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Cancer Trends During the 20th Century

Örjan Hallberg,[a] M.Sc. e.e., consultant and
Olle Johansson,[a] Assoc. Professor

Abstract

Purpose: To review development trends and possible relations between different cancers in Sweden and in other countries to better understand causing mechanisms.

Materials and methods: We used publicly available databases on cancer incidence and mortality to highlight trends and trend breaks. The data were used for correlation studies between different forms of cancers as reported from different counties within Sweden, and from other countries.

Results: Some cancer forms correlate to malignant melanoma while others, like leukaemia, do not relate to melanoma at all. Asthma is a disease that has a sharp trend break just as these cancers show around 1955.

Conclusions: There is a common environmental stress that accelerates several cancer forms such, as colon cancer, lung cancer, breast cancer, bladder cancer and malignant melanoma. Every effort should be taken to identify and eliminate this stress.

Introduction

There are a number of cancers that still are lacking good explanations as to their cause. The cancer report from *Socialstyrelsen* 1997[1] states that the causing mechanisms behind bladder-, breast-, colon- and prostate cancers still are unknown. Considerable doubt rests also with the popular explanation that sunburn is causing the drastic increased incidence in skin melanoma and death rates since 1955. Another problem that has not been solved is why we see such an explosive increase of asthma and allergies from about the same time.

In this paper, we will take a closer look at the statistics of all these diseases in an attempt to narrow down the range of possible causing mechanisms.

Methods

We used databases on cancer incidence and mortality for Sweden as well as for other countries to derive cancer trends over time.[1-3] We also combined results from a death-cause register and a cancer incidence register in Sweden to investigate if people who died from lung cancer or breast cancer had earlier in life suffered from skin melanoma.[4] Correlation characteristics were calculated between different cancer types, both within Sweden and between different countries.

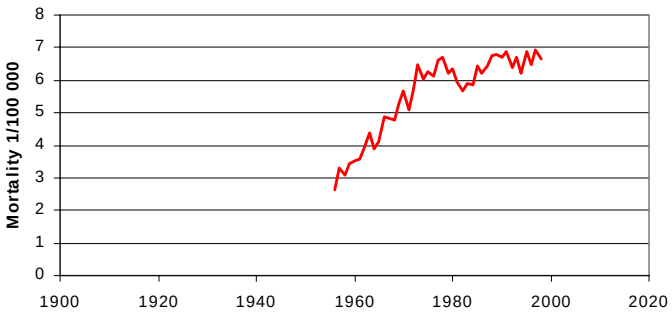

Figure 1. Mortality due to bladder cancer in Sweden since 1956.

Results

Bladder, prostate, melanoma, colon and breast cancers

Figure 1 shows the development of bladder cancer since 1955. In 1979 this disease had a reduction in the numbers dying annually, but since 1982 the rate is increasing again. Due to lack of data we can only see the development from 1955.

Figure 2 gives the drastic increase in Sweden in prostate cancer since 1951. Increasing trends can be noticed in 1955, 1970 and 1982, while a period of decreasing numbers started in 1979, just as for bladder cancer.

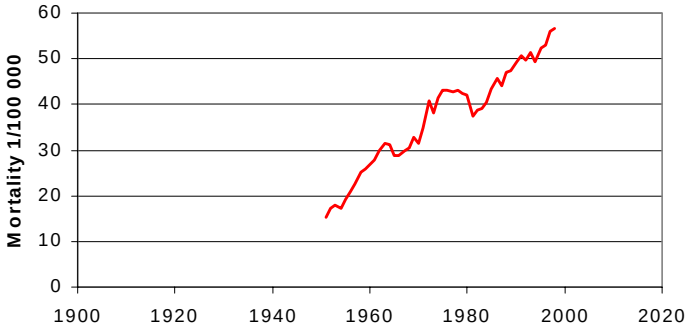

Figure 2. Development of prostate cancer death rates in Sweden since 1951.

Figure 3 shows the mortality for skin melanoma in Sweden. Data before 1955 is not published by the authorities, but was retrieved from a library.[5] The raw data shows that the 'natural' death rate increased from about 30 per year in 1912 to 50 in 1954. This gives an increase of 0.5 more victims per year. From 1955 it increased to 325 in 1996, which gives an increase by almost 7 victims per year, i.e. 14 times more than before 1955.

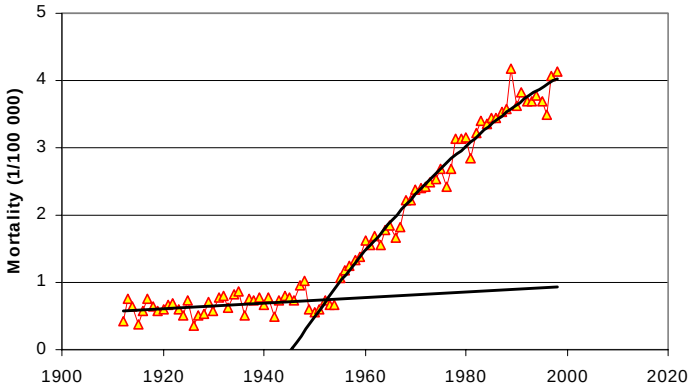

Figure 3. Skin melanoma mortality in Sweden since 1912.

Figure 4 gives the development of lung cancer death rate in Sweden.

Figure 5 gives the development of female breast cancer deaths in Sweden. Breast cancer screening started after 1975 to be gradually introduced in the country, which might explain part of the stabilisation. Better treatment in general is also altering these types of graphs. It should be noticed that breast cancer incidence has not levelled off, but continues to increase. This means that the causing mechanism behind breast cancer has not been properly addressed, but only methods of treatment and early diagnostics.

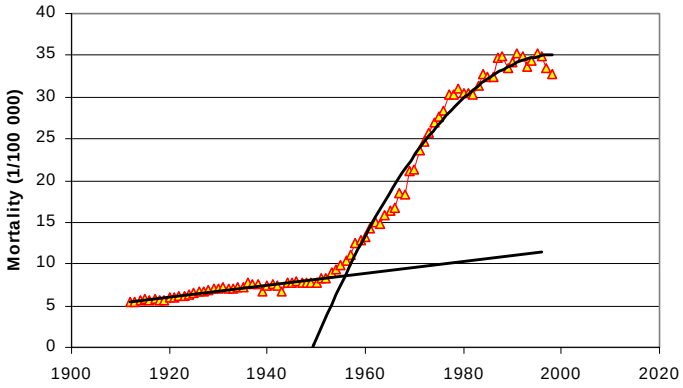

Figure 4. Lung cancer death rates in Sweden.

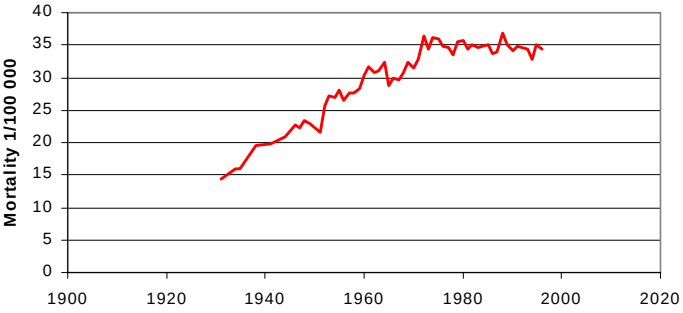

Figure 5. Development of female breast cancer mortality.

Figure 6 gives the development of colon cancer mortality since 1931. The mortality is increasing between 1920-1940 and starts to increase again around 1955 and 1969. A reduction is noticed from 1979.

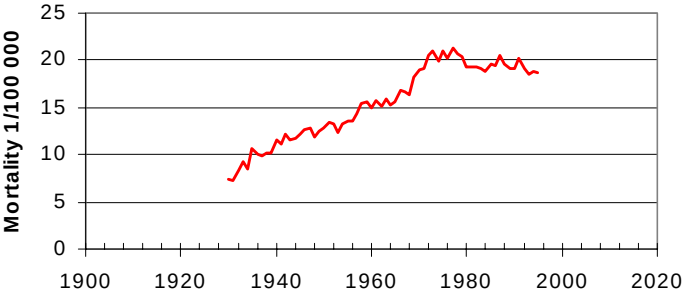

Figure 6. Mortality due to colon cancer in Sweden.

Asthma

Figure 7 shows the prevalence of asthma among 18-year-old males in Sweden.[6] The same graph also gives the percentage of 18-year-old males in Finland who were rejected at the military conscription test due to asthma.[7] These data are only available up to 1989. Before 1960 this level was essentially zero or at a very low level. Again, the graph indicates that a drastic change was made to the environmental conditions around 1960 or before 1960.

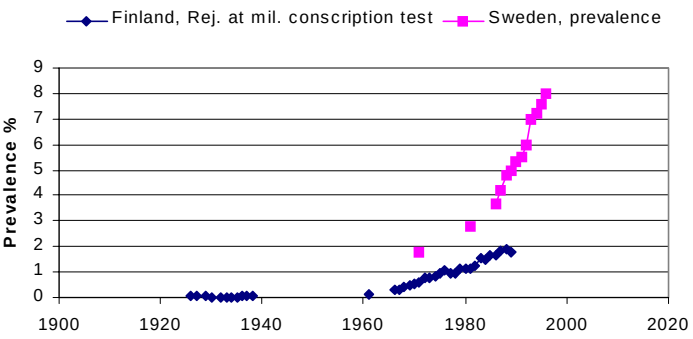

Figure 7. Asthma prevalence among Swedish 18-year-old males and the rejection rate at military conscription test due to asthma in Finland.[6,7]

Figure 8 gives the general asthma prevalence in the Swedish population according to a number of studies, summarised in ref. 8.

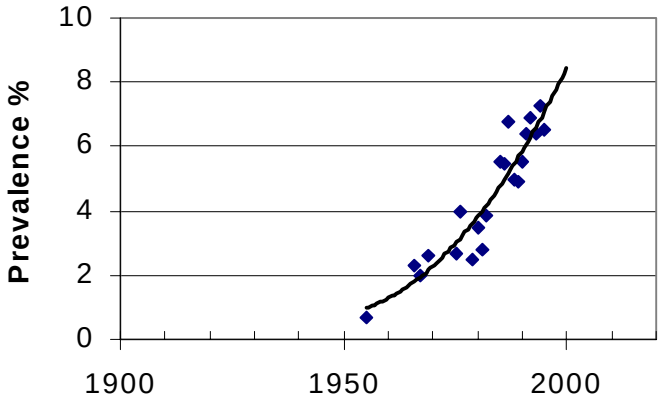

Figure 8. General asthma prevalence in the Swedish population.[8]

International cancer correlations

According to a recent study,[9] breast and prostate cancers are correlated. References 2 and 9 give the incidences from different regions in the world. People who move from low- to high-incidence countries also increase their incidence.[9] Figure 9 is a plot of prostate cancer mortality versus breast cancer mortality in a number of countries (Age standardised rates adjusted).

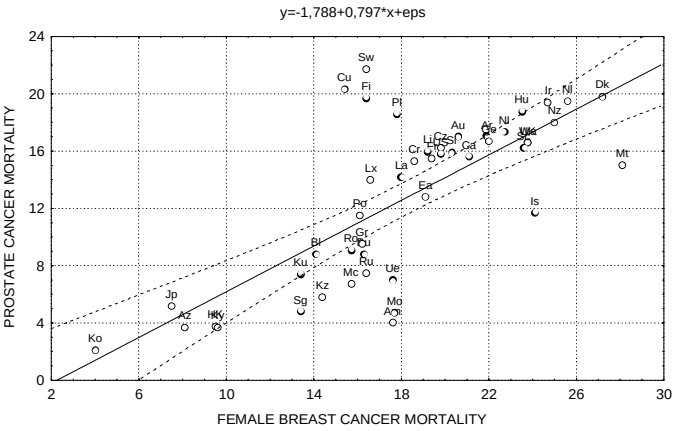

Figure 9. Breast and prostate cancer mortalities correlate. b=0.74; p<0.00001

Since we see a correlation between breast cancer and prostate cancer, it might be of interest to see if other cancers correlate. Figure 10 is a plot of melanoma and breast cancer incidences from 40 countries.[2] Here an association is also evident. Each dot is a specific country. See also Table 1.

Swedish cancer death rates

Figure 11 shows the development of different cancer death rates in Sweden, expressed as a percentage of reported rates in 1996. The graph also includes breast cancer incidence expressed in the same way. It is obvious that the graphs are quite similar, with a major trend break around 1955 and a short period of improvement around 1980. Colon cancer starts to increase already after 1920 and has a very clear reduction around 1980.

From Figure 11 it is clear that these cancer forms have a very similar development, although colon mortality seems to have been triggered already in 1920. The average development for the rest of the cancers

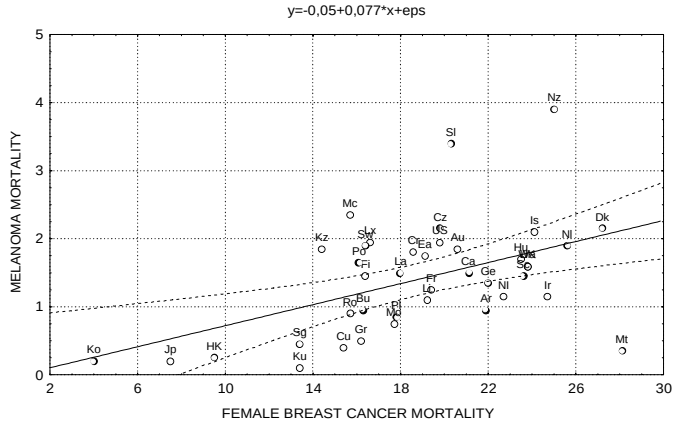

Figure 10 An association is noticed between breast cancer and skin melanoma mortality. b=0.49; p=0.00151

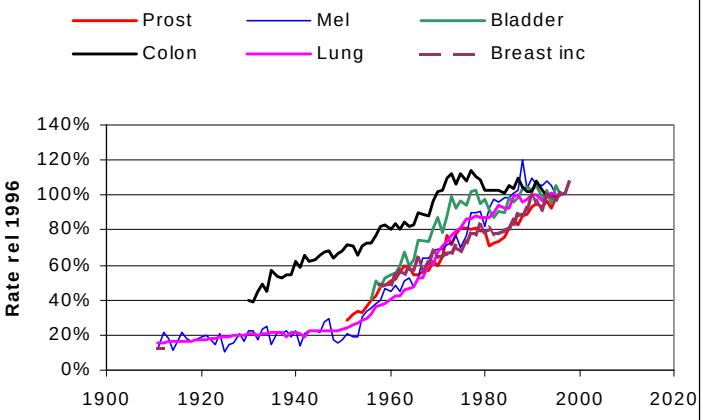

Figure 11. Cancer death rates and breast cancer incidence in Sweden expressed as a percentage of their values in 1996.

11 is given in Figure 12. In the same graph the number of persons per year who have been registered as sick for more than one year is also plotted. Again, 1979 seems to be a magic year of health improvement, while 1997 looks to be another year of disaster. It may predict that the cancer mortality for 1999 and onwards will also increase.

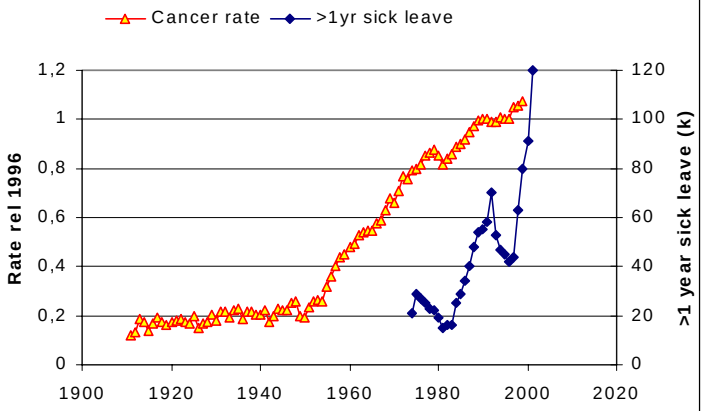

Figure 12. The average cancer rate relative to 1996 for bladder, melanoma, prostate, lung and breast cancers and the number of persons on sick leave for more than one year.

Figure 13 gives a similar graph where the 'illness factor' in Sweden has been plotted since 1955. There is obviously a clear relationship between this factor and cancer mortality.

Discussion

The authorities never publish the drastically increasing cancer mortality as shown in figures 11-13. First of all, data before 1955 has always been locked out from publicly available databases. Secondly,

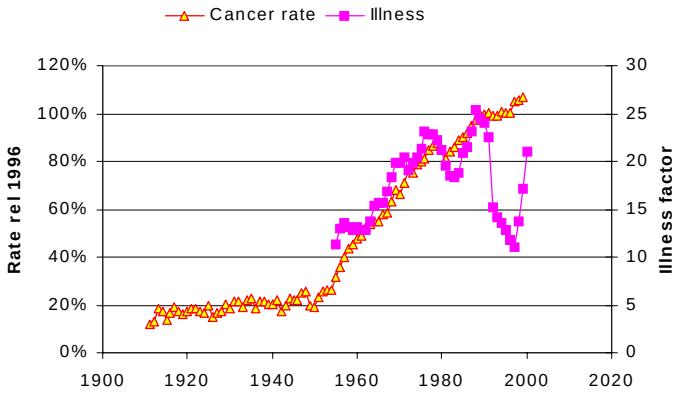

Figure 13. The similarity between the 'illness factor' and cancer mortality for the cancers analysed. Since 1997 the illness factor has increased drastically and continues to do so in 2001.

and even worse, trends for obviously exposure-time-dependent cancers are effectively neutralised by use of age-standardised ratios (ASR). This procedure assumes that the increasing cancer incidence is a natural effect of growing old and thus the age standardised mortality will stay the same although the population gets older. By doing this, the responsible institutions can show to the authorities that the mortality is in control and in effect not increasing at all despite the fact that it is. Furthermore, several cancer mortalities are not published before 1969, which makes it difficult to notice the sharp trend breaks that are present at that year. The responsible authorities do not agree that there is any trend break of interest at all.[13] Nothing speaks for either a trend break in cancer incidence or that a large number of cancers would depend on electromagnetic fields.

Figure 5 shows that breast cancer deaths started to increase long ago, maybe in 1920. This curve has an almost linear increase that flattens out around 1975. But since death rates are influenced by improvements in the medical treatment, it may be better to look at incidence data (rate of people getting ill per year) rather than on death rates.

Figure 14 shows that the incidence rate continues to grow even though the mortality levelled off after 1975. This implies that we have improved the treatment but not at all addressed the cause of this disease. It is interesting to note that breast cancer incidence also shows an improvement in 1979 and a few years onwards, just as the prostate, bladder and colon cancer death-rate graphs do.

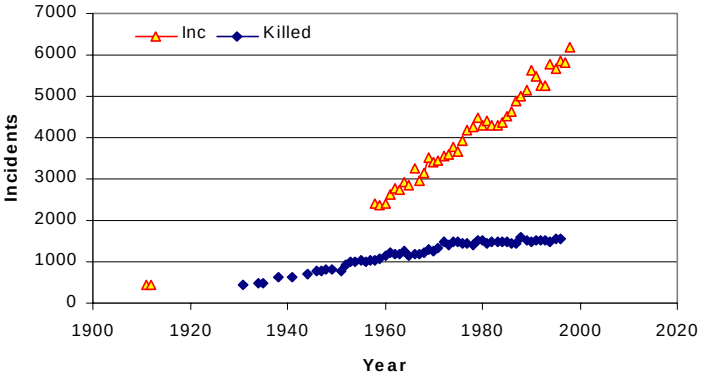

Figure 14. Development of female breast cancer cases in Sweden.

Skin melanoma is a cancer that started to explode in 1955 (see Figure 3). It is interesting to note that a similar steep increase in melanoma mortality was also reported from Queensland, Australia, when comparing 1951-1959 with 1964-1967.[10] This increase was related to the introduction of high power TV broadcasting transmitters. Skin melanoma has also been associated with the expansion of broadcasting networks in Sweden, Norway, Denmark and USA.[11] Lung cancer has an almost identical development, as melanoma has had in Sweden with a scale factor of 10 (see Figures 3 and 4).

Augustsson and Stierner[14, 15] presented statistics on the location of

moles, melanocytes and melanoma on the human body. Figure 15 is a summary picture of all these moles. Figure 16 gives the dot density for different parts of the body. It is interesting to note the similarity to induced vertical currents in the body due to radio frequent electromagnetic fields (RF) as has been presented in ref. 16 (see Figure 17).

Augustsson and Stierner[14, 15] noticed that the largest mole density

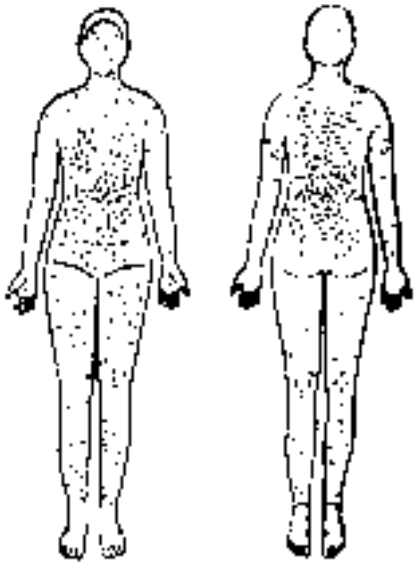

Figure 15. The combined distribution of dysplastic naevi and melanoma ('dots') over the human body.[14-15]

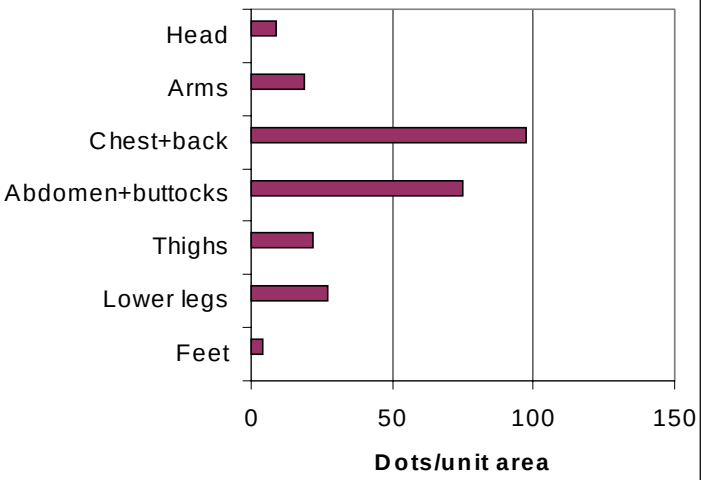

Figure 16. The number of 'dots' per unit skin area according to Figure 15.

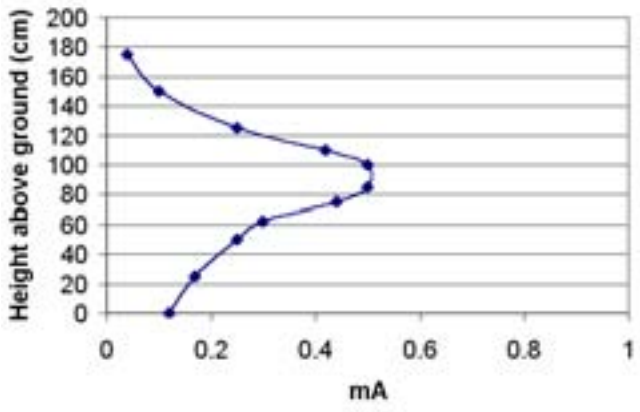

Figure 17. Induced vertical1 current distribution for isolated, shoe-wearing, grounded or ground-topped human model at 27.12 MHz under near-field exposure conditions.[16]

was found in areas that were not normally exposed to sunshine. Thus, they concluded that intermittent or minimal exposure to UV radiation was more dangerous than continuous exposure. We think that the explanation is quite different from that. The induced currents from RF exposure are largest at these parts of the body so the mole density should be expected to follow the same pattern.

Cancers in the Swedish counties

Figure 18 shows the correlation between a number of cancers and melanoma in the 26 different Swedish counties. Table 2 gives the respective beta-values. It is worth noticing that leukaemia does not correlate to these cancer types at all.

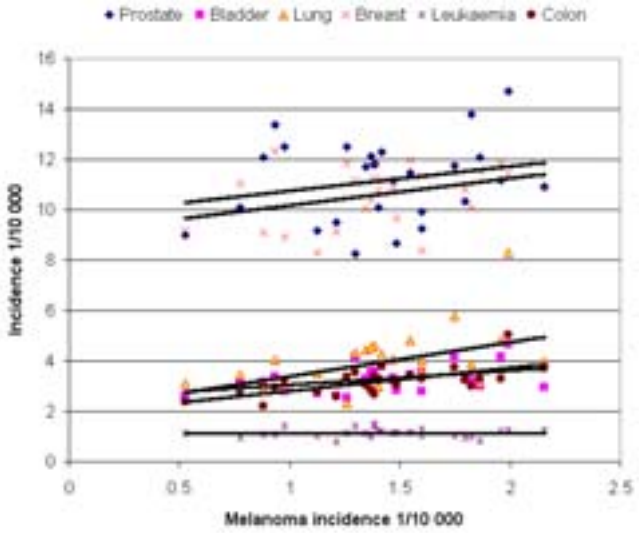

Figure 18. Several cancers correlate with skin melanoma in the 26 different Swedish counties, but leukaemia does not.

A closer look at the lung cancer mortality shows a development very similar to skin melanoma (see Figures 3-4). The average consumption of cigarettes in Sweden has decreased from 1,946 cigarettes per year per capita in 1980 to 1,200 in 1995, although the mortality has continued to increase; however, the increase has been lower than that for skin melanoma.

In Figure 19 we plotted the annual melanoma deaths vs. lung deaths in Sweden for each year from 1912 to 1996 (beta = 0,982).

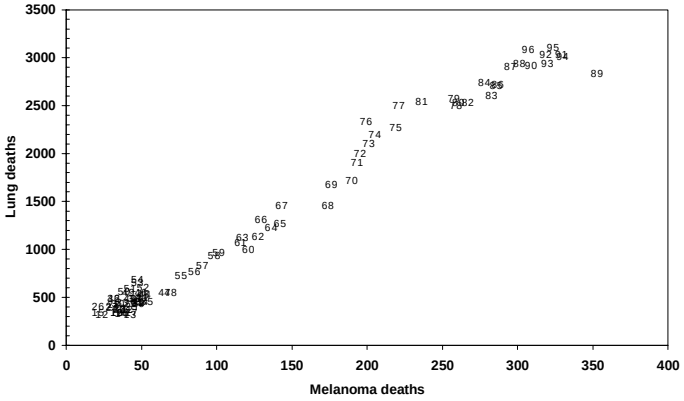

Figure 19. Melanoma and lung cancer deaths for different years.

In order to test by other means if lung cancer and breast cancer are related to skin melanoma, we combined two databases: the Swedish Cancer Register and the Death Cause Register of Sweden.[4] The records of those who died from breast cancer or lung cancer were searched for any treatment for skin melanoma earlier in their lives. As a reference, all other death causes except breast, lung or melanoma cancers were also searched for the same. A specific, non-cancer death

cause was ischemic heart disease, which also was searched for any melanoma treatment.

The data was collected over the time period 1970-1998. The results show the fraction (%) of the deceased who earlier in life had been treated against skin melanoma:

All death causes: ... 0.21% (>2.5 millions deaths)
Breast cancer: ..... 0.37% (42,610 deaths)
Lung cancer: ..... 0.33% (71,956 deaths)
Heart Disease: ..... 0.24% (821,367 deaths)

We conclude that breast cancer and lung cancer are linked to skin melanoma, since people who died due to breast or lung cancer had an increased melanoma incidence by a factor of 1.67 (0.35/0.21). This was further underscored by the strong geographical relationship between melanoma incidence and lung, breast or colon cancer incidence. The large numbers involved in this analysis exclude the possibility that the results are just a matter of coincidence.

Figures 20 and 21 show that colon cancer relates to skin melanoma and that lung cancer and bladder cancer are strongly correlated. Figures 22 and 23 show that cigarette consumption is not a strong common factor for these cancers. See Table 2, data is from 1989-1993.

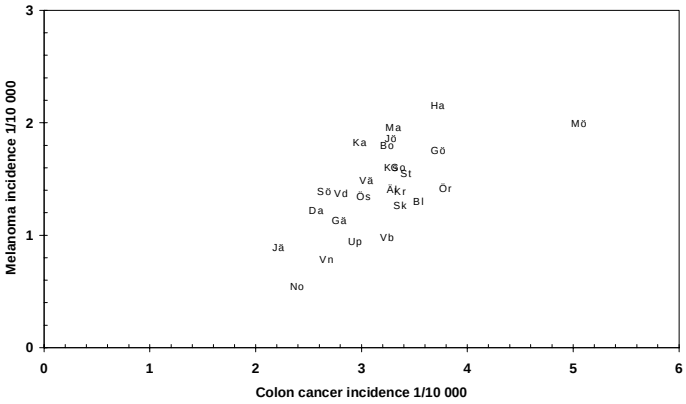

Figure 20. Melanoma incidence versus colon incidence in the 26 counties of Sweden. b=0.655; p=0.000207. R^2=0.43

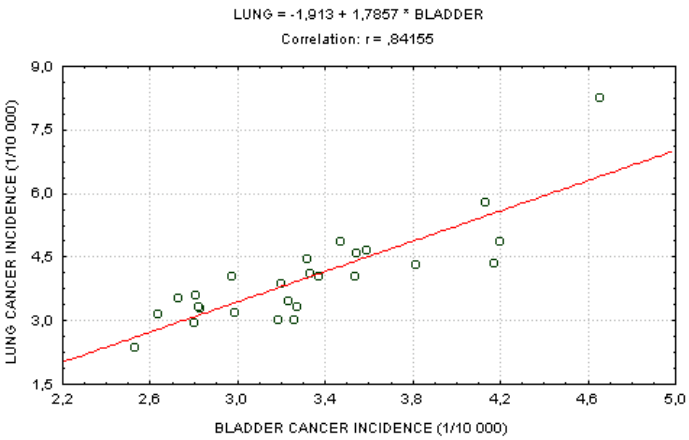

Figure 21. Lung cancer and bladder cancer incidence in the Swedish counties are strongly correlated. b=0.842; p<0.00001. R^2=0.71

A multi-regression analysis of lung cancer mortality in 22 different countries showed a relation to both cigarette consumption and melanoma mortality. Cig-beta=0.679 and Mel-beta=0.528 with p=0.00212.

Finally, we looked at all cancer deaths reported since 1912 and plotted the result in Figure 24. Trend-breaks are quite visible in 1920, 1955, 1970 and in 1979.

In 1920 we got MW radio, in 1955 we got FM radio and TV1, in 1969-70 we got TV2 and colour TV and in 1978 several of the old AM broadcasting transmitters were disrupted, all according to ref. 12.

Improvements in prostate cancer deaths have been reported in

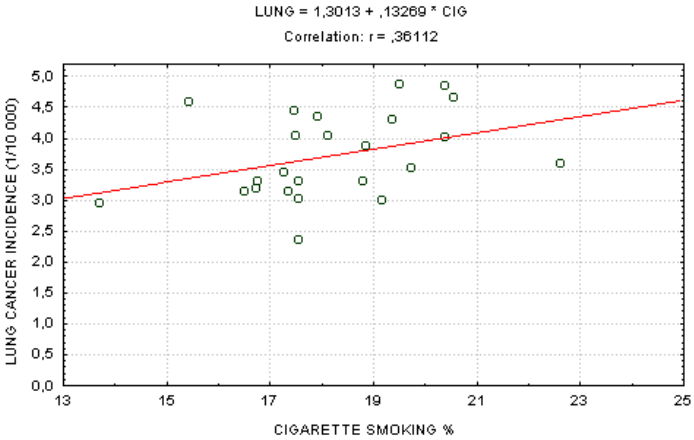

Figure 22. The correlation between lung cancer incidence and cigarette consumption (% of the population that is smoking cigarettes) is weak in the Swedish counties. R^2=0.13.

Figure 23. Bladder cancer incidence does not correlate well to cigarette consumption in Sweden. R^2=0.07

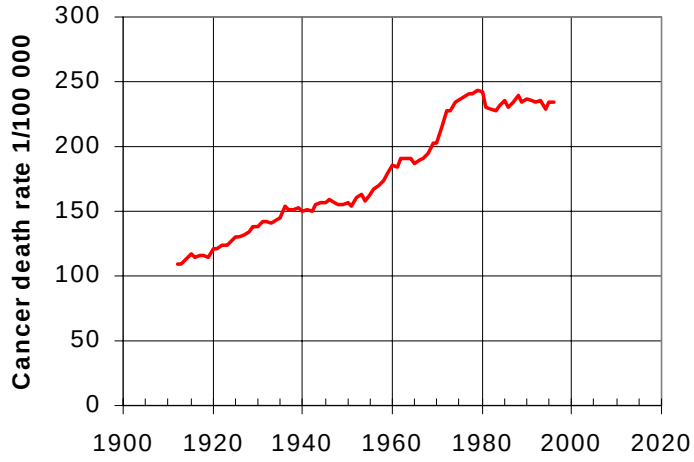

Figure 24. The mortality shows clear trend-breaks in 1920, 1955, 1970 and in 1979.

USA. Figure 25 gives the number of prostate cancer deaths and the number of AM stations still active. Since 1990 the number of active AM stations has been steadily decreasing.

Figure 26 gives the development of cancer mortalities in different countries.

Conclusions

1. Breast, bladder, prostate, lung, colon and cutaneous melanoma cancers are all associated with each other. Figures 15-17 and ref. 11 relate melanoma to radio-frequency EMF.

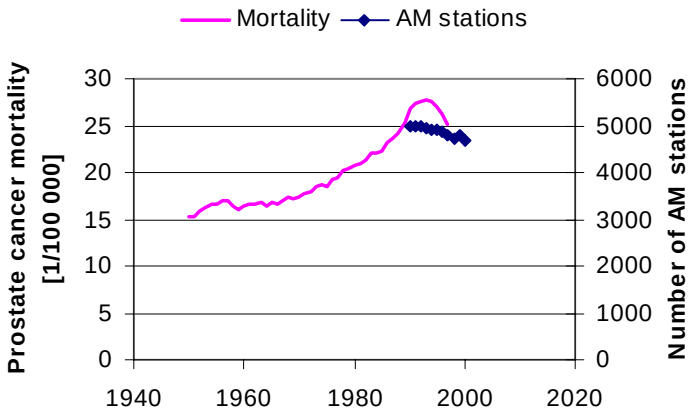

Figure 25. A sharp decline in number of men killed by prostate cancer has been noticed in USA since 1990. At the same time the number of AM stations have started to decline.

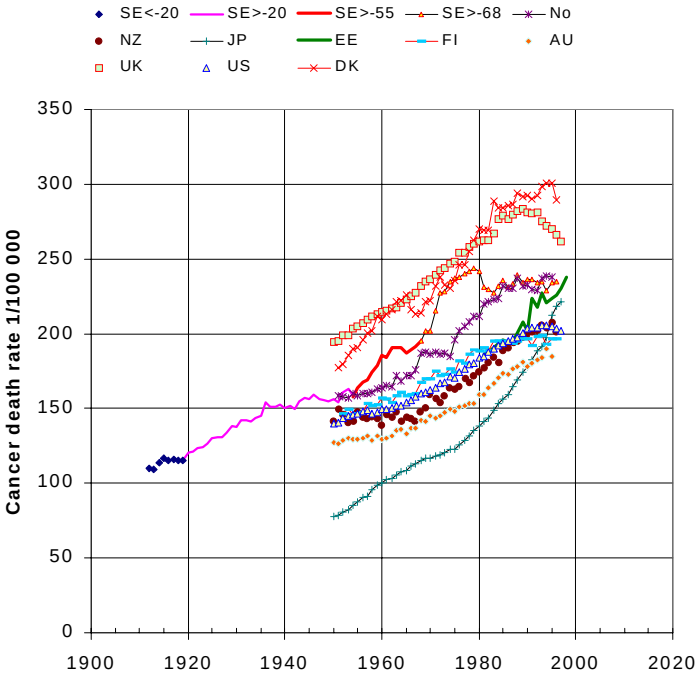

Figure 26. Cancer mortality development in several countries since 1950.

2. Figure 18 indicates that leukaemia has nothing to do with melanoma. Somewhat more unexpected is the strong relation between melanoma and colon cancer and between lung cancer and bladder cancer.
3. Since the cancer mortality trend-breaks coincide with expansion or disruption of public broadcasting in Sweden, studies regarding the influence from electromagnetic fields on cancer and asthma development cannot be further delayed.
4. Lung cancer mortality has a multiple correlation to both cigarette consumption and skin melanoma mortality.
5. Since closing down of public radio transmitters seems to have a strong effect in reducing cancer mortality, public air radio transmission should be avoided.
6. Age-standardised ratios should be used with care when presenting cancer rates that are dependent on exposure times.

Similar trend-breaks as found in Sweden can be noticed for other countries. Figure 26 shows, for example, that Estonia (EE) had a steep increase in the cancer mortality in 1991, the year that the 'western' FM radio-frequencies were allowed and introduced all over the country.

Acknowledgements

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a. Experimental Dermatology Unit, Department of Neuroscience, Karolinska Institute, S-171 77 Stockholm, Sweden
Correspondence to: *Örjan Hallberg,* e-mail: oerjan.hallberg@swipnet.se

Larger scale reproductions of the figures in this article may be obtained from ACNEM, in grey-scale or colour.

Cancers	Beta	p-level
Breast – Prostate	0.74	<0.00001
Breast – Melanoma	0.49	0.00151
Breast - Colon	0.671	<0.00001
Prostate - Colon	0.66	0.00001
Prostate - Melanoma	0.43	0.0053
Bladder - Melanoma	0.31	0.049
Colon - Melanoma	0.400	0.0105

Table 1. Correlation parameters between different cancer mortalities in the examined countries.

Cancers	Beta	p-value
Melanoma - Colon	0.655	0.000207
Bladder – Lung	0.842	<0.00001
Lung - Colon	0.664	0.000115
Bladder - Breast	0.519	0.00558
Melanoma - Leukaemia	0.016	0.94

Table 2. Correlation coefficients between incidence rates of different cancers in the Swedish communities.