

# Cancer Mortality Among Males and Females in Denmark, England, and Switzerland

## IV. Mortality of Accessible and Inaccessible Cancers in Danish Towns and Rural Areas

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Previous studies, recorded in detail (1, 2), showed that in the years immediately before World War II there was a clear difference in sex distribution of cancer deaths between the three European countries of highest cancer mortality: Switzerland, England, and Denmark.

For a further analysis the three European materials were subdivided into cancers of accessible and inaccessible site (3), the latter taken both as comprising and as excluding gastric cancer. This subdivision was made because we expected that international differences in diagnostic methods and clinical tradition would have most influence on the figures for cancers of inaccessible sites, which are equally inaccessible to diagnosis and treatment. Differences in deaths from cancers of accessible sites would probably be ascribable either to real differences in cancer incidence or to differences in therapeutical results, as the diagnosis of these cancers is less complicated.

Thus it was demonstrated, that exclusion of gastric cancer from inaccessible cancers in women eliminates the differences between the three countries concerned, whereas accessible female cancers show some differences in mortality which reasonably may be ascribed to differences in incidence, or perhaps in therapeutical results.

A corresponding exclusion of gastric cancer from the male inaccessible cancers did not eliminate inter-European differences, but if gastric cancer was eliminated from the total cancer mortality, both sexes showed that the differences between the two countries of highest cancer mortality (*viz.* for males Switzerland and England, and for females Denmark and England) disappeared. As these differences thus are ascribable to a cancer difficult to diagnose they may be taken with some reservation.

Danish death certificates from the same years, 1935 to 1939, showed similar differences in sex dis-

tribution according to age, if subdivided into Capital, Provincial Towns, and Rural Areas, and it may now be of interest to compare the results of division into accessible and inaccessible sites with and without gastric cancer, with those from the inter-European comparison.

To test the validity of the differences demonstrated we have carried out a corresponding comparison for the death certificates from the years 1942 to 1944 with similar result, and thereafter we have repeated this on the material of the Danish Cancer Registry for the same period.

The methods employed follow in every detail those of the earlier reports, and consequently tables will be directly comparable with those of previous papers.

### DEATH CERTIFICATES 1935 TO 1939

In dealing with Danish death certificates it should be mentioned that they are very uniform in quality. Public Health Insurance covers about 85 per cent of the population, and as nearly all hospitals are run by the public, the access to first-class medical attention is equal to all social strata. The percentage of death certificates issued by hospitals (2) has previously been given separately for Capital, Provincial Towns, and Rural Areas. It will be seen that there is some difference in the percentage of hospitalization, especially between Capital and Rural Areas, and the slightly higher quality of the Capital material is also reflected in the shape of the curves for the oldest age classes. Thus it will be seen that the curve for cancer deaths in the Capital (2, Fig. 5) continues its rise through the oldest age classes, while the curves for Rural Areas tend to fall in these classes, presumably as an expression of less hospitalization, and consequently less energetic diagnosis in the Rural Areas for the age classes concerned, which, however, are only of slight numerical importance.

*Females.*—It should be kept in mind, that differences in female cancer mortality between Danish Capital, Provincial Towns, and Rural Areas, although statistically significant, are less pronounced than those in male cancer mortality (2). However, female cancer of inaccessible site, whether or not including gastric cancer (Tables 2 and 2A and 3 and 3A), does not show any significant difference between the Danish country parts in question, so that—contrary to the inter-European comparison—we cannot ascribe the differences found to any difference in the occurrence of the diagnosis of gastric cancer.

With regard to accessible female cancer there is, however, a difference to be found (Table 4) as was the case in the European material, the Capital showing a higher mortality than Rural Areas. It is worth while noticing that the age classes concerned are ten years younger than the corresponding classes for male accessible cancers (Tables 4 and 4A and 8 and 8A), presumably because the female figures are an expression of mortality mainly from uterine and mammary cancer, which usually occur at an earlier age than cancers of the rectum and the oesophagus which will be prevalent as male cancers of accessible sites.

Especially with regard to uterine and breast cancer, however, hospital facilities are very uniform throughout Denmark, and to the authors it seems more than probable that differences in mortality from these sites of cancer are mainly due to a difference in incidence, and not to any difference in therapeutic or diagnostic results. This is in good correspondence with our more tentative suggestion to the same effect with regard to the differences in mortality from accessible female cancers, between the three European countries examined.

*Males.*—With regard to the male cancer mortality in Denmark, it seems that neither subdivision into cancers of accessible and inaccessible

sites (Tables 5, 6, 7 and 8 and 5A, 6A, 7A and 8A) nor the exclusion of gastric cancer will influence the excess mortality in towns to any degree of statistical significance.

#### SUMMARY AND CONCLUSION

Previous studies on cancer mortality in Danish Capital, Towns, and Rural Areas have been continued, and the material of death certificates subdivided into cancers of accessible and inaccessible sites, the latter category comprising and excluding gastric cancer. These comparisons have been carried out on material from the period 1935 to 1939 from which period comparisons between Danish, English, and Swiss materials were carried out in previous papers.

Female cancers show a higher mortality from cancer of accessible sites in Capital than in Rural Areas.

Female cancers of inaccessible sites show the same incidence in all three country parts.

Male cancers of all subdivisions show a higher mortality in the Capital than in Rural Areas.

#### REFERENCES

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DENMARK: 1935 TO 1939. CANCER MORTALITY PER 10,000 LIVING  
(Cancer of All Sites, Except Stomach)

TABLE 1

Age	FEMALES				MALES			
	Capital	Provincial Towns	Rural Areas	Rural Areas	Capital	Provincial Towns	Rural Areas	Rural Areas
0-19	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2
20-24	0.4	0.4	0.4	0.6	0.4	0.7	0.6	0.6
25-29	1.0	1.3	1.1	0.7	0.4	0.7	0.7	0.6
30-34	2.5	2.8	2.3	1.1	1.3	1.3	1.3	0.8
35-39	5.8	5.8	4.9	2.4	2.0	1.7	1.7	1.6
40-44	11.8	9.5	7.3	5.4	3.0	3.1	4.4	3.8
45-49	19.1	15.8	13.3	7.6	7.1	5.1	6.9	6.8
50-54	25.8	20.0	19.1	18.1	11.3	7.9	12.1	11.6
55-59	36.6	30.0	28.0	30.6	15.6	14.7	20.4	20.3
60-64	44.3	39.4	33.3	43.7	31.2	24.4	28.4	33.6
65-69	51.6	52.0	46.5	63.4	48.5	37.0	49.0	55.1
70-74	68.6	70.5	63.6	89.0	66.3	61.5	79.9	85.5
75-79	88.1	83.6	83.4	117.3	85.6	86.9	105.4	121.0
80-84	105.5	91.5	96.6	109.5	97.0	96.7	128.7	133.0
85-	133.3	110.8	91.7	141.5	87.6	89.7	96.9	100.8

DENMARK: 1935 TO 1939. CANCER MORTALITY PER 10,000 LIVING  
(Cancer of Inaccessible Sites, Including Stomach)

TABLE 2

Age	FEMALES				MALES			
	Capital	Provincial Towns	Rural Areas	Rural Areas	Capital	Provincial Towns	Rural Areas	Rural Areas
0-19	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.2
20-24	0.3	0.4	0.2	0.2	0.4	0.2	0.2	0.5
25-29	0.6	0.6	0.5	0.2	0.8	0.5	0.5	0.6
30-34	1.0	0.9	1.0	1.0	1.0	1.0	0.8	0.8
35-39	2.3	2.3	2.4	2.4	1.9	2.4	2.4	1.6
40-44	3.1	3.1	4.4	6.1	4.1	3.4	3.4	3.8
45-49	8.9	7.8	6.9	8.3	7.8	7.6	6.8	6.8
50-54	12.4	12.0	12.1	18.6	12.0	12.3	11.6	11.6
55-59	20.0	18.7	20.4	26.7	20.8	20.8	20.3	20.3
60-64	29.7	34.7	28.4	43.8	40.6	40.6	33.6	33.6
65-69	42.5	49.2	49.0	63.4	64.3	64.3	55.1	55.1
70-74	67.5	79.0	79.9	96.5	92.1	92.1	85.5	85.5
75-79	98.3	103.2	105.4	135.0	116.5	116.5	121.0	121.0
80-84	111.6	106.0	128.7	153.7	115.2	115.2	133.0	133.0
85-	148.2	116.9	96.9	183.1	100.8	100.8	107.5	107.5

DENMARK: 1935 TO 1939. CANCER MORTALITY PER 10,000 LIVING  
(Cancer of Inaccessible Sites, Stomach Excluded)

TABLE 3

Age	FEMALES				MALES			
	Capital	Provincial Towns	Rural Areas	Rural Areas	Capital	Provincial Towns	Rural Areas	Rural Areas
0-19	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.1
20-24	0.3	0.4	0.4	0.3	0.5	0.5	0.7	0.3
25-29	0.6	0.7	0.4	0.2	0.1	0.5	1.6	0.6
30-34	0.8	0.7	0.7	0.7	0.8	0.7	3.1	0.6
35-39	1.8	1.5	1.8	1.6	1.6	1.1	4.4	1.1
40-44	4.0	3.0	2.9	4.7	2.0	2.0	8.8	1.5
45-49	7.3	5.7	4.6	6.8	4.9	3.5	10.6	2.7
50-54	9.9	8.5	8.5	12.5	7.8	5.3	14.5	5.3
55-59	15.1	12.2	13.5	18.4	10.6	9.4	16.8	8.2
60-64	20.0	21.1	16.5	27.8	20.4	16.2	21.6	12.1
65-69	27.1	25.5	24.9	37.6	32.2	29.7	29.7	19.6
70-74	38.4	41.2	33.9	56.9	43.0	41.9	36.5	30.5
75-79	53.9	51.0	46.9	80.4	52.9	56.4	42.1	38.4
80-84	64.8	48.3	54.4	75.4	58.6	58.4	44.3	37.4
85-	82.1	54.2	47.4	101.5	44.6	52.3	44.3	37.4

DENMARK: 1935 TO 1939. CANCER MORTALITY PER 10,000 LIVING  
(Cancer of Accessible Sites)

TABLE 4

Age	FEMALES				MALES			
	Capital	Provincial Towns	Rural Areas	Rural Areas	Capital	Provincial Towns	Rural Areas	Rural Areas
0-19	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1
20-24	0.5	0.5	0.7	0.5	0.5	0.3	0.3	0.3
25-29	1.7	2.2	1.6	1.7	0.4	0.5	0.6	0.6
30-34	4.0	4.2	3.1	4.0	0.7	0.3	0.6	0.6
35-39	7.8	6.6	4.4	7.8	0.7	1.1	1.1	1.1
40-44	11.8	10.1	8.8	11.8	1.3	2.2	1.5	1.5
45-49	16.0	11.5	10.6	16.0	5.6	3.5	2.7	2.7
50-54	21.5	17.8	14.5	21.5	12.2	5.1	5.3	5.3
55-59	24.3	18.3	16.8	24.3	15.9	10.8	8.2	8.2
60-64	24.4	26.5	21.6	24.4	25.8	16.3	12.1	12.1
65-69	30.1	29.3	29.7	30.1	32.1	23.3	19.6	19.6
70-74	34.2	32.6	36.5	34.2	36.9	32.7	30.5	30.5
75-79	40.7	43.3	42.1	40.7	34.2	38.4	38.4	38.4
80-84	51.3	56.6	44.3	51.3	40.0	43.0	37.4	37.4
85-								

TABLE 1A

TEST OF SIGNIFICANCE: FEMALES  
(Cancer of All Sites, Except Stomach)\*

Age	cap-pr.t.	pr.t.-r.a.	cap-r.a.†
0-19	-0.04	-1.88	-1.75
20-24	0.34	0.30	0.08
25-29	-0.98	0.78	-0.21
30-34	-0.67	1.12	0.40
35-39	-0.72	1.36	1.28
40-44	1.96	2.52	5.00
45-49	2.10	1.95	4.52
50-54	3.10	0.60	4.31
55-59	2.73	0.98	4.26
60-64	1.63	2.49	4.51
65-69	-0.12	1.74	1.64
70-74	-0.39	1.59	1.14
75-79	0.66	0.08	0.80
80-84	1.40	-0.58	1.01
85-	1.34	1.47	2.98

TABLE 2A

TEST OF SIGNIFICANCE: FEMALES  
(Cancer of Inaccessible Sites, Including Stomach)

Age	cap-pr.t.	pr.t.-r.a.	cap-r.a.
0-19	0.14	-1.88	-1.56
20-24	-0.38	1.00	0.58
25-29	-0.55	1.16	0.59
30-34	0.09	-0.10	-0.01
35-39	0.84	-1.07	-0.16
40-44	1.29	-0.60	0.88
45-49	1.05	1.00	2.28
50-54	0.28	-1.08	2.46
55-59	0.72	-0.29	0.63
60-64	-1.92	2.79	-2.13
65-69	-1.91	0.06	-2.18
70-74	-2.26	1.12	-1.46
75-79	-1.36	-0.32	-1.89
80-84	0.53	-2.36	-1.76
85-	0.68	1.46	2.20

TABLE 3A

TEST OF SIGNIFICANCE: FEMALES  
(Cancer of Inaccessible Sites, Stomach Excluded)

Age	cap-pr.t.	pr.t.-r.a.	cap-r.a.
0-19	0.14	-1.82	-1.50
20-24	-0.66	1.00	0.28
25-29	-0.35	1.34	1.00
30-34	0.42	-0.26	0.20
35-39	0.57	-0.70	-0.07
40-44	1.58	0.21	2.29
45-49	1.78	1.46	3.62
50-54	1.17	0.04	1.42
55-59	1.88	-0.96	1.20
60-64	-0.52	2.62	2.10
65-69	0.62	0.29	1.04
70-74	-0.74	2.24	1.44
75-79	0.53	1.00	1.56
80-84	2.20	-0.98	1.52
85-	2.25	0.74	3.32

TABLE 4A

TEST OF SIGNIFICANCE: FEMALES  
(Cancer of Accessible Sites)

Age	cap-pr.t.	pr.t.-r.a.	cap-r.a.
0-19	-1.26	-0.44	-1.54
20-24	2.37	-2.66	-0.20
25-29	-0.93	-0.14	-1.18
30-34	-1.05	1.46	0.36
35-39	-0.39	2.10	1.70
40-44	1.36	2.94	4.72
45-49	1.31	1.34	2.64
50-54	3.12	0.79	4.48
55-59	2.00	2.18	4.68
60-64	2.74	0.88	4.18
65-69	-0.80	2.19	1.32
70-74	0.26	-0.12	0.17
75-79	0.40	-1.08	-0.64
80-84	-0.40	0.20	-0.25
85-	-0.48	1.34	0.76

TABLE 5A

TEST OF SIGNIFICANCE: MALES  
(Cancer of All Sites, Except Stomach)

Age	cap-pr.t.	pr.t.-r.a.	cap-r.a.
0-19	-1.04	0.56	-0.72
20-24	1.50	-1.68	0.00
25-29	-0.62	0.20	-0.53
30-34	0.80	0.62	1.59
35-39	3.06	-0.14	3.62
40-44	0.50	2.41	3.03
45-49	4.17	3.05	8.02
50-54	6.66	0.62	9.02
55-59	4.04	3.08	8.02
60-64	3.36	3.74	7.72
65-69	3.62	1.04	5.32
70-74	3.50	-1.98	3.95
75-79	0.96	0.03	1.12
80-84	2.36	-0.15	2.66
85-			

TABLE 6A

TEST OF SIGNIFICANCE: MALES  
(Cancer of Inaccessible Sites, Including Stomach)

Age	cap-pr.t.	pr.t.-r.a.	cap-r.a.
0-19	-0.90	0.43	-0.66
20-24	-0.65	-1.12	-0.88
25-29	1.02	-3.08	-2.15
30-34	0.01	0.60	0.64
35-39	0.06	1.84	1.98
40-44	3.29	-0.60	3.40
45-49	0.73	0.94	1.70
50-54	3.75	0.62	5.14
55-59	2.66	0.29	3.48
60-64	0.98	2.76	3.96
65-69	-0.20	2.50	2.17
70-74	0.63	1.24	1.91
75-79	1.83	-0.58	1.62
80-84	1.28	-0.74	0.84
85-	2.68	-0.44	2.56

TABLE 7A

TEST OF SIGNIFICANCE: MALES  
(Cancer of Inaccessible Sites, Stomach Excluded)

Age	cap-pr.t.	pr.t.-r.a.	cap-r.a.
0-19	-0.82	0.43	-0.66
20-24	-0.92	0.00	-1.08
25-29	1.58	-2.92	-1.38
30-34	-0.32	0.62	0.28
35-39	0.00	1.56	1.58
40-44	4.02	-0.03	4.99
45-49	2.00	1.98	4.46
50-54	3.52	2.75	7.12
55-59	4.55	0.99	6.60
60-64	2.98	2.38	5.94
65-69	1.52	2.92	4.68
70-74	2.76	0.28	3.53
75-79	3.74	-0.67	3.57
80-84	1.60	0.03	3.83
85-	3.19	-0.74	3.14

TABLE 8A

TEST OF SIGNIFICANCE: MALES  
(Cancer of Accessible Sites)

Age	cap-pr.t.	pr.t.-r.a.	cap-r.a.
0-19	-1.10	0.02	-0.74
20-24	-0.50	0.50	-1.16
25-29	0.82	0.42	1.44
30-34	-0.60	-0.40	-1.08
35-39	1.64	-1.38	0.51
40-44	-1.10	-0.19	-1.48
45-49	-1.62	1.40	-0.52
50-54	2.33	1.34	4.18
55-59	5.36	-0.29	6.31
60-64	2.77	2.01	5.82
65-69	3.53	2.35	6.61
70-74	2.34	1.41	4.08
75-79	0.80	0.56	1.48
80-84	-0.54	0.01	-0.60
85-	-0.21	0.60	0.22

\* All A tables are given in values of u. The statistical differences found in the tables giving the values of u are designated as follows:

1. no sign:  $u < 1.96, 5 \text{ per cent } < P < 2.58, 1 \text{ per cent } < P < 3.99, 0.5 \text{ per cent } < P < 5.00$   
 2.  $\oplus$  :  $1.96 < u < 2.58, 5 \text{ per cent } < P < 3.99, 1 \text{ per thousand } < P < 5.00$   
 3.  $\oplus\oplus$  :  $2.58 < u < 3.99, 1 \text{ per thousand } < P < 5.00$   
 4.  $\oplus\oplus\oplus$  :  $3.99 < u < 5.00, 0.5 \text{ per thousand } < P < 1 \text{ per cent}$

where P is the probability of finding the observed or more widely differing values under the assumption that the true rates were the same in the groups compared.

† Designations in A tables here and in paper V are cap. = Capital; pr. t. = Provincial Towns; r. a. = Rural Areas.