diphtheria, whooping cough	1·14 (0·70–1·85)	1·91 (1·06–3·47)	0·1	0·75 (0·48–1·18)	0·73 (0·38–1·40)	0·1
Typhus	1·04 (0·95–1·15)	1·66 (1·46–1·88)	3·5	0·72 (0·65–0·79)	1·44 (1·28–1·62)	2·8
Diabetes mellitus	1·89 (1·39–2·55)	1·69 (1·17–2·41)	0·3	0·68 (0·46–1·00)	0·99 (0·71–1·39)	0·3
Acute respiratoy diseases	1·07 (1·00–1·14)	1·36 (1·27–1·47)	7·6	0·92 (0·85–1·00)	1·24 (1·15–1·33)	5·4
Chronic respiratory diseases	1·21 (1·13–1·29)	1·37 (1·30–1·44)	10·7	1·18 (1·10–1·26)	1·30 (1·24–1·37)	9·7
Diseases of the circulatory system, rheumatism, arthritis	1·44 (1·31–1·58)	1·26 (1·15–1·38)	4·1	1·51 (1·39–1·64)	1·22 (1·13–1·32)	4·8
Acute diseases of the digestive system, dysentery, diarrhoea	1·30 (1·18–1·43)	1·27 (1·15–1·42)	3·5	0·83 (0·75–0·92)	1·07 (0·98–1·18)	3·5
Chronic diseases of the digestive system	1·15 (1·05–1·26)	1·18 (1·08–1·28)	4·5	0·99 (0·91–1·09)	1·11 (1·02–1·19)	4·3
Diseases of the genito-urinary system	1·07 (0·93–1·23)	1·12 (0·98–1·27)	2·0	0·75 (0·65–0·87)	1·03 (0·88–1·20)	1·5
Old age, dementia	1·23 (1·14–1·32)	1·52 (1·46–1·59)	11·3	1·35 (1·26–1·44)	1·49 (1·42–1·57)	13·7
Typhoid fever	1·01 (0·87–1·16)	1·48 (1·25–1·75)	1·6	0·79 (0·69–0·90)	1·06 (0·92–1·23)	1·7
Intermittent fever	1·19 (0·99–1·43)	1·47 (1·22–1·78)	1·0	0·67 (0·54–0·83)	1·45 (1·23–1·72)	1·0
Continuous fever	1·18 (1·01–1·39)	1·45 (1·25–1·69)	1·4	0·91 (0·78–1·05)	1·24 (1·10–1·40)	1·8
Smallpox	0·98 (0·90–1·07)	1·36 (1·17–1·59)	3·9	0·85 (0·78–0·93)	1·16 (1·01–1·32)	3·3
Apoplexy	1·51 (1·40–1·64)	1·32 (1·24–1·42)	5·7	1·35 (1·25–1·46)	1·19 (1·12–1·26)	6·6
Other diseases	1·67 (1·53–1·83)	1·55 (1·38–1·74)	3·4	1·64 (1·48–1·81)	1·12 (0·99–1·27)	2·4
Unknown and ill-defined causes	1·69 (1·57–1·80)	1·56 (1·46–1·66)	7·5	1·30 (1·22–1·38)	1·19 (1·13–1·26)	8·8
Total	1·30 (1·28–1·33)	1·42 (1·39–1·44)	100·0	0·97 (0·96–0·99)	1·17 (1·15–1·19)	100·0

Table 3. Relative mortality risks (RR_{ix}) by marital status (95% confidence intervals), controlled for age, with the married as reference category, 1901–1904

	Men			Women		
	Never-married	Widowed and divorced	As % of all deaths	Never-married	Widowed and divorced	As % of all deaths
Suicide	1·81 (1·54–2·12)	2·29 (1·91–2·76)	1·1	1·88 (1·40–2·51)	1·52 (1·10–2·10)	0·3
Other external causes	1·65 (1·51–1·81)	1·62 (1·42–1·83)	3·4	1·70 (1·44–2·01)	1·40 (1·17–1·67)	1·0
Complications of pregnancy and delivery				0·05 (0·04–0·06)	0·32 (0·21–0·49)	1·7
Tuberculosis of lung and larynx	1·47 (1·41–1·54)	1·69 (1·57–1·82)	13·5	0·94 (0·90–0·99)	1·28 (1·19–1·37)	12·7
Disseminated and other types of tuberculosis	1·86 (1·64–2·11)	1·53 (1·22–1·90)	1·8	1·46 (1·28–1·65)	0·87 (0·70–1·09)	1·6
Other infectious diseases	1·21 (1·07–1·38)	1·31 (1·10–1·56)	2·0	0·84 (0·74–0·97)	1·13 (0·95–1·33)	1·7
Cancer of female genital organs				0·65 (0·54–0·78)	1·03 (0·89–1·18)	1·3
Cancer of the breast				1·63 (1·38–1·92)	0·97 (0·82–2·14)	0·9
Other types of cancer	0·96 (0·90–1·02)	1·17 (1·11–1·23)	10·2	0·91 (0·84–0·97)	1·13 (1·08–1·19)	8·0
Syphilis	1·27 (1·05–1·54)	1·15 (0·91–1·46)	0·8	2·54 (1·95–3·33)	1·49 (1·10–2·03)	0·3
Brain diseases	1·85 (1·68–2·05)	1·19 (1·03–1·38)	2·9	1·74 (1·57–1·93)	1·13 (0·99–1·29)	2·6
Diabetes mellitus	1·31 (1·07–1·60)	0·82 (0·65–1·02)	0·8	0·84 (0·67–1·05)	1·00 (0·84–1·18)	0·8
Acute respiratoy diseases	1·35 (1·28–1·42)	1·43 (1·36–1·50)	12·1	1·13 (1·06–1·20)	1·28 (1·22–1·34)	10·8
Chronic respiratory diseases	1·23 (1·14–1·33)	1·41 (1·33–1·50)	6·4	1·11 (1·01–1·21)	1·27 (1·18–1·36)	4·7
Diseases of the circulatory system	1·42 (1·34–1·51)	1·31 (1·24–1·38)	9·1	1·29 (1·22–1·36)	1·25 (1·19–1·31)	10·7
Acute diseases of the digestive system	1·51 (1·33–1·71)	1·43 (1·26–1·64)	2·0	0·91 (0·80–1·02)	1·15 (1·03–1·29)	2·3
Chronic diseases of the digestive system	1·40 (1·27–1·54)	1·24 (1·12–1·38)	3·4	1·01 (0·92–1·11)	1·02 (0·93–1·12)	3·5
Diseases of the genito-urinary system	1·30 (1·20–1·41)	1·29 (1·20–1·39)	5·4	1·00 (0·92–1·08)	1·07 (1·00–1·14)	5·3
Old age, dementia	1·70 (1·59–1·81)	1·75 (1·67–1·82)	11·5	1·70 (1·59–1·80)	1·82 (1·73–1·91)	14·3
Alcoholism	2·38 (1·82–3·12)	2·71 (1·97–3·72)	0·3	0·77 (0·39–1·51)	1·68 (1·00–2·83)	0·1
Apoplexy	1·37 (1·27–1·48)	1·37 (1·29–1·45)	6·9	1·21 (1·13–1·29)	1·25 (1·19–1·32)	8·8
Other diseases	1·73 (1·47–2·02)	1·37 (1·14–1·65)	1·1	1·52 (1·33–1·74)	1·15 (1·00–1·32)	1·5
Unknown and ill-defined causes	2·20 (2·05–2·37)	1·64 (1·53–1·76)	5·5	1·24 (1·22–1·25)	1·23 (1·21–1·24)	5·2
Total	1·44 (1·41–1·46)	1·43 (1·41–1·46)	100·0	1·09 (1·07–1·12)	1·24 (1·22–1·26)	100·0

were not attended by a medical doctor during the final stage of their illness. As ill-defined causes of death are much less frequent among married men and women, this implies that the excess found in the other marital status categories for all other causes of death is in fact underestimated. For old age and dementia both the never-married and the formerly married showed excess mortality, which reached more than 50% among the last-mentioned group.

All in all, excess mortality could be observed for almost all causes of death among the formerly married, but the level of the excess varied considerably: it was highest for suicide, for several causes of death it was around 60–70%, and for others it remained between 25% and 50%. The never-married deviated much less, and for several causes of death no difference at all could be observed.

For several causes of death single women had lower mortality levels than married women. This was related first of all to complications during pregnancy and delivery. Both groups of unmarried women had much lower RRs for this cause of death than married women. Yet this does not imply that married women experienced higher risks of maternal mortality: if one relates the number of deaths in this cause-of-death category for each of the marital status categories to the number of births born to women in this marital status category, it becomes clear that the risks of dying per pregnancy were much higher among never-married and formerly married women. For tuberculosis of the lung never-married women also had lower mortality, and the same phenomenon was observed for cancer of the female genital organs, typhus, diabetes mellitus, acute diseases of the digestive system (including dysentery and diarrhoea), diseases of the genito-urinary system, typhoid fever, intermittent fever and smallpox. For cancer of the genital organs (cervical cancer and cancer of the uterus) differences in sexual behaviour between marital status groups, including age at first coitus, and number of pregnancies have been mentioned as risk factors, making low mortality among the never-married highly probable. External causes of death showed high excess mortality for the never-married. That also applied to diseases of the circulatory system, other types of tuberculosis and other diseases. In addition, several causes of death had RRs indicating a 15–25% higher mortality among the never-married.

For formerly married women, excess mortality compared with married women was the rule. With the exception of death resulting from complications during pregnancy and delivery, not a single cause of death was statistically significantly lower among the formerly married than among married women. The highest relative risks were observed for external causes of death (suicide excepted). For both types of tuberculosis, acute and chronic respiratory diseases, typhus, intermittent and continuous fever and smallpox RRs of between 1.15 and 1.45 were observed.

For the period 1901–1904 a much less detailed classification of infectious diseases than for 1869–1872 was used, but some other causes were specified that could not be distinguished in the earlier period (e.g. alcoholism, syphilis, breast cancer). For all causes of death, excepting other types of cancer, single males now had statistically significantly higher mortality than married males. The highest relative mortality involved death due to alcoholism. For several other causes of death mortality was also more than 70% higher than among married males: that applied to suicide, other types of tuberculosis, brain diseases, old age and dementia, other diseases, and ill-defined and unknown causes of death. Syphilis caused relatively more deaths

among the never-married, but RRs were no higher than for total mortality. Excess mortality during the period 1901–1904 had thus spread, and now applied to almost all cause-of-death groups.

Such a pattern of general excess mortality had already been observed among the formerly married in the period 1869–1872, and in 1901–1904 it was even more prominent. Only RRs for syphilis and diabetes mellitus did not deviate significantly from those of married males. The highest excess mortality was again observed for suicide and for deaths due to alcoholism. Numerically more important causes of death also showed high excess mortality: a case in point is respiratory tuberculosis, old age/dementia, and the group of ill-defined or unknown causes of death.

For women, the pattern had changed slightly: although differences were small, total mortality among the never-married was now higher than among the married, and for formerly married women excess mortality had also increased. Notwithstanding this amelioration of the position of married women, for some causes of death married women continued to have higher mortality. For maternal mortality, mortality of the never-married and formerly married remained much lower. The risk of death from cancer of the female genital organs was 35% less among single women than among married women. More importantly, never-married women were still charac-terized by lower mortality from respiratory tuberculosis. Other types of cancer and other infectious diseases also had RRs below 1·00. On the other hand, for several causes of death very high levels of excess mortality were found for never-married women: this was true of syphilis, but also brain diseases, breast cancer, old age/dementia, suicide, and other external causes of death. For breast cancer, factors that can help protect women, such as having a large number of children and long durations of breast-feeding, clearly advantage married and formerly married women.

With the exception of complications during pregnancy and delivery, widowed and divorced women were characterized by comparable or excess mortality for all causes of death. However, RRs were not as extreme as among the never-married. The highest death rates were found for old age/dementia, followed by suicide (in the first period the RR was not significantly different for this cause-of-death group). High rates could also be observed for syphilis and for other external causes of death. More important for the general pattern of excess mortality was again the fact that respiratory tuberculosis had RRs clearly in excess of 1·00. Comparable levels of excess mortality were observed for acute and chronic respiratory diseases, diseases of the circulatory system, apoplexy and unknown and ill-defined causes of death.

Discussion

This study has shown that marital status mortality differentials for both sexes have been a constant factor throughout the Netherlands over the period 1850–1970. Among men, relative differences between the married and the widowed increased over time, whereas those between married and divorced men fluctuated and those between married and single men only declined after the 1940s. For women, an increase in excess mortality among widows, single and divorced women compared with married women was visible even as late as the 1960s. During most of the period, divorced men and women had the highest mortality whereas in more recent periods widowed men

and women have experienced a deterioration in their relative position. Mortality levels among men were more influenced by their marital status than mortality levels among women were. In the course of time excess mortality among the never-married and formerly married has become characteristic of an ever-increasing number of causes of death. There were important exceptions to this rule in the case of women. By far the largest excess mortality was for external causes of death.

The improvement over time in the position of married men and women deserves particular attention, as it is contrary to formulated expectations. It has been argued that, theoretically, three groups of factors can be distinguished which might explain the differences in mortality between marital status groups and the changes in these differences: statistical artefacts, selection mechanisms and social causation. Can the findings be linked to these factors?

First, the potential effects of changes in the operation of statistical artefacts are considered. Until the last quarter of the nineteenth century, errors in the reporting of marital status in the census and the misreporting of the marital status of the deceased in the vital registration system will have caused biases in both the numerator and the denominator of the death rates. It might be expected that both the numbers of deaths and the populations at risk among the divorced would have been biased downwards and those among the married and widowed biased upwards. Given the usually lower 'real' death risks among married men and women, this might have led to an overestimation of the death rates of the married and to an underestimation of the death rates of the divorced, in particular, and to a narrowing of the observed mortality differences compared with the real mortality differences. For more recent periods the data are more reliable, and so the upwards bias in the estimated mortality levels of married men and women will be lower, and perhaps even absent. As a consequence, these data underestimate the trend towards increasing survival prospects for married men and women that have been observed. Thus, although data errors might explain some of the mortality differences, they are insufficient to account for the improvement observed in the position of the married. Changes in the frequency of another statistical artefact are not compatible with the observed mortality trends either. In the past, infectious diseases often led to the death of both spouses within a short period, thus creating an impression of higher mortality among the widowed as a consequence of being a widow(er). As infectious diseases became less prevalent, the frequency of intimately correlated death rates among spouses became lower and ought, in contrast to what has been observed, to have led to a stronger decrease in mortality among the widowed.

To a large extent the changing marital status mortality differences must thus be related to transformations in the life circumstances of the married, never-married, widowed and divorced and/or to a modification of the operation of selection processes.

Are there reasons to assume that during the period under consideration the direct or indirect selection of 'healthy' persons into, and 'unhealthy' persons out of, marriage started to play a larger role with regard to first marriages or to other marital transitions (divorce, bereavement, remarriage)? A direct test of this presumption is not possible, but some indirect clues are available. The hypothesis underlying the selection theory is that populations in which the vast majority of persons marry are

characterized by a greater selectivity effect among those who remain single than populations in which substantial proportions never marry. Similarly, in populations in which divorce is rare or in which the majority of the divorced remarry, those who are divorced should be more selected with regard to their underlying mortality risk (Hu & Goldman, 1990). Kisker & Goldman (1987) and Livi-Bacci (1985) have demonstrated that in populations in which almost all persons marry, single persons are characterized by substantially higher mortality rates compared with married persons than in populations in which marriages are less frequent. For each census year between 1850 and 1970, age-standardized percentages of married, single, widowed and divorced for the Netherlands were calculated for both men and women aged 25 and over. The percentage never-married decreased continuously for males and females, from 34% to 20% among males and from 32% to 15% among females. This decrease was particularly strong during the period 1950–1970. Among males, the percentage currently married increased from 57% to 76%, and here too an acceleration was visible after 1950. For women, the percentage currently married increased from 51% to 74%. The percentage of widows decreased from 17% to 9%, while the percentage of widowers decreased from 9% to 3%. Divorcées made up a very small part of the Dutch population, although the proportion of divorcées increased from less than 1% to 1% in 1970.

The continuous decrease in the proportions of single men and women during the period 1850–1970 is compatible with a greater selectivity effect and the observed increased excess mortality among single women, but it is hardly compatible with the trend among men. Similarly, the rise in the percentage of divorcées would point to a decrease in selectivity and thus to decreased excess mortality, but the development observed among divorced men and women does not point in this direction. Only the change in the relative size of the widowed population is consistent with greater selectivity and thus with increased excess mortality of the widowed compared with the currently married.

Information on the changing role of indirect selection is scarce as well. During the nineteenth and early twentieth centuries socioeconomic status continued to play a role in determining the chances of marriage, low status leading to high percentages of men being single. There is evidence that selectivity in this regard has even increased. The risk of divorce was much higher among men and women living in large cities, which had high mortality regimes, but this unequal distribution decreased after the first few decades of the twentieth century. Changes in the tendency of people to marry people similar to themselves, which, when there was a predisposition to ill health (among people of low social status for example), might lead to a clustering of times of death of spouses, might have played a role as well. Yet research on choice of spouses in the Netherlands has shown that the tendency to marry partners from the same social class did not change much during 1850–1940 (van Leeuwen & Maas, 1997).

This leads automatically to the conclusion that social causation has played an important role. Hu & Goldman (1990) have argued that the comparatively stronger decrease in the mortality of married men and women during the last few decades in many Western countries might largely be explained by the increased health benefits of marriage. It is the opinion of the authors that this factor is also the most important in explaining the improvement in the position of married men and women in the

Netherlands during the period 1850–1970. It is hypothesized that the most funda-
mental factor contributing to the more favourable position of married men and
women is the different way in which marital status groups were affected by two
important societal changes characterizing Dutch (and European) society, particularly
after 1870: the increase in real wages, which made a strong increase in the standard
of living possible, and the civilizing offensive, starting around 1870, in which the
middle classes vigorously tried to propagate their values and norms among the lower
classes. Intermediary factors through which these social changes contributed to the
improved health of married men and women include psychosocial factors (social
support), material circumstances (financial situation, housing conditions), and changes
in health behaviours.

From the mid-1860s on, real wages in the Netherlands started to increase
considerably. In a period of forty years, between 1860 and 1900, real wages increased
by more than 150% (van Zanden, Luiten & van Riel, 2000, pp. 352–355). The rise in
real wages after 1870 made it possible to harmonize ideals and reality regarding the
division of labour between men, women and children. The male breadwinner wage
norm was already a normative standard long before the nineteenth century: whenever
feasible, specialization took place in which the husband concentrated on earning an
income while the wife focused on reproductive activities within the home. In practice
there were many exceptions to this rule, out of pure necessity. It was the rise in real
income that made it possible for women to withdraw from the workforce and to
restrict their role to that of housewife and mother providing family members with
valuable but unwaged personal care and support (Horrell & Humphries, 1997).

This development was strongly stimulated by sociocultural processes accompany-
ing the process of economic development. The nineteenth century shifts in social and
economic structure – industrialization, proletarization and urbanization – confronted
society with a variety of new social problems and aggravated some existing ones:
pauperism, the heavy burden on private and public charities, prostitution, overcrowd-
ing, lack of hygiene and sanitary facilities, increased alcohol consumption, etc.
Medical doctors, bureaucrats, politicians, Poor Law administrators, private charitable
institutions and representatives of church organizations shared a growing concern
about these social problems. They rejected those aspects of the lifestyle of the lower
social classes – their lack of moderation, the neglect they showed in bringing up their
children, their lack of moral principles, and drunkenness – which they held at least
partly responsible for the evils that plagued society. Particularly from the last quarter
of the nineteenth century on, members of the learned middle classes, in close
co-operation with church and state organizations, began efforts to educate the masses
and to drive them to adopt the moral standards of the middle classes. They were the
driving force behind the sanitary reform movement (Houwaart, 1991), the campaign
against venereal diseases (Mooij, 1993) and prostitution (De Vries, 1997), behind the
temperance movement (Van der Stel, 1995), challenges to the double standard of
sexual morality and the lack of political and legal rights of women (Jansz, 1990), and
of campaigns highlighting the danger of improvident marriages (Röling, 1987), etc.
Moderation and control were key concepts in these movements for social and moral
reform, and one issue of concern to all social commentators was the role of the family
in the social order. Progressives and conservatives alike recognized that marriage and

the family were fundamental social institutions, and that social change or the maintenance of the prevailing social order could be achieved only by taking the family into account.

In this civilizing offensive, the necessity of changes in the division of labour between men and women and the need for improvement in domestic hygiene played a very important role (De Regt, 1984). The domestic ideology fostered by the middle-class nineteenth century family stressed the different spheres inhabited by men and women. Married women were expected to concentrate their energy, attention and labour on the home and the family, caring for their husbands and children and maintaining the household in a material sense. The notion of separate spheres was not only a powerful ideological prescription: legislation, partly reflecting the changes in norms and incomes, also contributed to this development. To protect women against the physical and moral effects of industrial work, from 1889 they were prohibited from working longer than 11 hours a day. Whereas labour force participation rates of married women aged 15–64 remained as low as 5–11% in the period 1899–1960, rates for non-married women increased from 39% to 56%. Between 1890 and 1910 the contribution of married women to the total household income halved (Pott-Buter, 1993, pp. 189–210). This civilizing offensive also encouraged more attention to be devoted to the improvement of hygiene in the household. It found fertile ground, because women now had more time for such activities, and again this increase in time was primarily made possible by the increase in household incomes (van Zanden *et al.*, 2000, pp. 402–408).

For other reasons too, the reforms that resulted from this civilizing offensive favoured married men and women more than other marital status groups. From the 1880s on, the growing concern at the social effects of alcohol consumption – men consumed alcohol literally at the expense of their wives and children, and the money that should have supported families went instead into the pockets of the manufacturers and purveyors of alcohol – stimulated propaganda campaigns in which the negative consequences of alcohol consumption for family members figured very prominently. The double standard of sexual morality came under attack from the social purity movement, which saw it as one cause of the spread of venereal diseases, and in propaganda the family again took a central place. Housing policy, which brought about a reduction in overcrowding and an associated decrease in the risks of infectious diseases, was almost exclusively directed at improving the situation of families with children. Lay rent collectors attempted to improve the housing conditions of lower-class families by teaching them new standards of behaviour, such as cleanliness, orderliness and punctuality in paying the rent.

Even more important, because they were directly focused on health, were the activities of the health reformers. In the late nineteenth century, the sanitary movement accorded a major role to deficient household arrangements in the spread of serious diseases. They recognized voluntary reforms within the private sphere as one of the most direct and effective means of improving public health. Increasingly, inexpensive books, magazines, newspapers and pamphlets circulated sanitary information to the public (Tomes, 1990; Daru, 1998). This information concentrated on the proper construction of the house itself, especially ventilation and plumbing to ensure the circulation of clean air, careful home nursing of patients with contagious

diseases to prevent the spread of infections, special hygiene in the nursery, and general housekeeping measures designed to ensure cleanliness. This propaganda was mainly directed at families, and changes in health behaviour might therefore have been expected particularly among married men and women. At the end of the nineteenth century, there was growing concern about the high rate of infant mortality. The solutions advocated by Dutch campaigners were 'maternal' rather than material. A reduction in infant deaths was expected to follow from the re-education of the mother, who would be persuaded not to work outside the home, to improve her domestic hygiene, and to bathe, clothe and tend her infants properly. The mother was to be educated by means of supervision at the new and expanding health care facilities directed at women and children: hospital facilities, maternity clinics, maternity and district nursing services, gynaecological and birth-control clinics, and through propaganda, courses, books and pamphlets (Marland, 1992).

Whereas a civilizing offensive was characteristic of many countries in Europe, in the Dutch situation it gained extra force through a development known as *verzuiling* (literally, 'pillarization') (Stuurman, 1983). From the last quarter of the nineteenth century onwards, individual religious groups organized themselves into separate factions in which there was a strong link between political power, social organization and individual behaviour. Orthodox Protestant and Catholic political parties with religiously inspired programmes were formed and achieved a great degree of political power in the first decade of the twentieth century. Catholic and Protestant views on the family, sexuality and the position of men and women then started to determine local and national policies. For both Catholics and Protestants, marriage, once entered into, had a Godly status, and the only proper place for a married woman was in the home, as a mother, housewife and spouse. From the beginning of the twentieth century onwards, the government tried to enforce this ideal by attempting to restrict and forbid all work by married women outside the home. Legislative proposals attempted to forbid married women from any form of employment in the public service and in factories because of the assumed adverse influence on the care of children and the household. Due to the resulting decline in employment opportunities for married women, these women were able – willingly or unwillingly – to devote much more time to activities within the home: improving hygiene, providing better care for their children, ensuring better quality food and housing, providing a more comfortable home life for their husbands and children.

A different factor, which operated through its effect on health behaviour, is the strong decrease in maternal mortality, from which married women profited mostly. Maternal mortality declined due to the introduction and diffusion of a number of innovations in the medical care system, particularly during the period 1935–1950. Of these the most important were the introduction of sulphonamides and penicillin, blood transfusion on a large scale, the improvement in obstetrical care and education, and advances in maternal care (Loudon, 1992). The risk of dying from causes related to pregnancy was influenced by the number of pregnancies experienced, and additional risks were associated with pregnancies occurring at the later stages of a woman's reproductive life, as well as with very high parities. Repeated pregnancies and confinements might also have had an indirect influence on the risk of mortality of women. Mechanisms that might explain the relationship between number of

children and mortality include restrictions on mobility, maternal depletion, competition for food, care and money, and increased potential household sources of transmission for a variety of infectious agents (Reves, 1985; Potter & Volpp, 1993). The reduction in the number of children per woman (in the Netherlands from 5·4 in the 1870s to 1·6 in the early 1970s) and the decrease in grand multiparities (fourth births and higher) considerably reduced the risks of maternal mortality and the negative long-term influences of repeated pregnancies and deliveries. These developments benefited married women with children in particular.

To summarize, local and national policies directed at improving housing, hygiene, vaccination, alcohol consumption, education, etc., were primarily focused on married couples and their children. These groups could also be much more easily reached by the private and public agencies concerned: through the school system, maternity clinics, workers' health insurance schemes, etc. For financial or social reasons, married people could avail themselves more readily of improvements in medical technology, and many of the preventive health activities undertaken by Western governments were primarily directed at families with children. Thus, increased social support, improved material conditions, better access to health facilities and changing health behaviours all contributed to the larger improvement in the health of married men and women (De Regt, 1984).

The stronger decrease in mortality among divorced and single men and women compared with the widowed also deserves attention. Why the survival prospects of widows and widowers compared with single and divorced men and women have deteriorated over time is less clear. It has been argued that during the period studied here, the economic situation of all groups of non-married people improved. Since age was controlled for, changes in the distribution of age at death cannot be relevant either. It is speculated that two factors played a role: the direct effects of the loss of a life-long partner have increased due to changes in the duration of marital relationships, and changes in support networks have affected widowed men and women more than married people and other groups.

The effects of the duration of marriage on the health and mortality of the married have recently been studied by Lillard & Waite (1995). The advantages of marriage for women and men tend to cumulate with the length of marriage. It could be argued though that where a marriage has lasted particularly long, the emotional trauma of the marriage terminating might be stronger than in the case of shorter marriages. Furthermore, research has shown that widows characterized by negative well-being are those who continue to regard their deceased husband as the most important potential fulfiller of their needs (Stevens, 1989). As the degree of attachment to the deceased spouse may be related to the duration of the marriage, long durations of marriage might also be expected to have a negative effect on the health of the widow(er). And since the duration of marriage has increased strongly in the twentieth century, one could speculate that the negative health consequences of spousal loss, i.e. the incidence of emotional-focused stress, as such are stronger now than in the past.

There is a close connection between the quality and quantity of social support networks and well-being. The adverse effects of the stressful life event of spousal bereavement might be mitigated by support provided by the remaining social network. Research has shown that the widowed are more dependent on their adult

children than are married people. Two historical changes may have negatively affected the support networks of widows and widowers in the Netherlands. First, women who were born in more recent periods had much lower fertility than nineteenth century cohorts of women, and the number of children alive was even smaller as widows and widowers nowadays lose their spouse at much higher ages. Secondly, the mobility of families has a greater impact now as the offspring of more recent widows and widowers may be quite widely dispersed.

Finally, the improvement in the position of single men and women deserves attention. The modernization of society during the last half of the nineteenth century negatively affected single people in particular. After 1860, large numbers of migrants left the northern and southern provinces of the Netherlands, seeking their fortune in the larger towns. Single men and women made up a sizeable portion of these migrants. They were characterized by lower-paid and casual work, lived in sub-standard houses or lodging houses, and lacked support and protection. They had recourse to excessive alcohol consumption because of difficulties in adapting to new working conditions and to the harshness of their new environment. It was only due to the creation of non-familial responses to meet the material exigencies of life, such as public health clinics, social benefits, unemployment insurance, pensions and the like, which rendered the role of the family far less important, that single men and women were able to catch up with married men and women after World War II.

The hypotheses discussed above are tentative and need to be tested on historical data. Large historical databases, consisting of tens of thousands of individual life histories, have become available in recent years and offer the opportunity to improve our understanding of the way in which men and women in different marital status categories were affected by and reacted to the social and economic changes that Western societies have undergone. Confirmation of the speculative explanations given above awaits the exploration of these sources of information.

References

BERTILLON, A. (1877) Mariage (Démographie). In: *Dictionnaire Encyclopédique des Sciences Médicales*, Vol. 5, pp. 43–52. Edited by G. Masson & P. Asselin. Paris.

BERTILLON, J. (1990) *Nomenclature des Maladies (Statistique de Morbidité – Statistique des Causes de Décès), Arrêtées par la Commission Internationale Chargée de Réviser les Nomenclatures Nosologiques* (Paris, 18–21 août 1900), pour être en usage à partir du 1er janv. 1901. Paris.

DARU, M. (1998) Hygiënisering en moralisering van de gezondheidszorg. In: *Gezond en wel. Vrouwen en de zorg voor gezondheid in de twintigste eeuw,* pp. 31–52. Edited by R. van Daalen & M. Gijswijt-Hofstra. Amsterdam University Press, Amsterdam.

DE REGT, A. (1984) *Arbeidersgezinnen en beschavingsarbeid. Ontwikkelingen in Nederland 1870–1940, een historisch-sociologische studie.* Boom, Meppel.

DE VRIES, P. (1997) *Kuisheid voor mannen, vrijheid voor vrouwen; de reglementering en bestrijding van prostitutie in Nederland 1850–1911.* Verloren, Hilversum.

FARR, W. (1858) Influence of marriage on the mortality of the French people. In: *Transactions of the National Association for the Promotion of Social Science* (London), Vol. 2, pp. 3–12.

FRINKING, G. A. B. & VAN POPPEL, F. W. A. (1979) *Een sociaal-demografische analyse van de huwelijkssluiting in Nederland.* Staatsuitgeverij, The Hague.

GOLDMAN, N. (1993) Marriage selection and mortality patterns: inferences and fallacies. *Demography* **30**, 189–208.

HORRELL, S. & HUMPHRIES, J. (1997) The origins and expansion of the male breadwinner family: The case of nineteenth-century Britain. *Int. Rev. Soc. Hist.* **42**, 25–64.

HOUWAART, E. S. (1991) *De hygiënisten. Artsen, staat en volksgezondheid in Nederland, 1840–1890.* Historische Uitgeverij, Groningen.

HU, Y. & GOLDMAN, N. (1990) Mortality differentials by marital status: An international comparison. *Demography* **27**, 233–250.

JANSZ, U. (1990) *Denken over Sekse in de Eerste Feministische Golf.* Sara/Van Gennep, Amsterdam.

JOUNG, I. M. A. (1996) *Marital Status and Health. Descriptive and Explanatory Studies.* PhD thesis, Erasmus University, Rotterdam.

KISKER, E. E. & GOLDMAN, N. (1987) Perils of single life and benefits of marriage. *Social Biol.* **34**, 135–152.

KLEINBAUM, D. G., KUPPER, L. L. & MULLER, K. E. (1988) *Applied Regression Analysis and Other Multivariable Methods.* PWS-Kent Publishing Company, Boston.

LILLARD, L. A. & WAITE, L. J. (1995) 'Til death do us part: marital disruption and mortality. *Am. J. Sociol.* **100**, 1131–1156.

LIVI-BACCI, M. (1985) Selectivity of marriage and mortality: notes for future research. In: *Population and Biology,* pp. 99–108. Edited by N. Keyfitz. Ordina Edition, Liège.

LOUDON, I. (1992) *Death in Childbirth. An International Study of Maternal Care and Maternal Mortality 1800–1950.* Clarendon Press, Oxford.

LUBACH, D. (1872) De zorg voor een gezond nageslacht. In: *Handboek der openbare gezondheidsregeling en der geneeskundige politie, met het oog op de behoeften en de wetgeving van Nederland,* Vol. 2, pp. 541–610. Edited by L. Ali Cohen. Wolters, Groningen.

MARLAND, H. (1992) The medicalization of motherhood: doctors and infant welfare in the Netherlands, 1901–1930. In: *Women and Children First. International Maternal and Infant Welfare 1870–1945*, pp. 74–96. Edited by V. Fildes, L. Marks & H. Marland. Routledge, London & New York.

MOOIJ, A. (1993) *Geslachtsziekten en besmettingsangst. Een historisch-sociologische studie 1850–1900.* Boom, Amsterdam.

MURPHY, M. (1992) *Marital Status and Mortality: An Epidemiological Viewpoint.* Paper given to the EAPS/BIB Seminar on Demographic Implications of Marital Status, held in Bonn, Germany, 27–30 October 1992.

POTT-BUTER, H. (1993) *Facts and Fairy-tales about Female Labor, Family and Fertility.* Amsterdam University Press, Amsterdam.

POTTER, J. E. & VOLPP, L. (1993) Sex differentials in adult mortality in less developed countries: The evidence and its explanation. In: *Women's Position and Demographic Change*, pp. 140–161. Edited by N. Federici, K. O. Mason & S. Sogner. Clarendon Press, Oxford.

REVES, R. (1985) Declining fertility in England and Wales as a major cause of the twentieth century decline in mortality. *Am. J. Epidemiol.* **122**, 112–126.

RÖLING, H. Q. (1987) *De tragedie van het geslachtsleven. Dr J. Rutgers (1850–1924) en de Nieuw-Malthusiaansche Bond (opgericht 1881)*.Van Gennep, Amsterdam.

SANDBERG, W. T. (1867) Statistische Studien. Eene statistiek van den echtelijken staat in Nederland. III De huwelijken naar den bur–ger–lijken staat. *De Economist* **16**, 445–478.

STATACORP (1995) *Stata Statistical Software: Release 4·0*. Stata Corporation, College Station, TX.

STEVENS, N. (1989) *Well-being in Widowhood: A Question of Balance*. PhD thesis, University of Nijmegen.

STUURMAN, S. (1983) *Verzuiling, kapitalisme en patriarchaat. Aspecten van de ontwikkeling van de moderne staat in Nederland.* Sun, Nijmegen.

TOMES, N. (1990) The private side of public health: sanitary science, domestic hygiene, and the germ theory, 1870–1900. *Bull. hist. Med.* **64**, 509–539.

TURKSMA, B. (1898) *Huwelijk en sterfte. Bijdrage tot de statistiek*. H. Eisendrath, Amsterdam.

VAN DER STEL, J. C. (1995) *Drinken, drank en dronkenschap. Vijf eeuwen drankbestrijding en alcoholhulpverlening in Nederland.* Verloren, Hilversum.

VAN LEEUWEN, M. H. D. & MAAS, I. (1997) Social mobility in a Dutch province, Utrecht 1850–1940. *J. Soc. Hist.* **30**, 619–644.

VAN POPPEL, F. (1992) Trouwen in Nederland. Een historisch-demografische analyse van de 19e en vroeg-20ste eeuw. *AAG-bijdragen* **33**, 554.

VAN POPPEL, F. & VAN DIJK, J. P. (1997) The development of cause-of-death registration in the Netherlands. *Continuity and Change* **12**, 265–287.

VAN POPPEL, F. (1998) Nineteenth-century remarriage patterns in the Netherlands. *J. interdisciplin. Hist.* **28**, 343–383.

VAN POPPEL, F. W. A. (1999) *De 'statistieke ontleding van de dooden': een spraakzame bron?* Nijmegen University Press, Nijmegen.

VAN REESEMA, A. S. (1882) Over den levensduur in verband met het huwelijk. *De Economist* **31**, 374–378.

VAN SOLINGE, H. & VAN POPPEL, F. (1995) Over oude vrijsters, knorrige vrijgezellen en stadsyuppen: de veranderende positie van ongehuwden en alleenstaanden in de samenleving. In: *Alleenstaanden. Leven en werken door de geschiedenis heen*, pp. 149–176. Edited by L. de Zwaan. Staatsuitgeverij, The Hague.

VAN ZANDEN, LUITEN, J. & VAN RIEL, A. (2000) *Nederland 1780–1914. Staat, instituties en economische ontwikkeling*. Uitgeverij Balans, Amsterdam.

VEREENIGING VOOR DE STATISTIEK IN NEDERLAND (1873) *Algemeene statistiek van Nederland*, Vol. II. A. W. Sijthoff, Leiden.

VON BAUMHAUER, M. M. (1867) Tienjarige (1850–1859) levens – en sterftewet voor het Koninkrijk der Nederlanden. In: *Statistisch Jaarboek van het Koninkrijk der Nederlanden*, Vols 14 & 15. Departement van Binnenlandse Zaken, The Hague

WATKINS, S. C. (1984) Spinsters. *J. Fam. Hist.* **9**, 310–325.

WOLLESWINKEL-VAN DEN BOSCH, J. H., VAN POPPEL, F. W. A. & MACKENBACH, J. P. (1996) Reclassifying causes of death to study the epidemiological transition in the Netherlands, 1875–1992. *Eur. J. Popul.* **12**, 327–361.