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Current Trends in the Incidence of Senile and Multi-Infarct Dementia

A Prospective Study of a Total Population Followed over 25 Years; the Lundby Study *

Olle Hagnell[1], Jan Lanke[2], Birgitta Rorsman[1], Rolf Öhman[3], and Leif Öjesjö[1]

[1] Department of Social and Forensic Psychiatry,
[2] Department of Statistics, and
[3] Department of Psychiatry, University of Lund, Sweden

Summary. Organic brain syndromes among the elderly have been studied prospectively in a total population during the 25-year period 1947–1972. The population (2,550 persons) originates from a geographically delimited area in southern Sweden (Lundby). The original population has been followed for 25 years irrespective of domicile. A comparison of incidences for the first 10-year period (1947–1957) and the second 15-year period (1957–1972) shows a decrease in organic brain syndromes in the population concerning multi-infarct as well as senile dementias.

Key words: Organic brain syndrome – Multi-infarct dementia – Senile dementia – Lundby Study – Epidemiology

Zusammenfassung. Prospektive Studien über organisch bedingte Hirnsyndrome in hohem Alter wurden an einer Gesamtbevölkerung in einer Periode von 25 Jahren 1947–1972 durchgeführt. Die Bevölkerung (2550 Personen) stammt aus einem geografisch abgegrenzten Gebiet in Südschweden, hier Lundby genannt. Unabhängig vom Wohnsitz wurde die ursprüngliche Bevölkerung über 25 Jahre beobachtet. Ein Vergleich der Inzidenzen zwischen der ersten 10-Jahresspanne (1947–1957) und der zweiten 15-Jahresspanne (1957–1972) zeigt eine Abnahme von organisch bedingten Hirnsyndromen betreffend Multi-infarkt Demenz sowie Senile Demenz in der Bevölkerung.

Schlüsselwörter: Organisch bedingte Hirndemenz – Multi-infarkt Demenz – Senile Demenz – Lundbyprojekt – Epidemiologie

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Offprint requests to: O. Hagnell, Department of Social and Forensic Psychiatry, S:t Lars Sjukhus (RPK), Box 638, S-220 06 Lund, Sweden

Table 1. Survey of all inhabitants (n=2,550) in Lundby on July 1, 1947

Age 1947	Men (n=1,312)			Women (n=1,238)		
	In Lundby 1972	Moved 1947–1972	Dead 1947–1972	In Lundby 1972	Moved 1947–1972	Dead 1947–1972
0–09	73	116	8	43	164	0
10–19	57	149	7	41	140	1
20–29	78	91	11	69	57	3
30–39	113	59	21	120	48	10
40–49	110	37	52	107	41	31
50–59	42	14	60	64	11	59
60–69	8	5	99	17	3	99
70–79	0	0	82	0	0	75
80+	0	0	20	0	0	35
0+	481	471	360	461	464	313

Table 2. Survey of residence and obtained information in 1972 of the 1947 Lundby cohort (n=2,550)

Residence	Total of persons	Personally examined 1972		With enough information 1972	
		n	(%)	n	(%)
Men (n=1,312)					
Remainders in 1972	481	475	(98.8)	481	(100.0)
Moved	471	454	(96.4)	466	(98.9)
Deceased	360	–	–	357	(99.2)
Women (n=1,238)					
Remainders in 1972	461	455	(98.7)	461	(100.0)
Moved	464	455	(98.1)	463	(99.8)
Deceased	313	–	–	310	(99.0)

Introduction

In a previous paper (Hagnell et al. 1981) dealing with a cohort consisting of all the inhabitants in a geographically delimited area (Lundby, Sweden) we reported that the incidence of chronic brain disorders among the elderly had decreased from the first period of study, 1947–1957, to the second, 1957–1972.

Table 3. The incidence and risk of contracting senile dementia for the first time based on data from a total population during the 10-year period 1947–1957

Degree of impairment: Severe

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	8824.6	0	0.0000	0.000	0.000 (0.000)
50–59	1475.1	0	0.0000	0.000	0.000 (0.000)
60–69	1038.5	0	0.0000	0.000	0.000 (0.000)
70–79	828.0	4	0.0048	0.047	0.047 (0.023)
80–89	279.4	4	0.0143	0.133	0.174 (0.062)
90–99	5.3	0	0.0000	–	–
100+	0.0	0	–	–	–
0+	12450.9	8	–	–	–
Women					
00–49	7892.2	0	0.0000	0.000	0.000 (0.000)
50–59	1527.2	0	0.0000	0.000	0.000 (0.000)
60–69	1172.9	1	0.0009	0.008	0.008 (0.008)
70–79	772.3	3	0.0039	0.038	0.046 (0.023)
80–89	254.9	9	0.0353	0.297	0.330 (0.080)
90–99	21.8	0	0.0000	–	–
100+	0.0	0	–	–	–
0+	11641.3	13	–	–	–

From this observation new questions arise, e.g. is the incidence also decreasing for each of the two main groups of dementia among the elderly, the multi-infarct dementia and senile dementia, in the same way as for the total group? Is the pattern for both sexes alike? How high are the incidence and the probability of contracting the diseases in question?

The Lundby Study is a prospective one, and several field studies of all the inhabitants have been performed over a 25-year period. The first field study was initiated by Essen-Möller in 1947 (Essen-Möller et al. 1956). He and his colleagues wished to recognize the personality variants and traits described by Sjöbring (Sjöbring 1973) in a normal population, and how they were distributed. A secondary aim was to describe the prevalence of all mental disorders in the population. Ten years later Hagnell (1966), and 25 years later Hagnell and Öjesjö (Hagnell et al., in preparation) examined the same persons

Table 4. The incidence and risk of contracting senile dementia for the first time based on data from a total population during the 15-year period 1957–1972

Degree of impairment: Severe

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	9322.5	0	0.0000	0.000	0.000 (0.000)
50–59	2843.2	0	0.0000	0.000	0.000 (0.000)
60–69	2210.9	0	0.0000	0.000	0.000 (0.000)
70–79	1160.4	5	0.0043	0.042	0.042 (0.018)
80–89	492.5	5	0.0102	0.097	0.135 (0.043)
90–99	78.0	0	0.0000	–	–
100+	0.2	0	0.0000	–	–
0+	16107.7	10	–	–	–
Women					
00–49	8398.1	0	0.0000	0.000	0.000 (0.000)
50–59	2589.8	0	0.0000	0.000	0.000 (0.000)
60–69	2293.7	3	0.0013	0.013	0.013 (0.007)
70–79	1393.9	5	0.0036	0.035	0.048 (0.017)
80–89	536.2	7	0.0131	0.122	0.164 (0.044)
90–99	57.7	1	0.0173	–	–
100+	2.6	0	0.0000	–	–
0+	15271.0	16	–	–	–

irrespective of domicile. In 1957 Hagnell added the 1,013 persons who had either been born in or moved into the area during the previous 10 years. In this paper we deal only with the original cohort first examined in 1947 (2,550 persons). Table 1 shows the 1947 cohort that has been followed until 1972.

Material and Methods

The information concerning the probands was collected in two ways: direct in confrontation with the proband, and indirect through various record files. The general methodology of the Lundby field studies has been previously described (Hagnell 1966; Hagnell and Öjesjö 1975). In brief, one part of the information concerning the probands was collected during a visit by a psychiatrist to the proband's home. After taking notes of the proband's history concerning his/her health, the socio-economic background and history of social relations and professional career were inquired into. A second part of the examination had the character of a semi-structured interview based on a file of items (Hagnell 1966)

Table 5. The incidence and risk of contracting senile dementia for the first time based on data from a total population during the 10-year period 1947–1957

Degree of impairment: Severe + Medium

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	8824.6	0	0.0000	0.000	0.000 (0.000)
50–59	1475.1	0	0.0000	0.000	0.000 (0.000)
60–69	1035.9	2	0.0019	0.019	0.019 (0.013)
70–79	825.1	8	0.0097	0.092	0.110 (0.033)
80–89	269.4	6	0.0223	0.200	0.288 (0.070)
90–99	5.3	0	0.0000	–	–
100+	0.0	0	–	–	–
0+	12435.4	16		–	–
Women					
00–49	7892.2	0	0.0000	0.000	0.000 (0.000)
50–59	1527.2	0	0.0000	0.000	0.000 (0.000)
60–69	1164.5	3	0.0026	0.025	0.025 (0.014)
70–79	765.5	4	0.0052	0.051	0.075 (0.028)
80–89	254.1	10	0.0394	0.325	0.376 (0.080)
90–99	21.4	1	0.0467	0.373	0.609 (0.189)
100+	0.0	0	–	–	–
0+	11624.9	18		–	–

with the aim of describing e.g. the proband's behaviour, personality, mental traits etc. A third part of the examination was turned into an informal discussion concerning everyday topics of interest to the proband. The latter part of the examination often gave important supplementary information.

Another important part of the information concerning the individual proband was derived from official registers or other secondary sources as listed below.

List of sources of information

1. Field examination:
   Interview
   Description
2. Supplementary information:
   Parish and Central Population Registration
   Regional archives
   The Swedish Central Bureau of Statistics

Table 6. The incidence and risk of contracting senile dementia for the first time based on data from a total population during the 15-year period 1957–1972

Degree of impairment: Severe + Medium

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	9322.5	0	0.0000	0.000	0.000 (0.000)
50–59	2843.2	0	0.0000	0.000	0.000 (0.000)
60–69	2204.8	1	0.0005	0.005	0.005 (0.005)
70–79	1140.7	8	0.0070	0.068	0.072 (0.023)
80–89	479.6	8	0.0167	0.154	0.215 (0.050)
90–99	77.2	1	0.0130	–	–
100+	0.2	0	0.0000	–	–
0+	16068.2	18		–	–
Women					
00–49	8398.1	0	0.0000	0.000	0.000 (0.000)
50–59	2589.8	0	0.0000	0.000	0.000 (0.000)
60–69	2292.3	4	0.0017	0.017	0.017 (0.009)
70–79	1379.4	6	0.0043	0.043	0.059 (0.019)
80–89	526.7	10	0.0190	0.173	0.222 (0.049)
90–99	56.6	1	0.0177	–	–
100+	2.6	0	0.0000	–	–
0+	15245.5	21		–	–

Social Insurance Office
Inland Revenue Office
National Police Board (criminal register)
County Temperance Boards
Hospital case notes, psychiatric
Hospital case notes, non-psychiatric
Official death certificates
Autopsy reports
Key informants
Postal investigation in 1962

In the Lundby Study information has also been continuously collected between census dates illustrating developmental trends of change in the Lundby society of interest as background factors.

The response at the field examinations was in all the three studies 98%–99%. With few exceptions we have sufficient supplementary information concerning those persons who were not personally examined (Table 2).

Table 7. The incidence and risk of contracting senile dementia for the first time based on data from a total population during the 10-year period 1947–1957

Degree of impairment: Severe + Medium + Mild

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	8824.6	0	0.0000	0.000	0.000 (0.000)
50–59	1475.1	0	0.0000	0.000	0.000 (0.000)
60–69	1035.9	2	0.0019	0.019	0.019 (0.013)
70–79	825.1	8	0.0097	0.092	0.110 (0.033)
80–89	269.4	6	0.0223	0.200	0.288 (0.070)
90–99	5.3	0	0.0000	–	–
100+	0.0	0	–	–	–
0+	12435.4	16		–	–
Women					
00–49	7892.2	0	0.0000	0.000	0.000 (0.000)
50–59	1527.2	0	0.0000	0.000	0.000 (0.000)
60–69	1164.5	3	0.0026	0.025	0.025 (0.014)
70–79	765.5	4	0.0052	0.051	0.075 (0.028)
80–89	253.8	11	0.0433	0.352	0.400 (0.080)
90–99	21.4	1	0.0468	–	–
100+	0.0	0	–	–	–
0+	11624.6	19		–	–

Regarding the probands who had died, their nearest relations, and other persons who knew the deceased well, were interviewed. For a further description, see Hagnell (1966).

The principles of classification were given in the 1957 report of the Lundby Study (Hagnell 1966). The only difference between the 1957 and the 1972 study was the abolishment of the age limit (60 years of age) for age psychoses.

Diagnostic criteria used were Roth's (1955) Organic Brain Syndrome (OBS) and the "Dementias arising in the senium och presenium" of the DSM-III (APA, 1980). In the Lundby Study cases of dementia were classified into three groups according to their degree of impairment: 'severe', 'medium', and 'mild' (Hagnell 1966).

For the few cases where the differential diagnosis between senile and multi-infarct dementia was hard to state, persons with focal neurological signs and symptoms were placed in the multi-infarct group.

Statistical Methods

The methods used in the present paper are exactly parallel to those in Hagnell et al. (1981). In the tables we have however, also included standard errors of some of the quantities computed; for relevant formulae we refer to Hagnell et al. (1982).

Table 8. The incidence and risk of contracting senile dementia for the first time based on data from a total population during the 15-year period 1957–1972

Degree of impairment: Severe + Medium + Mild

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	9322.5	0	0.0000	0.000	0.000 (0.000)
50–59	2843.2	0	0.0000	0.000	0.000 (0.000)
60–69	2203.0	2	0.0009	0.009	0.009 (0.006)
70–79	1140.7	8	0.0070	0.068	0.076 (0.024)
80–89	476.5	9	0.0189	0.172	0.235 (0.052)
90–99	75.5	1	0.0132	–	–
100+	0.2	0	0.0000	–	–
0+	16061.6	20		–	–
Women					
00–49	8398.1	0	0.0000	0.000	0.000 (0.000)
50–59	2589.8	0	0.0000	0.000	0.000 (0.000)
60–69	2292.3	4	0.0017	0.017	0.017 (0.009)
70–79	1379.1	7	0.0051	0.049	0.066 (0.020)
80–89	513.6	13	0.0253	0.224	0.275 (0.053)
90–99	56.3	1	0.0178	–	–
100+	2.6	0	0.0000	–	–
0+	15231.8	25		–	–

Results

Our diagnosis of 'age psychosis' was divided into two: senile dementia and multi-infarct dementia. As already mentioned three different degrees of impairment were considered; the results relating to these categories are given in the tables, while only the 'severe + medium + mild' figures are commented on in the text.

The cumulative probability for the 25-year period of contracting *senile dementia* up to the age of 90 was slightly higher for women (31.9%) than for men (25.5%). Up to the age of 80, however, the risk of contracting senile dementia was slightly higher for men (8.9%) than for women (6.9%).

Concerning *multi-infarct dementia* during the same period: the cumulative probability was higher for men both up to the age of 80 (13.4% for men; 11.0% for women) and 90 (29.8% for men; 25.1% for women). It is noteworthy that the figures for the entire life-span (up to the age of 90) are similar for both sexes.

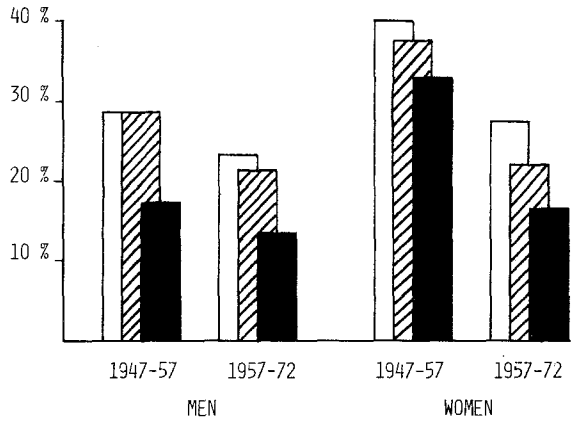

Fig. 1. Cumulative probability of contracting senile dementia before the age of 90 ($n=2,550$) (▭ = Severe + Medium + Mild; ▨ = Severe + Medium; ■ = Severe)

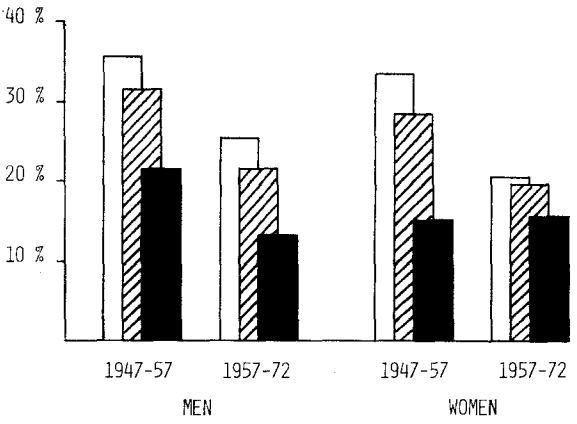

Fig. 2. Cumulative probability of contracting multi-infarct dementia before the age of 90 ($n=2,550$) (▭ = Severe + Medium + Mild; ▨ = Severe + Medium; ■ = Severe)

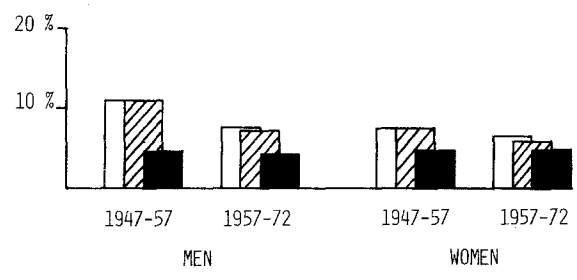

Fig. 3. Cumulative probability of contracting senile dementia before the age of 80 ($n=2,550$) (▭ = Severe + Medium + Mild; ▨ = Severe + Mild; ■ = Severe)

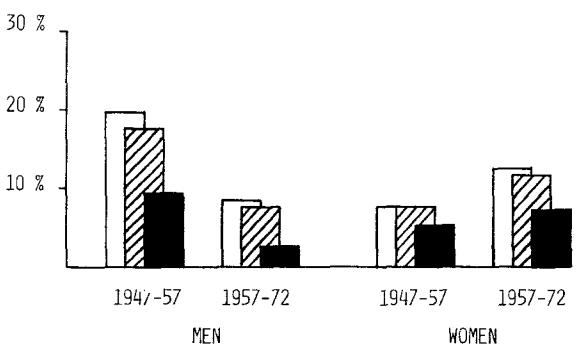

Fig. 4. Cumulative probability of contracting multi-infarct dementia before the age of 80 ($n=2,550$) (▭ = Severe + Medium + Mild; ▨ = Severe + Medium; ■ = Severe)

Table 9. The incidence and risk of contracting multi-infarct dementia for the first time based on data from a total population during the 10-year period 1947–1957

Degree of impairment: Severe

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	8824.6	0	0.0000	0.000	0.000 (0.000)
50–59	1475.1	0	0.0000	0.000	0.000 (0.000)
60–69	1031.0	3	0.0029	0.029	0.029 (0.016)
70–79	829.6	6	0.0072	0.070	0.096 (0.031)
80–89	282.5	4	0.0142	0.132	0.216 (0.062)
90–99	6.9	0	0.0000	–	–
100+	0.0	0	–	–	–
0+	12449.7	13		–	–
Women					
00–49	7892.2	0	0.0000	0.000	0.000 (0.000)
50–59	1525.1	1	0.0007	0.007	0.007 (0.007)
60–69	1168.7	1	0.0009	0.009	0.015 (0.011)
70–79	774.9	3	0.0039	0.038	0.052 (0.024)
80–89	281.5	3	0.0107	0.101	0.148 (0.057)
90–99	25.8	0	0.0000	–	–
100+	0.0	0	–	–	–
0+	11668.2	8		–	–

The 25-year period was divided into two: one 10-year period comprising the years 1947–1957 and another 15-year period, 1957–1972. The reason for this division into unequal parts is that one of the three fundamental field examinations of the cohort was performed in 1957. A comparison between these periods as regards the probabilities of contracting dementia up to the age of 80 or 90 shows that there was a decrease in all groups (Tables 3–14, Figs. 1–4) except for multi-infarcts among women up to the age of 80, where the cumulative probability increased from 7.7% during the 10-year period 1947–1957 to 12.7% during the 15-year period 1957–1972.

Discussion

Even if dementias among the elderly have grown to be one of our major public health problems, this has only recently received scientific epidemiological recog-

Table 10. The incidence and risk of contracting multi-infarct dementia for the first time based on data from a total population during the 15-year period 1957–1972

Degree of impairment: Severe

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	9322.5	0	0.0000	0.000	0.000 (0.000)
50–59	2843.2	0	0.0000	0.000	0.000 (0.000)
60–69	2199.5	2	0.0009	0.009	0.009 (0.006)
70–79	1158.9	2	0.0017	0.017	0.026 (0.013)
80–89	511.2	6	0.0117	0.111	0.134 (0.043)
90–99	79.2	1	0.0126	–	–
100+	0.2	0	0.0000	–	–
0+	16114.7	11		–	–
Women					
00–49	8398.1	0	0.0000	0.000	0.000 (0.000)
50–59	2589.4	0	0.0000	0.000	0.000 (0.000)
60–69	2290.5	1	0.0004	0.004	0.004 (0.004)
70–79	1396.9	10	0.0072	0.069	0.073 (0.021)
80–89	540.6	5	0.0092	0.088	0.155 (0.040)
90–99	65.3	0	0.0000	–	–
100+	2.6	0	0.0000	–	–
0+	15283.4	16		–	–

nition. For instance, base line figures of the incidence in a non-hospitalized population are rare. However, the impact of the dementias among the elderly can scarcely be underestimated. This is our impression after having been out in the community visiting the inhabitants in their homes. The assumption that Mortimer and Schuman (1981) make that the cumulative life-time risk for each individual alive today of becoming severely demented may be as high as 20% is a correct estimate according to our findings in the Lundby Study. They underline that this figure must be interpreted with the knowledge that the persons with severe dementia require almost total care. The present cost of this care in the United States has been estimated to be greater than 12 billion dollars, and by the year 2030 has been projected to rise to 30 billion dollars, more than eight times the current spending on all medical and mental health research in the United States (Plum 1979). Since the problem is alike in many other countries, at least in the Western World, it is surprising that govern-

Table 11. The incidence and risk of contracting multi-infarct dementia for the first time based on data from a total population during the 10-year period 1947–1957

Degree of impairment: Severe + Medium

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	8824.6	0	0.0000	0.000	0.000 (0.000)
50–59	1475.1	0	0.0000	0.000	0.000 (0.000)
60–69	1023.7	5	0.0049	0.048	0.048 (0.021)
70–79	812.9	12	0.0148	0.137	0.178 (0.039)
80–89	275.8	5	0.0181	0.166	0.315 (0.065)
90–99	6.9	0	0.0000	–	–
100+	0.0	0	–	–	–
0+	12419.0	22		–	–
Women					
00–49	7892.2	0	0.0000	0.000	0.000 (0.000)
50–59	1525.1	1	0.0007	0.007	0.007 (0.007)
60–69	1168.7	1	0.0009	0.009	0.015 (0.011)
70–79	772.3	5	0.0065	0.063	0.077 (0.029)
80–89	274.3	7	0.0255	0.225	0.285 (0.072)
90–99	24.4	0	0.0000	–	–
100+	0.0	0	–	–	–
0+	11657.0	14		–	–

ments have almost completely ignored the epidemiology of dementias among the elderly.

To get some impression of the magnitude of our figures compared with those of others, we have searched the literature. Figures founded on admissions to mental hospitals are useless, because most demented elderly people do not enter there (Hagnell 1961; Gruenberg 1978). However, even using rather different approaches in calculating the cumulative risk the Baltimore Longitudinal Study, BLS, (Sluss et al. 1981) and the Lundby Study come to comparable figures, BLS 29% and Lundby 25.5% for the whole life-span. The Lundby figures are smaller, and using only the time 1957–1972, which is more comparable with BLS's time period 1958–1978, the Lundby figures decreased to 23.5%. In the BLS study, which consisted of highly educated men, repeated medical, physiological, psychological, and sociological examinations were performed. In the Lundby Study one to three examinations were performed on each proband (1947, 1957,

Table 12. The incidence and risk of contracting multi-infarct dementia for the first time based on data from a total population during the 15-year period 1957–1972

Degree of impairment: Severe + Medium

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	9322.5	0	0.0000	0.000	0.000 (0.000)
50–59	2841.2	1	0.0004	0.004	0.004 (0.004)
60–69	2182.7	7	0.0032	0.032	0.035 (0.012)
70–79	1137.5	5	0.0044	0.043	0.076 (0.022)
80–89	491.3	8	0.0163	0.150	0.215 (0.049)
90–99	74.7	3	0.0402	–	–
100+	0.2	0	0.0000	–	–
0+	16050.1	24		–	–
Women					
00–49	8398.1	0	0.0000	0.000	0.000 (0.000)
50–59	2589.4	0	0.0000	0.000	0.000 (0.000)
60–69	2290.5	1	0.0004	0.004	0.004 (0.004)
70–79	1383.9	17	0.0123	0.116	0.119 (0.027)
80–89	537.5	5	0.0093	0.089	0.198 (0.041)
90–99	65.3	0	0.0000	–	–
100+	2.6	0	0.0000	–	–
0+	15267.3	23		–	–

and 1972). Roth (1981) has thoroughly discussed the special problems in diagnosing dementias of the elderly and given several reasons why the clinical examination provides a much more sensitive, valid and reliable tool in diagnosing dementias than do standardized psychological tests. He emphasizes especially the significance derived from history taking and the flexibility of the clinical examination, both topics that are essential throughout the Lundby Study. This does not mean that e.g. a combination of medical, physiological, sociological, and psychological factors are essential for the development of dementia. At Dalby Health Center, Nordén (1982) has followed a subgroup of elderly persons from the Lundby cohort by regular and meticulous clinical follow-ups. It is our intention in future research to combine these two sources of information in order to be able to divide the persons with dementias into clinical subgroups.

A decreasing incidence of 'strokes' has been reported from various parts of the world, e.g. the United States and Japan (Garraway et al. 1979; Tanaka et al.

Table 13. The incidence and risk of contracting multi-infarct dementia for the first time based on data from a total population during the 10-year period 1947–1957

Degree of impairment: Severe + Medium + Mild

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	8824.6	0	0.0000	0.000	0.000 (0.000)
50–59	1475.1	0	0.0000	0.000	0.000 (0.000)
60–69	1023.7	5	0.0049	0.048	0.048 (0.021)
70–79	811.5	14	0.0173	0.158	0.199 (0.041)
80–89	274.4	6	0.0219	0.196	0.356 (0.066)
90–99	6.9	0	0.0000	–	–
100+	0.0	0	–	–	–
0+	12416.2	25		–	–
Women					
00–49	7892.2	0	0.0000	0.000	0.000 (0.000)
50–59	1525.1	1	0.0007	0.007	0.007 (0.007)
60–69	1168.7	1	0.0009	0.009	0.015 (0.011)
70–79	772.3	5	0.0065	0.063	0.077 (0.029)
80–89	272.2	9	0.0331	0.282	0.337 (0.076)
90–99	24.4	0	0.0000	–	–
100+	0.0	0	–	–	–
0+	11654.9	16		–	–

1981; Ueda et al. 1981). The reported decrease of the incidence of strokes might be associated with the decrease of multi-infarct dementia in the Lundby cohort (Tables 9–14, Figs. 2 and 4). The decrease of the incidence of strokes has been attributed to a better prognosis for the treatment of high blood pressure (changes of diet, especially the salt intake, improved medicaments).

The age- and sex-specific annual incidence rates for senile dementia (SDAT) in the Lundby Study are so far unique. Thus there are no figures for comparison.

The major trends for both senile and multi-infarct dementias show decreasing incidences and probabilities to contract these diseases. Some irregularities, however, were observed in the Lundby cohort. Whether these are artefacts is hard to judge. It is noteworthy though that even if the number of cases is small, women up to 80 years of age show a slight but evident increase in the incidence of multi-infarct dementia, which is a tendency quite opposite to that observed for all other subgroups in the study. This finding does not contradict the importance of

Table 14. The incidence and risk of contracting multi-infarct dementia for the first time based on data from a total population during the 15-year period 1957–1972

Degree of impairment: Severe + Medium + Mild

Age interval	Observation years under risk	Cases	Rate per year	Probability of disease during age interval	Cumulative probability of disease
Men					
00–49	9322.5	0	0.0000	0.000	0.000 (0.000)
50–59	2841.2	1	0.0004	0.004	0.004 (0.004)
60–69	2180.2	9	0.0041	0.040	0.044 (0.014)
70–79	1130.9	5	0.0044	0.043	0.085 (0.022)
80–89	488.2	10	0.0205	0.185	0.255 (0.052)
90–99	74.7	3	0.0402	–	–
100+	0.2	0	0.0000	–	–
0+	16037.9	28		–	–
Women					
00–49	8398.1	0	0.0000	0.000	0.000 (0.000)
50–59	2589.4	0	0.0000	0.000	0.000 (0.000)
60–69	2283.7	3	0.0013	0.013	0.013 (0.007)
70–79	1382.9	17	0.0123	0.116	0.127 (0.027)
80–89	537.5	5	0.0093	0.089	0.205 (0.041)
90–99	65.3	0	0.0000	–	–
100+	2.6	0	0.0000	–	–
0+	15259.5	25		–	–

better treatment of hypertension and a changed diet in the interest of a decreasing incidence of strokes. However, it clearly indicates that the explanations for the changes of the incidence figures of strokes/multi-infarctions are complex, and that other stronger causes might be found through deeper studies of the changed incidence and risk figures.

The incidence in a subgroup of the Lundby Study, the 1947 cohort, has so far been analyzed. Next analyses to be presented, and with the same methodology, are those of the 1957 cohort. This cohort offers more detailed information about the probands, but the observation period is shorter: 15 years, 1957–1972.

Since there is an enormous deficit in our knowledge of which persons develop senile or multi-infarct dementia, background factors for these diseases ought to be investigated. In the Lundby Study there is a wealth of background information registered *before* the probands contracted their illnesses. Our background data describe e.g. personality, previous disorders, social status. On account of acces-

sible data it is possible for us to re-evaluate the diagnoses of senile and multi-infarct dementia into several subgroups and analyze these new categories together with the before-mentioned background factors. In doing so we might reveal other background factors of importance, which may lead to new conclusions regarding the causes of the changed incidence of senile and multi-infarct dementia. Making comparative studies with other more physiologically directed projects in the area, or performing a fourth wave of field examinations might be some other ways of increasing our knowledge of the epidemiology of these diseases.

References

American Psychiatric Association (1980) Diagnostic and statistical manual of mental disorder.DSM-III (third edn)

Essen-Möller E, Larsson H, Uddenberg CE, White G (1956) Individual traits and morbidity in a Swedish rural population. Acta Psychiatr Neurol Scand [Suppl] 100

Garraway WM, Whisnant JP, Furlan AJ, Phillips II LH, Kurland LT, O'Fallon WM (1979) The declining incidence of stroke. New Engl J Med 9 : 449–451

Gruenberg EM (1978) Epidemiology of senile dementia. In: Schoenberg BS (ed) Neurological epidemiology: principles and clinical application. Raven Press, New York, pp 437–455

Hagnell O (1961) Epidemiologi och åldrande. Sv Läkartidn 58 : 492–499

Hagnell O (1966) A prospective study of the incidence of mental disorder. Scand Univ Books, Svenska Bokförlaget/Norstedts-Bonniers, Stockholm

Hagnell O, Öjesjö L (1975) A prospective study concerning mental disorders of a total population investigated in 1947, 1957 and 1972. The Lundby Study III (preliminary report). Acta Psychiat Scand [Suppl] 263 : 1–11

Hagnell O, Lanke J, Rorsman B, Öjesjö L (1981) Does the incidence of age psychosis decrease? A prospective, longitudinal study of a complete population investigated during the 25-year period 1947–1972; the Lundby Study. Neuropsychobiology 7 : 201–211

Hagnell O, Lanke J, Rorsman B, Öjesjö L (1982) Are we entering an age of melancholy? Depressive illnesses in a prospective epidemiological study over 25 years: the Lundby Study, Sweden. Psychol Med 12 : 279–289

Mortimer JA, Schuman LM (1981) The epidemiology of dementia. Oxford University Press, New York Oxford

Nordén Å (1982) Longitudinal study of a defined population from age 67 to 80 years of age. Paper read at the International Conference for the Mental Health of the Elderly. Cairo, Egypt, Nov 22–25, 1982

Plum F (1979) Dementia: an approaching epidemic. Nature 279 : 372–373

Roth M (1955) The natural history of mental disorder in old age. J Ment Sci 101 : 281–301

Roth M (1981) The diagnosis of dementia in late and middle life. In: Mortimer JA, Schuman LM (eds) The epidemiology of dementia. Oxford University Press, New York Oxford, pp 24–61

Sjöbring H (1973) Personality structure and development. A model and its application. Acta Psychiatr Scand [Suppl] 244

Sluss TK, Gruenberg EM, Kramer M (1981) The use of longitudinal studies in the investigation of risk factors for Senile Dementia—Alzheimer type. In: Mortimer JA, Schuman LM (eds) The epidemiology of dementia. Oxford University Press, New York Oxford, pp 132–154

Tanaka H, Ueda Y, Date C, Baba T, Yamashita H, Hayashi M, Shoji H, Owada K, Baba K-I, Shibuya M, Kon T, Detels R (1981) Incidence of stroke in Shibata, Japan, 1976–1978. Stroke 12 : 460–466

Ueda K, Omae T, Hirota Y, Takeshita M, Katsuki S, Tanaka K, Enjoji M (1981) Decreasing trend in incidence and mortality from stroke in Hisayama Residents, Japan. Stroke 12 : 154–160

Note Added in Proof

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