Prevalence of dementia in the elderly in Europe

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Abstract

Dementia is an important public health problem as it is one of the most common diseases in the elderly and a major cause of disability and mortality. This review on dementia is restricted to European Union countries where the overwhelming majority of studies have been undertaken, and will also refer to the EURODEM publications which may be considered to be the principal European reference point in this area. In subjects aged over 65, crude prevalence rates for dementia varied between 5.9% and 9.4%. We discuss the major problems limiting the use of these estimations, limits which may differ according to the area of application, be it etiological research or care provision.

Keywords: Dementia; Alzheimer; Epidemiology; Incidence; Prevalence; Age; Gender

1. Introduction

According to the Diagnostic and Statistical Manual of Mental Disorders, 3rd ed. Revised (DSM-III-R) (Association, 1987), the criteria for dementia include demonstrable evidence of impairment in memory and either (a) impairment in one other intellectual function (abstract thinking, judgment or impairment of higher cortical functions) or (b) a personality change. Theses disturbances must be sufficient to interfere with work, usual social activities or relationships with others. Compared to DSM-III-R, ICD-10 criteria for dementia appear to be more restrictive requiring a decline in memory and other cognitive abilities sufficient to impair normal everyday personal activities. Another popular definition proposes that “dementia is the decline of memory and other cognitive functions in comparison with the patient’s previous level of function as determined by a history of decline in performance and by abnormalities noted from clinical examination and neuropsychological tests” (Mckhann et al., 1984).

Dementia has already been established as one of the major challenges of this century due to the enormous burden these pathologies impose on health care systems. Dementia is a significant public health problem as it is one of the most common diseases in the elderly and a major cause of disability and mortality (Ritchie and Lovestone, 2002). Dementia has numerous negative consequences on daily life. For example, urinary incontinence, which is an important factor for quality of life among the elderly, is more common in persons with dementia (Hellstrom et al., 1994). Other studies report that the risk for hip fracture more than doubles among women with dementia as compared to non-demented women (Johansson and Skoog, 1996). Several studies have shown that dementia markedly increases the risk for dependence on nursing care (Wancata et al., 2003a). In Germany, dementia is the main reason for nursing home admission for 43% of new residents (Bickel, 1996). Similar rates are also found in France and the UK. This leads to extremely high prevalence rates of dementia among those living in nursing homes (Wancata et al., 1998).
Thus, it is not surprising that the costs of care for patients with dementia are enormous (Wimo et al., 1996).

From a public health perspective, the phenomenon of population ageing is leading to a rapid increase in the number of elderly throughout the world, not just in western countries (Wimo et al., 2003). This has been largely due to a decline in mortality with advances in medical technology at higher ages and simultaneous increases in fertility. A European work-group has estimated that in European countries 1 year of life with dementia can be expected for every person over the age of 65 (Jagger et al., 1998). Accurate prevalence rate estimates of dementia by age and sex for different levels of severity would aid both etiological research and health service planning. It has been noted that published estimates of age- and sex-specific prevalences fluctuate widely. Before age 65, there are few cases and data on prevalence is scarce (Treves et al., 1986). In a recent study conducted in London boroughs (Harvey et al., 2003), in which cases were notified to the study by health care professionals, the prevalence of dementia in those aged 30–64 was estimated to be 54.0 per 100 000 (95% confidence interval [81.1–118]), and 98.1 per 100 000 for those aged 45–64 years. The present discussion is limited to data obtained in the elderly after age 65.

In the majority of cases where significant cognitive decline is observed, a neurologically degenerative disorder will be the underlying cause (Ritchie and Lovestone, 2002). However, this is such a catastrophic diagnosis in the absence of effective therapies, it is essential that all potentially reversible causes be fully investigated. Whilst Alzheimer’s disease (AD) is the predominant aetiology of the dementias (65–70% of cases), differential diagnosis is often complicated by the fact that features of other types of dementia, such as vascular dementia or Lewy body dementia, are also present.

This review is restricted to those European union (EU) countries where studies have been, undertaken and will also refer to the EURODEM meta-analyses which are currently considered to be the best European reference. Major data on incidence of dementia, Alzheimer’s disease and vascular dementia have been published by this group as presented in Fig. 1 (Frattiglioni et al., 2000). The incidence rates show a dramatic rise with increasing age.

We will discuss the major problems that limit the use of prevalence estimations, limits that can differ according to the domain of application, be it etiological research or the planning of care provision.

2. Methodological issues

This review is focused on population-based studies in the elderly over age 65. Systematic computer-assisted searches in Medline used the keywords “dementia” and “prevalence”, and the name of the relevant countries or Europe. Criteria for inclusion were (1) indication of prevalence rate for dementia with raw data on number of cases and sample size (global, age- and/or sex-specific); (2) publication in English, German or French; (3) field work on a representative general population of a European country (Medline research for Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom); (4) assessment of dementia referring to a validated classification system. When more than one large epidemiological study was published in one country, we restricted our choice to the most recent one, generally using the most recently revised criteria (for example, DSM-III-R instead of DSM-III) and to population-based studies. In this overview, a number of other interesting studies could not be considered because of limited space.

In 1988, investigators working on European studies formed the European Studies of Dementia (EURODEM=European Community Concerted Action Epidemiology an Prevention of Dementia) network. One of the EURODEM goals was to harmonize the protocols used in their newly initiated, population-based follow-up studies. A collaborative reanalysis of the prevalence of dementia and specific dementing disorders conducted in the 1980s in Europe was published first in 1991 (Rocca et al., 1991). In this first paper, all studies were based on face-to-face interviews and used internationally accepted diagnostic guidelines, but they were all based on small samples and used Diagnostic and Statistical Manual of Mental Disorders, 3rd ed. (DSM-III) criteria before its revision in 1987 A second up-dated report, based on eight studies conducted in the 1990s, appeared in 2000 (Lobo et al., 2000).

We did not include in the tables those data used in the EURODEM analysis which are not referenced in Medline.
For some studies, crude data is not presented in the relevant publications so that it is impossible to estimate either global prevalence, or prevalence by gender and age. In all studies where details on numbers of cases and sample size are given, we calculated 95% confidence intervals (Newcombe, 1998) by sex and in three age classes (65–74, 75–84, 85+) from raw data provided in the publications. In the MRC-ALPHA study and in the EURODEM analyses, only standardized rates were provided. We also indicate age-standardized rates where these have been given.

Diagnostic procedures are indicated in Table 1. Most of the studies described are two-step studies with a screening procedure including various tests, followed by a diagnostic examination for screen positives, and in some cases screen negatives. We did not find relevant publications for Austria, Belgium, Cyprus, Czech Republic, Estonia, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Slovakia and Slovenia. Results are given for 10 countries and 12 studies briefly described below:

Belgium. The National Dementia Economic studies (NADES) (Kurz et al., 2001) was based on the sampling of 2253 consecutive patients consulting a general practitioner, over 65 and living at home. The diagnosis of dementia was based on the CAMDEX (O'Connor et al., 1989) performed at home in patients presenting ≥3 warning signs of dementia.

Denmark. The Odense study (Andersen et al., 1997) was conducted on randomly selected persons between 65 and 85 years of age living within the municipality of Odense (community-dwelling and nursing homes). The baseline cohort was 3346 persons in 1992 (64% response). Rates have been studied according to severity using the CDR (Washington University Clinical dementia Rating Scale (Hughes et al., 1982)).

Finland. The Kuopio study 75+ (Rahkonen et al., 2003) was conducted on a random sample of subjects living in the city of Kuopio. A total of 601 subjects aged 75 years or more were included in 1998 (response rate 86%); all subjects were available for a structured clinical examination, diagnosis of dementia was based on DSM-IV criteria (Association, 1994), and dementia was rated as mild, moderate or severe according to the guidelines given in DSM-III-R.

France. The PAQUID study (Letenneur et al., 1993) was conducted in 75 districts in the Departments of Gironde and Dordogne. The sample was selected randomly from electoral roles using a multistage procedure stratified by age, sex and size of geographic unit. Participants had to be living at home at baseline to be eligible for the study. The baseline cohort was 3777 persons in 1988–1989 (68% response rate). Results on prevalence in 1997 in the survival sample (n=1461) are used for prevalence estimates according to severity using MMSE level (severe=0–9, moderate=10–18, mild ≥19) (Ramaroson et al., 2003).

Germany. A population-based sample living in the community of Leipzig (LEILA 75+) was randomly selected from an age ordered list provided by the official registry office. The study included 1692 subjects aged 75 and over (response 74.8%) who were investigated in a one-step procedure using DSM-III-R (data presented in tables) and ICD-10 (Riedel-Heller et al., 2001).

Italy. The Italian Longitudinal Study on Aging (ILSA) was carried out on a random sample of 3497 Italians aged 65–84 years from the population register of eight Italian municipalities (response rate 64%). Published results on prevalence (DSM-III-R criteria) are limited (The Italian Longitudinal Study on Aging Working Group, 1997). We have also examined a more recent study, the Conselice study (Ravaglia et al., 2002), which included 1016 subjects aged 65–97 years living in a Northern Italian municipality (75% response rate) in 1999 with a two-step dementia diagnostic procedure using DSM-IV criteria.

The Netherlands. The Rotterdam study (Ott et al., 1995) was conducted in Ommoord, a district of the municipality of Rotterdam. Analysis was limited to persons 65 years and over. The baseline cohort starting from 65 years of age was 5265 persons in 1990 (75% response rate) with a three-phase prevalence study at inclusion.

Spain. The Zaragoza study included 1080 subjects drawn from a municipal list excluding long stay hospital residents (Lobo et al., 1992, 1995). Diagnostic procedures used the AGECAT computerized diagnostic package (Cope-land et al., 1992) and DSM-III-R criteria. The Pamplona study (Manubens et al., 1995) is a door-to-door two-phase prevalence survey of dementia which includes 1019 subjects between 72 and 91 from a resident list kept by the municipality registry office. The study population is derived from an original cohort selected as a probability sample of the total population of Pamplona 2 years ago.

Sweden. The Kungsholmen Project (Von Strauss et al., 1999) includes all the 77-year-old living in the Kungsholmen area and persons 90 years and older registered in a contiguous area in 1992 (response 87.7%). All 1424 individuals were submitted to a battery of neuropsychological tests and were examined by physicians; DSM-III-R criteria were used for the clinical diagnosis of dementia. The Washington university Clinical dementia Rating Scale (Hughes et al., 1982), CDR, was used to classify disease severity (mild=0.5–1; moderate=2; severe=3).

United Kingdom. The MRC-ALPHA study (MRC, 1998) was conducted in a stratified random population sample of people 65 years and over obtained from Family Health Service Authorities. Subjects (n=7844) were recruited in six geographically defined areas. Published results on prevalence (DSM-III-R criteria using a computerized diagnostic algorithm AGECAT) did not include raw data. We also included data published for the Liverpool part of this study (Saunders et al., 1993). In the municipality of Liverpool, samples were selected randomly from the general practitioner registry within equal-size strata by age (5-year bands) and sex. This general practitioner registry is essentially population-based, excluding less than 1% of
<table>
<thead>
<tr>
<th>Country (reference)</th>
<th>Year</th>
<th>Study</th>
<th>N</th>
<th>Age</th>
<th>Diagnostic procedure</th>
<th>n</th>
<th>Prevalence (M+F)</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium (Kurz et al., 2001)</td>
<td>1998</td>
<td>NADES (via GP)</td>
<td>2253</td>
<td>≥65</td>
<td>CAMDEX; DSM-III-R</td>
<td>186</td>
<td>8.0 [6.9–9.1]</td>
<td>8.3</td>
<td>8.3 [6.9–9.7]</td>
</tr>
<tr>
<td>Finland (Rahkonen et al., 2003)</td>
<td>1998</td>
<td>Kuopio study 75+*</td>
<td>601</td>
<td>≥75</td>
<td>DSM-IV</td>
<td>137</td>
<td>22.8 [19.6–26.3]</td>
<td>18.6</td>
<td>24.3 [20.5–28.5]</td>
</tr>
<tr>
<td>Italy (ILSA WG, 1997)</td>
<td>1992</td>
<td>ILSA*</td>
<td>3497</td>
<td>≥65</td>
<td>CAMDEX; DSM-III-R</td>
<td>289</td>
<td>8.3 [7.4–9.2]</td>
<td>5.3</td>
<td>7.2*</td>
</tr>
<tr>
<td>Italy (Ravaglia et al., 2002)</td>
<td>1999–2000</td>
<td>the Conselice study</td>
<td>1016</td>
<td>≥65</td>
<td>DSM-IV</td>
<td>60</td>
<td>5.9 [4.6–7.5]</td>
<td>2.6</td>
<td>8.5 [6.5–11]</td>
</tr>
<tr>
<td>Spain (Lobo et al., 1992)</td>
<td>1987</td>
<td>Zaragoza study*</td>
<td>1080</td>
<td>≥65</td>
<td>AGECAT, DSM-III</td>
<td>80</td>
<td>7.4 [5.8–9]</td>
<td>8.0</td>
<td>5.9 [3.9–8]</td>
</tr>
<tr>
<td>Spain (Manubens et al., 1995)</td>
<td>1991</td>
<td>Pamplona study*</td>
<td>1127</td>
<td>72–91</td>
<td>CAMDEX DSM-III-R</td>
<td>194</td>
<td>17.2 [15.1–19.6]</td>
<td>32.4</td>
<td>15.3 [12.6–18.5]</td>
</tr>
<tr>
<td>Sweden (Von Strauss et al., 1999)</td>
<td>1992</td>
<td>Kungsholmen Project*</td>
<td>1424</td>
<td>≥77</td>
<td>DSM-III-R</td>
<td>358</td>
<td>25.1 [22.8–27.4]</td>
<td>27.4</td>
<td>17.0 [12.8–21.2]</td>
</tr>
<tr>
<td>United Kingdom (Saunders et al., 1993)</td>
<td>1991</td>
<td>MRC Liverpool</td>
<td>5182</td>
<td>≥65</td>
<td>GMS-AGECAT/DSM-III-R</td>
<td>444</td>
<td>8.6 [7.8–9.36]</td>
<td>10.9</td>
<td>6.0 [5.1–7.0]</td>
</tr>
<tr>
<td>United Kingdom (MRC, 1998)</td>
<td>1991</td>
<td>MRC-ALPHA study</td>
<td>7844</td>
<td>≥65</td>
<td>GMS-AGECAT/DSM-III-R</td>
<td>6.6</td>
<td>5.9–7.3</td>
<td>7.0a</td>
<td>5.6a</td>
</tr>
<tr>
<td>EURODEM (Lobo et al., 2000)</td>
<td></td>
<td>Data from 11 studies</td>
<td>31,031</td>
<td>≥65</td>
<td></td>
<td>2346</td>
<td>7.6 [7.3–7.9]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N: number of subjects studied.
n: number of dementia cases.
* indicates studies included in the EURODEM analyses.
GMS: Geriatric mental state.
AGECAT (Copeland et al., 1991): standardized interview that yields a DSM-III-R equivalent diagnosis of dementia.
CAMDEX: Cambridge Examination for mental disorders of the elderly (O’Connor et al., 1989).
a Age-standardized indicated in publication.
Table 2
Prevalence (per 100, with 95% confidence interval) in selected European Studies, by gender and age

<table>
<thead>
<tr>
<th></th>
<th>65–74</th>
<th></th>
<th>75–84</th>
<th></th>
<th>≥85</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Female</td>
<td></td>
<td>Male</td>
<td>Total</td>
<td>Female</td>
</tr>
<tr>
<td>Finland (Rahkonen et al., 2003)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>18.3 [15–22]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Italy (Ravaglia et al., 2002)</td>
<td>1.2 [0.6–2.5]</td>
<td>1.0 [0.4–5.5]</td>
<td>1.4 [0.6–3.7]</td>
<td>4.5 [2.7–7.3]</td>
<td>6.3 [3.7–11]</td>
<td>1.5 [0.4–5.5]</td>
</tr>
</tbody>
</table>
the population living in long-term hospital facilities. The baseline cohort was 5222 persons in 1989 (response rate 87%).

3. Prevalence results

Table 1 summarizes studies that were carried out on regional or national general population probability samples with at least 1000 cognitive evaluations (except for the Kuopio study). Seven studies were completed in northwestern Europe including Belgium, Denmark, Finland, Germany, The Netherlands, Sweden and the United Kingdom. Five studies were carried out in southern Europe including France, Italy (two studies) and Spain (two studies). No data published in English or German was available from Eastern Europe.

Eight studies were conducted around 1990 and four after 1998: the Belgium study, the Kuopio study 75+, the Conselice study, LEILA 75+. DSM-III-R criteria for dementia were the most often used; DSM-IV criteria only appeared in the latest studies (the Conselice study, the Kuopio study 75+).

In subjects aged over 65, crude prevalence rates for dementia varied between 5.9% (Italy, the Counselice study) and 9.4% (Netherlands, Rotterdam study). The age standardized estimate provided by the EURODEM analysis (Lobo et al., 2000) was 6.4%, this being comparable to the standardized rate reported on the large multi-centre sample of the MRC-ALPHA study in the UK, 6.6%. In the four studies including the oldest subjects (>72 for Pamplona study and ≥75 for Kuopio, LEILA and the Kungsholmen Project), rates were higher and varied between 17.2% and 25.1%.

Table 1 also shows gender differences. All studies, except those conducted in Belgium and Denmark, found higher prevalence rates in females. This difference was marked but was not consistently found in each age group (Table 2).

In the age group 65–74, men had higher rates than females in four studies and lower rates in the three others. Except in Belgium and Denmark under 85, women had consistently higher rates. As illustrated in Fig. 2, the EURODEM pooled analyses (Lobo et al., 2000) showed slightly higher rates for men (1.6%) than for women (1.0%) in the age group 65–69 only. The pooled prevalences for the groups aged 70 to 74 years, 75 to 79 years, 80 to 84 years, 85 to 89 years and 90 years or older were 2.9%, 5.6%, 11%, 12.8% and 22.1% in men. In women the pooled prevalences were 3.1%, 6%, 12.6%, 20.2% and 30.8%.

Table 2 and Fig. 2 illustrate the well-known increase with age. In the group aged 65 to 74 years, rates varied between 1.2% and 4.7%. Between 75 and 84 years, it was between 4.5 and 18.3. After 85, with larger confidence intervals, rates varied between 11.5% and 39%.

We found limited information on the prevalence of dementia according to severity in three studies. For defining mild, moderate and severe dementia, the studies used DSM-III-R criteria (the Kuopio 75+ study), MMSE level (PAQUID study, 10-year prevalence) or the CDR (the Kungsholmen Project). Despite differences in the clinical definition of severity, each level represented approximately one third of prevalent cases, respectively, 8.0, 8.3 and 6.3 in the Kuopio 75+ study, 4.4, 5.6 and 7 in the PAQUID study, and 8.4, 8.4 and 8.3 in the Kungsholmen Project.

4. Discussion

All recent European population-based studies on the prevalence of dementia with standardized diagnosis criteria show an exponential increase with age and a female excess mostly after age 75. However, age-specific prevalences vary between countries and studies. This may be due to study design, population sampling methods but also limits and variations across the last 20 years in detection and diagnosis, or real geographical variations (Corrada et al., 1995; Jorm et al., 1987). Furthermore, we should also keep in mind that
crude rates are very sensitive to the age distribution (and life expectancy) of the target population and that geographical comparisons are possible only with age- and sex-standardized rates. Because prevalence is dependant on duration of disease, factors such as health care that might influence survival also can influence prevalence.

Field studies in elderly populations face special challenges with numerous difficulties related to the recruitment of subjects which in turn influence study outcome (Riedel-Heller et al., 2000). Across the different European countries, the sampling frames are quite different (civil registry in Italy or Germany, electoral rolls in France, registration with a general practitioner in UK...), some researchers can rely upon permanently up-dated population registers, but this is not always the case. The inclusion of institutionalized individuals is crucial and standard in most of the studies under review; under- or over-representation of nursing home residents can significantly inflate or under-estimate rates since dementia is a major cause of institutionalization. Sampling and stratification in nursing homes are often not carried out by the same method as in the general population. There are also likely to be differences in refusal rates. Given the large proportion of people with dementia in nursing homes, these factors, plus cross-national differences in criteria for nursing home admission, are likely to have a significant impact on prevalence estimates. Whatever the initial sampling methods, response rate is also a limiting factor. Under- or over-representation of cognitively impaired subjects among responders may have important implications for prevalence estimates (Boersma et al., 1997). Individuals who died before inclusion, moved or were considered ineligible for other reasons such as sensory impairment or functional dependency have been excluded. In the oldest old, as mortality increased, time between sampling and field work should be reduced in order to limit selection and mortality bias. Few pooled analysis examine differences in refusal rates or the clinical characteristics of subjects lost to view. Earlier studies from the US suggest persons with cognitive impairment are more likely to refuse to participate and are also more likely to drop out due to ill health. Differences in prevalence estimates found in published studies are likely to be due mainly to methodological differences.

Despite its prevalence, dementia often goes unrecognized or is misdiagnosed especially in its early stages but also sometimes even when it is severe, as many health care professionals, patients and family members mistakenly view the early symptoms of dementia as the inevitable consequence of normal ageing. In the NADES study (Belgium), less than half of the patients had previously been diagnosed by their GP (Kurz et al., 2001). In epidemiology, specific case detection strategies are required and often employ a multistage design. In the first stage, a screening test is given to persons being studied followed by a more complete diagnostic interview based on commonly used classification systems. The very brief and inexpensive screening tests used in the 1980s subsequently gave way to more sophisticated forms of patient identification in the 1990s. The question of whether different diagnostic systems might yield differing estimates of prevalence has been examined by Erkinjuntti (Erkinjuntti et al., 1997) who calculated the proportion given a diagnosis of dementia according to six commonly used algorithms (DSM-III, DSM-III-R, DSM-IV, ICD-9, ICD-10 and CAMDEX) in a population-based study of 1879 men and women 65 years of age or older (Canadian Study of Health and Aging). The proportion of subjects with dementia varied from 3.1% (ICD-10) to 29.1% (DSM-III) Only 20 subjects were given a diagnosis of dementia according to all six systems. The classifications based on the various systems differed little according to the patients’ age, sex, educational level, or institutionalization. The factors that most often caused disagreement in diagnosis between DSM and ICD-10 were long-term memory, executive function, social activities, and duration of symptoms. These findings support the need for validation of the criteria used to diagnose dementia. Review of cases by a panel of specialists, independent of the investigators, has been proposed to improve diagnosis.

When comparing prevalence rates of dementia from different studies, it is important to determine whether or not mild or incipient dementia is included and whether functional impairment is required for diagnosis. Few studies detailed the severity of dementia and this is an important limitation. Some of the screening instruments are not designed to detect a considerable proportion of cases with mild dementia. In the Odense study (Andersen et al., 1997), the screening procedure was developed to detect very mild and mild cases of dementia systematically. This could explain why their prevalence rates are the highest in the age group 65–74 (4.7%).

Furthermore, epidemiological studies of ageing and dementia have demonstrated that the use of research criteria for the classification of dementia identifies three groups of subjects: those who are demented, those who are not demented, and individuals who cannot be classified because they have a cognitive (memory) impairment but do not meet criteria for dementia. In the recent literature, attention has been paid to the transitional stage of cognitive impairment between normal aging and early AD, so-called mild cognitive impairment (Petersen et al., 2001). Mild cognitive impairment refers to the clinical state of individuals who are memory impaired but are otherwise functioning well and do not meet clinical criteria for dementia. As in clinical practice, the difficulty encountered in epidemiology is how to categorize individuals with cognitive impairment just short of dementia, which may turn out in the long run either to be normal ageing or clear dementia (Kukull and Ganguli, 2000). People in the community who seem to meet the operational criteria for cognitive impairment but do not subjectively acknowledge any distress or functional disability pose a major challenge in epidemiological studies. This point is very important if we want to have sufficient...
numbers of demented subjects for accurate health economic analysis.

Active research of dementia cases gives rates, which represent the true risk of a disease for a given population taking into account cases which have not been diagnosed by the medical system. Moreover, the inclusion of very mild cases in prevalence studies would increase rates and lead to an overestimation of costs. Detection of mild and very mild cases of dementia is more important when searching incident cases for etiological research than for the planning of care.

At the other extreme of the dementia scale, data on institutionalization, which marks a dramatic change in resource utilization, are absent. Age is the major risk factor for dementia but, in the oldest old after 85, where confidence intervals become larger because of the relatively small sample sizes, few studies are available. An earlier meta-analysis focusing on the nine international studies with the most adequate sampling over age 80 (Ritchie and Kildea, 1995) demonstrated a possible asymptote at around age 80 with a levelling off of prevalence towards a logistic rather than exponential increase even when centre effects and changes in sample variance are included in the model. Subsequent studies suggest this phenomena to be due partly to changes in life expectancy with dementia at higher ages and changes in the ratio of AD to vascular dementia. In a recent review, Anki and Poupard (2003) analyzed incidence and prevalence data published in the literature in subjects over 85. The range for prevalence is large between 15% and 40% with incidence varying from 60 to 100 per 1000 person-years. Few subjects are studied and screening and diagnosis are more difficult in the oldest old. We should interpret with caution all rates after age 85.

The prevalence estimates for European populations are very similar to those observed in North American studies. In the United States, the estimated overall prevalence reported in patients 65 years and over varied from 2% to 10% (Alloul et al., 1998). A recent paper based on the population projections of the United Nations and on several meta-analyses of dementia epidemiology have reported a dramatic increase of dementia cases in Europe (Wancata et al., 2003b). In the European Union (including the new member states) approximately 5.1 million people live with dementia (for a comparison to the size of other mental disorders in Europe see Wittchen and Jacobi, 2005). Within the next 50 years this number will rise to approximately 11.9 million dementia cases. In contrast, the working-age population offering care for elderly impaired persons is projected to decrease significantly during the next 50 years. Now 5.1 million dementia cases face 302 millions persons of working-age. This equals a ratio of 59.9 persons of working-age per 1 demented person. Until the year 2050 this ratio will decrease to only 18.9. Thus, the burden placed by dementia on the working-age population will rise dramatically.

Preventing and planning for health care for dementia should be a priority. In the coming years there is a clear priority for studies which examine the evolution of the prevalence of dementia in the elderly in relation to severity and type of care.

References