Medical Conditions of Nursing Home Admissions

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Abstract

Background: As long-term nursing home care is likely to increase with the aging of the population, identifying chronic medical conditions is of particular interest. Although need factors have a strong impact on nursing home (NH) admission, the diseases causing these functional disabilities are lacking or unclear in the residents’ file. We investigated the medical reason (primary diagnosis) of a nursing home admission with respect to the underlying disease.

Methods: This study is based on two independent, descriptive and comparative studies in Belgium and was conducted at two time points (1993 and 2005) to explore the evolution over twelve years. Data from the subjects were extracted from the resident’s file; additional information was requested from the general practitioner, nursing home physician or the head nurse in a face-to-face interview. In 1993 we examined 1332 residents from 19 institutions, and in 2005 691 residents from 7 institutions. The diseases at the time of admission were mapped by means of the International Classification of Diseases - 9th edition (ICD-9). Longitudinal changes were assessed and compared by a chi-square test.

Results: The main chronic medical conditions associated with NH admission were dementia and stroke. Mental disorders represent 48% of all admissions, somatic disorders 43% and social/emotional problems 8%. Of the somatic disorders most frequently are mentioned diseases of the circulatory system (35%) [2/3 sequels of stroke and 1/5 heart failure], followed by diseases of the nervous system (15%) [mainly Parkinson’s disease] and the musculoskeletal system (14%) [mainly osteoarthritis]. The most striking evolution from 1993 to 2005 consisted in complicated diabetes mellitus (from 4.3 to 11.4%; p < 0.0001) especially with amputations and blindness. Symptoms (functional limitations without specific disease) like dizziness, impaired vision and frailty are of relevance as an indicator of admission.

Conclusion: Diseases like stroke, diabetes and mobility problems are only important for institutionalisation if they cause functional disability. Diabetes related complications as cause of admission increased almost three-fold between 1993 and 2005.
primary and other diagnoses at admission and noticed that the leading admission diagnoses for elderly nursing home residents were diseases of the circulatory system, followed by mental disorders [9]. Banaszak et al. demonstrated significant effects of chronic medical conditions and dementia on the risk of institutionalization [10]. According to Chan, the most common medical problems of the applicants were neurological, heart diseases, orthopaedic conditions and psychiatric problems” [11]. McNabey et al. quantified four chronic medical conditions: congestive heart failure, chronic obstructive pulmonary disease, diabetes mellitus and Parkinson’s disease [12].

Avoiding disease and disability can avoid NH admission. To know the medical risk profiles is very useful for developing interventions to prevent the need for institutionalisation [2].

For instance well treated diabetes, stroke and mobility problems may in some cases remove the functional limitations. Primary care providers can modify the pathology and mitigate the expression of disease through prevention and treatment [13].

The major emphasis of this exploratory study is to describe the real underlying diseases causing the disabilities (= the ‘reviewed’ primary diagnoses at admission) and to explore the evolution over a period of twelve years.

Medical issues surrounding nursing home care are becoming increasingly important for public health policymakers from the point of view of health education, and to primary care providers for prevention, detection and treatment of people who are at risk of chronic medical conditions.

Methods

The aim of this exploratory survey was to quantify and characterize the chronic conditions of NH applicants who are lower functioning. In Belgium, NH beds, legally created in 1982 and destined for elderly in need of care, were primarily set up in the lap of existing rest homes (RH) who accommodate valid elderly, at an average of 12 NH beds out of 100 RH beds.

Since 2000 the care setting in Belgium was comparable with the international criteria for nursing homes (≥ 80% of the residents are in severe need of care) [12].

Residents which are defined as ‘in need of care’ are to a certain extent dependent on ADL. Dependence in ADL (washing, dressing, transferring, toileting, incontinence and feeding) was used to classify residents’ physical functional status. The psychical items include disorientation in time and place. The resident classification scale distinguishes four main categories of ability. Residents of category O don’t need assistance with any ADL’s; category A need assistance in two ADL’s (washing and dressing); category B require assistance in three and category C in more than three ADL’s. The subcategories Bd and Cd are people in need of care, who are also disoriented.

This study is based on two independent, descriptive and comparative surveys (field research) conducted in 1993 and 2005. Data from the subjects were obtained from two convenience samples. The first sample survey was an unpublished part of a pilot project under the authority of the Belgian Ministry of Health. In 2005 we performed an update.

The questionnaire, with structured and open ended questions, was derived from the traditional hospital questionnaire that collects medical data. Based on the residents’ medical records, socio-demographic variables were filled in by the head nurse. The primary diagnosis was written in full (open question) by the general practitioner at the moment of admission. The gathered data were mapped by means of the International Classification of Diseases - 9th edition (ICD-9) [14] by trained staff of the University Hospitals of Leuven. In 1993 it involves all the 12 000 diagnosis codes. We used the same classification in 2005, yet with a simplified encoding system. In 1993 seven secondary diagnoses could be given, in 2005 only one. The study was performed in accordance with the Helsinki Declaration and was approved by the ethical board of nursing home organizations.

In 1993 all current and deceased NH residents during the first trimester, were included. It involves 1,332 residents (338 men and 994 women) from 19 institutions.

The cross sectional survey of November 2005, (n = 691; 151 men, 540 women) involves seven representative institutions, namely six comparable NHs and one smaller institution (Cocoon), exclusively specialised in the care of people having dementia. Residents with a short stay were excluded.

The primary diagnosis (reason of admission) constitutes together with a possible ‘secondary diagnosis’, (the major pre-existing disorder), the medical condition of NH residents at the time of admission (point prevalence). We gathered information in both medical files and open interviews with the nursing home physician or the residents’ general practitioner and/or the head nurse to determine the true medical reason why the elderly applied for NH admission.

Longitudinal changes in reason for admission were assessed and compared by a χ2-test.

The residents were divided in two groups; those with a somatic reason for admission and those with a mental illness.

Results

1. General characteristics of the NH population

In 1993 the mean age at admission was 83.2 years (SD 8.0) and 75% were women. The corresponding numbers in 2005 were 84.4 years (SD 8.3) and 78%.
In 2005 more (proportional) details were available (table 1). Somatic disorders represented 43% of all admissions, mental disorders 48% and social/emotional problems (SEM) 8%.

The number of residents with a mental disorder ranged from 39 to 60% per institution (Cocoon 98%). Women were the large majority with an average of 78%, from 69 to 88% per institution. In all institutions, approximately 20% was ‘higher functioning’, this means category O/A and 43% of the residents were located in the most severe category Cd.

2. Description and evolution of the somatic primary diagnoses
Classifying the physical disorders according to the affected system, in accordance with the ICD-9, we get table 2 in decreasing order (according to 1993).

The table showed a comparable relative frequency of the different disease systems between 1993 and 2005 (except diabetes).

For 1993 and 2005, disorders of the circulatory system were the most widely indicated primary diagnosis (36.3 vs 35.4% respectively; p = 0.78), of which two thirds were strokes, followed by disorders of the nervous system (21.3% vs 15.5%; p = 0.04), of which one third was Parkinson, and the musculoskeletal system (13% vs 14%; p = 0.03). Two thirds of the strokes was attended with hemiplegia, the others had slighter sequels. More men were affected (36 versus 17) but women were often affected when they are younger (mean age 79.2; SD 12.1 versus 80.9 year; SD 6.9 for men).

The chronic heart diseases increased from 12 to 21% (p = 0.07) and the fraction of osteoarthritis declined from 46 to 26% (p = 0.14). The most striking evolution is by diabetes type 2, which was indicated as a primary diagnosis in 11.4% of all admissions in 2005 versus 5.5% in 1993 (p = 0.0001). Moreover, the diagnosis often went hand in hand with serious related problems like amputations, polynoepathy, kidney failure and blindness.

The decrease of the percentage of disorders of the nervous system was mainly due to the fact that hemiplegia was no longer registered separately in the nervous system.

Ex-poliomyelitis patients remain represented (two in 1993 and four in 2005) and ‘symptoms’ were still indicated as reason for an admission.

In 2005, we remarked the disappearance of skin diseases as well as a regression of cancer (p = 0.08) and COPD (p = 0.11). In 2005 two cases of eye cancer were still admitted because of blindness.

Table 1: Characteristics of the population in the various Nursing homes (2005)

| Institutions   | Bed size | Katz category (%) | Men (%) | Women (%) | Cause of admission (%) | Average Age (SD) |
|----------------|----------|-------------------|---------|-----------|------------------------|------------------|
|                | O A B C Bd Cd | Somat | Mental | Soc/Emo |
| Cantershof     | 100      | 7 14 23 15 0 41   | 26 74   | 33 59     | 8                      | 84.6 (7.3)       |
| Cleo           | 90       | 6 20 20 10 0 44   | 12 88   | 37 53     | 6                      | 87.5 (7.5)       |
| Cocoon         | 51       | 2 10 18 4 0 67    | 31 69   | 2 98      | 0                      | 83.5 (9.1)       |
| Compostela     | 98       | 12 9 3 15 22 38   | 31 69   | 58 39     | 3                      | 84.8 (7.3)       |
| Czagani        | 104      | 13 11 16 19 0 41  | 14 87   | 40 48     | 12                     | 83.9 (8.1)       |
| Den Olm        | 159      | 5 13 19 20 0 44   | 20 81   | 51 39     | 10                     | 83.8 (9.2)       |
| Releghem       | 89       | 11 10 12 23 7 37  | 26 74   | 30 60     | 10                     | 82.6 (8.1)       |
| **Total**      | **691**  | **8 12 16 16 4 43** | **22 78** | **40 52** | **8**                  | **84.4 (8.3)**   |

Legend: category O: residents who don’t need assistance with any ADL’s.  
category A: residents who need assistance in two ADL’s (washing and dressing).  
category B: residents who need assistance in three ADL’s.  
category C: residents who need assistance in more than three ADL’s.  
category Bd or Cd: residents category B or C who are also disoriented.
Besides MS and ALS, we also noticed an increasing number of (sub) coma patients and posttraumatic victims in some facilities.

3. Description and evolution of the mental primary diagnoses

In the ICD-9, the mental disorders were categorised in psychosis, neurosis and mental retardation (table 3). Dementia remains the most important one (95% of the psychosis group). An increase of the psychiatric disorders was remarkable (p = 0.01). Mainly paranoia and schizophrenia were mentioned. In 2005, 17 residents (out of 360) were admitted with a psychiatric primary diagnosis, compared to 11 (out of 636) in 1993.

In the neurosis group, depressions have risen from 42 to 64% (p = 0.03), or from 5 cases in 1993 to 9 in 2005. Five residents in 1993 and six in 2005 were admitted because of mental retardation.

In 1993, little distinction was made between the different types of dementia. In 2005, we noticed a more specific classification of the mental disorders (table 4).

Looking only at dementia and its subtypes (n = 323; code 30-36), the following percentages emerged: Dementia NEC 27%; (Senile) Dementia of the Alzheimer Type (code 31 + 32) 44%; MID or Vascular dementia 5%; Senile dementia 17%; Korsakoff/Huntington 6%; DLB 1%.

The concepts of 'dementia NEC' and 'senile dementia' continued to be mixed up. The distinction between dementia type Alzheimer (DTA) and senile dementia type Alzheimer (SDTA) remained vague. We highlight the following statistics. The institution Compostela had one resident with DTA, versus 30 with SDTA. Exactly the opposite could be noticed at Czagani where mainly DTA was encoded. Releghem usually registered dementia NEC.

Psychiatric disorders were present in all the institutions. In case of neurosis, only depression was important. Four institutions accepted feeble-minded (mostly less aged) elderly people.

4. Description of the secondary diagnoses

In 1993, seven secondary diagnoses could be registered. In no hierarchical order, anamnesis data as well as geriatric and common complaints, like insomnia and constipation, were mentioned. Symptoms of the disease itself were additionally recorded, as for instance 'confusion' in case of dementia. Hip fractures, hip replacements and walking difficulties provided three codes. This resulted in a complex and unclear arrangement.

In 2005, only one secondary diagnosis could be given, which happened for six out of ten residents. A secondary diagnosis could only be given, if it was truly important as a pre-existing disease at the time of admission.

Especially people having dementia had only dementia as a diagnosis, both in 1993 and in 2005. A possible secondary diagnosis mentioned striking behavioural distur-

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Table 2: Classification of the somatic primary diagnoses per disease system: 1993 (n = 688); 2005 (n = 278)

| Disease systems             | ICD-9   | % 1993 | % 2005 | Most frequent disorder per section (%)               |
|----------------------------|---------|--------|--------|-----------------------------------------------------|
| 10. Circulatory system     | 390-459 | 36.3   | 35.4   | Stroke (64, 66), heart diseases (12, 21)            |
| 11. Nervous syst/sense org.| 320-389 | 21.3   | 15.5   | Parkinson (35, 45), hemiplegia (30), blindness (21) |
| 12. musculoskeletal system | 710-739 | 13.0   | 14.0   | Osteoarthritis (46, 26), fractures                  |
| 13. Neoplasms              | 140-239 | 5.5    | 3.0    | Intestinal (24)-prostate cancer (26)                |
| 14. Endocrine disorders    | 240-279 | 5.5    | 11.4   | Diabetes (87, 100)                                  |
| 15. Accidents              | 800-999 | 4.8    | 5.9    | (femur)Fractures (64, 56), head injuries, CO-poison |
| 16. Respiratory system     | 460-519 | 3.8    | 1.9    | COPD                                                |
| 17. Genitourinary system   | 580-629 | 2.9    | 2.6    | Renal insufficiency NEC (80, 100) en nephropathy    |
| 21. Post surgical state    | V-code  | 1.9    | 3.3    | Stoma (APN), hipprosthesis (54, 33), amputation (56) |
| 20. Symptoms               | 780-799 | 1.9    | 4.1    | Abnormality of gait                                 |
| 18. Digestive system       | 520-579 | 1.6    | 0.4    | Stomach-liver disorder                              |
| 19. Diseases of blood      | 280-289 | 0.6    | 1.1    | Anaemia                                             |
| 22. Diseases of skin       | 680-709 | 0.6    | -      | Chronic ulcer                                       |
| 23. Infectious diseases    | 001-139 | 0.3    | 1.5    | Late effects of poliomyelitis                       |

Total 100% 100%

The numbers in standard between brackets indicate the percentage in 1993, while those in bold refer to the percentage of 2005. For instance, in 1993, strokes represented 64% of the disorders of the circulatory system and in 2005 66%. For small absolute numbers, no percentage was calculated.
bances. For people in need of somatic care, usually symptoms and disorders of the circulatory system, mainly high blood pressure, were registered as a secondary diagnosis in 1993.

In 2005, 418 secondary diagnoses were quoted: 70% of physical nature and 30% of mental nature.

In the field of somatic secondary diagnoses, symptoms scored the highest (22%), by which we mean 'frequently falling' and 'abnormalities of gait', followed by diabetes (20%). Next, we came across disorders of the nervous system and sense organs (14%), mostly blindness, followed by post surgical status (13%), in particular amputations, stomas and hip prostheses, and finally heart failure (10%) and osteoarthritis (10%).

For the mental secondary diagnoses, mainly beginning or alleged dementia was indicated (36%), as well as behavioural disturbances (36%), primarily 'disturbing' shouting behaviour. Depressions constituted a secondary diagnosis in 12% of the cases and in 8% of the cases this was an additional psychiatric problem.

Discussion and conclusion

1. Principal findings and their interpretations

1.1. Dementia and stroke are most associated with NH placement

Fourty-three percent of all admitted residents have dementia (95% of the psychosis group) and 36% of the residents with somatic problems have disorders of the circulatory system, mostly a stroke. The relatively high frequency of these disorders in NH facilities is consistent with other research [15-17].

In Belgium and in Europe, the prevalence of a certain form of dementia increases and grows exponentially with age but precise figures on the number of formally identified cases are missing [18,19]. In 2005 Ferri et al. estimated the dementia prevalence for Europe at 25% for elderly ≥85 years. [20].

In our study dementia seems to affect particularly the oldest among the old, as well as women. People with dementia had an average age of 85 years (slightly above the average of the total group) and were mostly female (81%). The observation that dementia 'age-, and gender-related' is, is very similar with other research [15,20-23].

The number of institutionalized dementia sufferers might be a good representation of the number of patients in the community who suffer from a moderate to severe form of dementia. A study, regarding a mortality cohort in Belgium in the year 2000 [6], mentioned that 8 out of 10 deceased patients with dementia have resided in a NH before they die.

1.2. NH residents have their own health profile with fixed components

According to our study, residents seem to have their own health profile, with fixed components, that has shown minimal changes over the last twelve years. In all participating facilities, we observed roughly the same range of some 100 disorders. Dementia, disorders of the circulatory system (e.g. stroke, heart failure), the nervous system (e.g. hemiplegia, Parkinson) and the musculoskeletal system (e.g. osteoarthritis, femur fractures) continue to form the core of the diseases common in NHs. This diagnosis ranking corresponds to what was found in literature [11,24].

1.3. Increasing of Diabetes Mellitus (1993 vs 2005)

The prevalence of diabetes is rising all over the world and this tendency can be seen in the NHs. In our data the most striking shift in prevalence across the 12 year period was the increased number of diabetics, especially because of the related complications.

A Belgian national report shows the strong amount of diabetes related diseases. The prevalence of most complications doubled at least, and the prevalence of amputations and blindness is even 4 times higher in 2007 than in 2002 [25].

Other studies similarly mention diabetes as an important disease associated with new admission to a nursing home [26,27].

Diabetes strongly reduces the quality of life in advanced age. The complications for other organs, mainly circulatory problems, neurological problems, retinopathy and nephropathy, do not only affect the mind (leg amputations, blindness, dialysis), but they also drastically diminish the ability to cope. All actions have to be focussed on health education, prevention, detection and treatment. Diseases like diabetes (and stroke) only are important for

### Table 3: Classification of mental primary diagnoses per disease group: 1993 (n = 636); 2005 (n = 360)

| Disease group       | ICD-9     | % 1993 | % 2005 | Most frequent disorder per group (%)     |
|---------------------|-----------|--------|--------|------------------------------------------|
| Psychosis           | 290 - 299 | 97.3   | 94.0   | Dementia (98, 95), Psychiatric disorder (2, 5) |
| Neurosis            | 300 - 316 | 1.9    | 3.9    | Depression (42, 64), alcohol abuse, behavioural dist. |
| Mental retardation  | 317 - 319 | 0.8    | 1.7    | Mental retardation                        |

| Total               | 100%      | 100%   |        |                                          |

The numbers in standard between the brackets indicate the percentage for 1993; those in bold refer to 2005.
### Table 4: Classification of the mental primary diagnoses per specific disease and per institution (2005)

| Code | 30 | 31  | 32  | 33  | 34  | 35  | 36  | 39  | 40  | 41  | 42  | 43  | 45  |
|------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|      | Dem | DAT | SDAT | MID | S dem | Kor | DLB | Psy | Neu | Depr | Abus | Behav | Retar | Tot.n |
| Canershof | 36% | 17 | 0 | 3 | 19 | 7 | 3 | 7 | 0 | 8 | 0 | 0 | 0 | 59 |
| Cleo | 35 | 29 | 13 | 2 | 6 | 6 | 0 | 4 | 0 | 4 | 2 | 2 | 0 | 48 |
| Cocoon | 10 | 60 | 6 | 2 | 18 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 50 |
| Compostela | 0 | 3 | 0 | 3 | 79 | 6 | 0 | 8 | 0 | 0 | 0 | 0 | 3 | 38 |
| Czagani | 2 | 80 | 0 | 10 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 2 | 50 |
| Den Olm | 15 | 5 | 53 | 6 | 6 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 53 |
| Total, % | 24 | 28 | 12 | 4 | 15 | 5 | 1 | 5 | 0.3 | 3 | 0.3 | 1 | 2 |
| Total, n | 87 | 101 | 42 | 16 | 55 | 19 | 3 | 17 | 1 | 9 | 1 | 3 | 6 | 360 |

**Code 30 to 39: psychosis** (code 290 - 299 in the ICD-9)
- 30 = Dementia NEC; 31 = Dementia of the Alzheimer Type (DAT); 32 = Senile Dementia of the Alzheimer Type (SDAT); 33 = Multi-infarct dementia (MID); 34 = senile dementia; 35 = specific dementia (Korsakoff, Huntington); 36 = Dementia with Lewy Body (DLB); 39 = Psychiatric disorder (mainly paranoia, schizophrenia)

**Code 40 o 43: neurosis** (code 300 - 316 in the ICD-9)
- 40 = Neurosis NEC; 41 = Depression; 42 = abuse (alcohol); 43 = behavioural disturbance.

**Code 45 = mental retardation** (code 317-319 in the ICD-9)

Institutionalisation if they cause functional disability. If these diseases are treated well, their consequences will be less severe. Banaszak et al. showed that the effects of stroke and diabetes on institutionalization disappear after controlling for functional disability [10].

### 1.4. The necessity of an appropriate and concise encoding system

The entire disease classification for NH residents included some hundred typical disorders. Using the 12,000 diagnostic codes of the ICD-9 is difficult and unpractical in a NH context. Abstracted from this extensive clinical instrument, an ‘adapted and shortened’ classification of the diseases was used in 2005 and was as reliable and effective as his longer counterpart in 1993. Short versions of instruments are often as good as their longer equivalents [23,28,29]. Such a condensed version allows an optimal accuracy and comparability.

### 2. Strengths and limitations of the study

#### 2.1. Definition and selection of the real primary diagnosis

A standard interpretation of the primary diagnosis is very important. We defined this diagnosis as the motive for admission. The medically most severe condition is not necessarily the primary diagnosis. One should always ask oneself: ‘Is this the real reason for admission? We sketch a few cases.

- An elderly person, who suffers from a severe form of diabetes, does not need to be admitted, even if he lives on his own. The situation changes if this person starts to be confused and if he is no longer in control of his eating habits or taking his medication. The direct cause of admission in this case is ‘starting dementia’ and diabetes constitutes the secondary diagnosis.
- A 91 year old woman with a leg amputation has been living at home for a while. Confusion and an alleged beginning dementia cause the family to send her to a nursing home.
- An 84 year old man with an official diagnosis of ‘prostate cancer’ is admitted because of disturbances of equilibrium after the death of his wife. He was afraid to fall and not to be able to raise the alarm.

Since the survey was performed in close consultation (face to face interview) with the general practitioners or nursing home physicians and the head nurses, it was eas-
ier to select the clinical primary diagnosis, as the underlying disease causing the disabilities.

When discussing the primary diagnoses, the degree of reliability and severity of the diseases intrinsically was taken into account.

2.2. Special attention to symptoms and social/emotional issues

Mostly symptoms were quoted as secondary diagnoses in our sample. Disease related symptoms were usually not accepted as a primary diagnosis; the underlying disease had to be indicated. For instance, ‘difficulties of walking’ can occur in case of dementia, hip prosthesis, osteoarthritis, rheumatism, Parkinson’s disease, poliomyelitis or bone TBC. Dementia, brain contusion, traumatic events in the family or psychiatric problems can cause severe behavioural difficulties.

Symptoms without an identified cause, yet with a large impact on disability, may well be a primary diagnosis, for instance dizziness, lack of standing function without clinical labelling.

Social/emotional problems were not mentioned in 1993, and also in 2005, this admission indication was only taken into account after discussion. The main reasons of a SEM admission were ‘advanced age’ without a specific clinical disorder; being admitted together with a husband or wife; extreme social neglect; loneliness or weariness of life after the loss of a dear one.

2.3. Specifying dementia remains difficult

In 1993 we were not able to classify adequately the mental disorders. People having dementia were primarily (428 cases or 71%) encoded as ‘psychosis NEC’ (Not Elsewhere Classifiable or unspecified) and ‘senile dementia’ (16%). On the other hand, one used an abundance of terminologies to indicate dementia. Patients with ‘unspecified cerebral degeneration’ (code 331) or ‘encephalopathy’ (437.2), which come under the nervous system and the circulatory system respectively, according to the ICD-9, did not specify sufficiently common disorders of NH residents. Until now, most of the residents’ files still mention (beginning or alleged) ‘dementia NEC’. Differential diagnosis remains problematic and may consequently cause some misclassifications.

Epidemiological studies of dementia subtypes have revealed widely varying distribution rates [33]. Recently, in May 2009, the European Collaboration on Dementia (EuroCoDe) project [22] aimed at producing new consensus guidelines, hoping to achieve a better understanding of the breakdown between various forms of dementia.

Alzheimer’s disease and vascular dementia are the most frequently identified subtypes respectively 69% and 25% [Erkinjuntti et al. in Stevens, 23]. Dementia with Lewy bodies (DLB) is a relatively recently identified entity and changing neuropathological and clinical diagnostic criteria have resulted in great variation in the frequency, ranging from 1.7% to 30.5% (respectively Herrera and Stevens in Zaccai et al.) [34]. Regarding the frontal lobe dementias (FLD), there is a dearth of epidemiological data. In Stevens et al. [23] Oliva estimated the distribution of this subtype in 2000 at 10-20% but in 2001 Yamada identified no cases.

Our data quality was influenced by the fact that not only mental health professionals like psychiatrists or neurologists were making the diagnosis. It is highly likely that many of our figures on the distribution of dementia subtypes are forced into ‘unspecified dementia’.

2.4. The lack of a (concise) standardised instrument fulfilling our purpose

On the one hand the coding difficulties that arose in 1993 are situated in the field of coding possibilities. The ICD-9 did not specify sufficiently common disorders of NH residents. For instance, ‘advanced age’ is classified under 797: ‘senility’. Medical diagnoses are mostly described by means of the first three coding numbers, a fourth and fifth number is optional. Yet, Alzheimer or vascular dementia can only be indicated with four digits. Combined codes, like the ones used in hospitals to indicate (one) primary diagnosis, are statistically difficult to process.

On the other hand, the inaccurate diagnosis descriptions, caused some diseases to occur in various disease classification systems or in the category ‘NEC’. For instance: ‘Mobility problems’ could be encoded as 728.3: immobility syndrome’, or 781.2: abnormalities of gait’ or...
describe the diseases. As we have no specific data on
cially due to disagreement about the terminology used to
restricted number of medical problems [12] or with
this coding system is unique for NHs.
interview) was coded according to the ICD-9. The use of
admission (reviewed primary diagnosis in a face to face
provide more empirical findings (case analysis of each
symptoms, hip fractures and diabetes are strongly associ-
the reasons of admission, we did not take it into account
risk of, or suffer from diseases like stroke, diabetes and
mobility problems. These risk profiles constitute a chal-
need factors have the greatest impact on NH admission
but the underlying diseases causing these disabilities are
not well studied. This requires accuracy of diagnosis and
standardisation of diagnostic criteria together with an
ability to distinguish particular subtypes of dementia is a key issue.

Competing interests
The authors declare that they have no competing interests.

Authors’ contributions
GVR designed the study, carried out the interviews and wrote the first draft of
the paper. TN performed the statistical analysis. All authors read and approved
the final manuscript.

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