Initiation of advance care planning in newly admitted nursing home residents in
Flanders, Belgium: a prospective cohort study

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Author’s contributions: M. Elseviers and T. Dilles designed the study. K. Paque, I. Ivanova, and M. Elseviers were responsible for the statistical design and analyses. K. Paque wrote the paper. All authors were involved in developing the research questions, discussing and interpreting the results and supervising the draft of the paper.

Running title: advance care planning in nursing homes
Abstract

Aim: to describe (1) the timing of initiation of advance care planning (ACP) after nursing home admission, (2) the association of dementia and physical health with ACP initiation, (3) if and how analgesic use and use of lipid modifying agents is related to ACP, in a cohort of newly admitted residents.

Methods: Prospective, observational cohort study of nursing home residents. Data were collected three months, 15 months (year1) and 27 months (year2) after admission, using a structured questionnaire and validated measuring tools.

Results: ACP was never initiated during the two-year stay for 38% of the residents, for 22% ACP was initiated at admission, for 21% during year1, and for 19% during year2 (n=323). ACP initiation was strongly associated with dementia, but not with physical health. Residents without dementia were more likely to have ACP initiation at admission or not at all, while for residents with dementia ACP initiation was postponed. Between admission and year2, analgesic use increased (34%-42%) and use of lipid modifying agents decreased (28%-21%). Analgesic use increased more in residents with ACP initiation during year1 and year2. The use of lipid modifying agents was not associated with ACP.

Conclusion: The timing of ACP initiation differed significantly for residents with and without dementia, which highlights the importance of an early onset of ACP before residents lose their decision-making capacity. ACP conversations may create opportunities to discuss adequate pain and other symptom treatment and deprescribing at the end of life.

Key words: advance care planning, analgesics, cohort study, dementia, nursing home
Introduction

As age increases, people are confronted with multimorbidity and increasing physical, cognitive and social decline \(^{(1)}\), and its consequences, such as frailty, decreasing quality of life, increasing hospitalization rates and related costs, and an increasing need for long-term care \(^{(2,3)}\). On the one hand, recent progress in medicine enables more and more life-prolonging treatment. On the other hand, the main care goal in nursing homes (NHs) is to support and improve their residents’ quality of life. To prevent unnecessary treatments and hospitalizations, and support and preserve quality of life, it is crucial to know people’s preferences regarding current and future treatment and care goals \(^{(4)}\).

Advance care planning (ACP) is defined as ‘the ability to enable individuals to define goals and preferences for future medical treatment and care, to discuss these goals and preferences with family and healthcare providers, and to record and review these preferences if appropriate’ \(^{(5)}\). ACP has been associated with a decrease in hospitalizations and use of resources, lower levels of unwanted life-sustaining treatments, increasing patient and family satisfaction with care, an increasing number of residents dying in their NH instead of in hospital, and increasing compliance with patients’ end-of-life care wishes \(^{(6-9)}\).

In this study, ‘ACP’ is used as an umbrella term and includes all forms of forms of ACP, regulated by law or not. Currently, two forms of ACP occur together in Flemish NHs. Firstly, patient driven ACP, which may, but need not to be documented (e.g. in an Advance Directive (AD)), and can include nomination of a proxy decision maker. Both possibilities are provided by the law. Several structured forms in accordance with current legislation are offered by a number of organizations, such as health insurance organizations. Secondly,
physician driven ACP by means of written general practitioner (GP) orders, which are medical decisions documented in the medical file in accordance with the institution’s protocol. These orders should be discussed with other healthcare professionals, family members or with the resident\(^{(10-12)}\). These orders include do-not-resuscitate and do-not-intubate orders, alleviation of pain and other symptoms, etc.\(^{(12)}\).

Earlier studies found a varying prevalence of ACP in NHs: between 45% and 77% for physician driven and between 8% and 14% for patient driven ACP\(^{(10-14)}\). Documented care plans were rarely ADs, but mostly written GP orders\(^{(10, 13, 15)}\).

The prominent prevalence of GP orders, and particularly the order regarding alleviation of pain and other symptoms, raises the question if having any type of ACP is related to medication use. Generally, medication use should be in accordance with the changing care goals of NH residents\(^{(16)}\). Supporting and preserving quality of life should include treating symptoms that are currently undertreated (e.g. pain) and deprescribing of medications which lack short-term benefit. We hypothesize that analgesic use, as an example of adequate treatment according to the definition of palliative care\(^{(16)}\), will increase in residents for whom ACP is initiated. Earlier studies have demonstrated an increased use of analgesics in people with pain symptoms caused by advanced disease\(^{(17)}\).

On the contrary, use of lipid modifying agents, as an evidence based example of preventive medication appropriate for deprescribing in patients with a limited life-expectancy, will decrease in these residents\(^{(18)}\). Research has demonstrated that discontinuation of these medications reduces the number of adverse drug events\(^{(19)}\). In this context, it is important to include decision-making regarding medication use in ACP discussions.
The aim of this longitudinal study is to determine when ACP is initiated during the NH stay in a cohort of newly admitted residents, and whether ACP initiation is related to dementia symptoms and physical health. This information is crucial to determine the need for a systematic approach of ACP. Adding data on possible relationships with medication use, i.e. analgesic use and lipid modifying agents, will feed future discussions on the content and potential outcomes of ACP.

Methods

This study uses baseline data at NH admission and follow-up data of year1 and year2 after admission of the ageing@NH cohort study, examining newly admitted residents’ general health. Two other articles reporting on data of this study were published earlier (1, 20).

Study design and study population

A convenience sample of 67 NHs with at least 60 beds in Flanders, the Dutch speaking part of Belgium, were included in the study. In the participating NHs, all newly admitted residents between September 2013 and December 2013 were invited to participate in the study, if aged >= 65, Dutch-speaking and permanently admitted to the NH. All residents were consecutively recruited during the period of four months for the baseline assessment at NH admission. The same residents were invited to participate after one and two years for follow-up assessment, provided that they were still alive and still resided in a participating NH. All residents (or their proxy decision maker in case of dementia) had to provide informed consent before baseline and both follow-up assessments.
Procedure

Residents were interviewed one to three months after admission, and one and two years later, using a structured questionnaire and validated measuring tools for activities of daily living (Katz-ADL) \(^{(21)}\) and cognitive status (MMSE) \(^{(22)}\). (Supplementary file S.I.) These data were completed with administrative data, data from the nursing chart, and a copy of the resident’s medication chart. In case of dementia, the proxy decision maker (at admission) or the responsible nurse (year 1 & 2) was interviewed.

Measures

We considered that ACP was initiated if data on ACP initiation were documented in the nursing chart, or mentioned by the responsible nurse where this information was missing. In this study, we refer to all types of documented care plans and all related communication about future medical treatment and care as ‘ACP’, because our aim was to measure ACP initiation. The available data did not allow to determine if these documented care plans – particularly GP orders – were discussed with the resident himself or not. We determined whether ACP was initiated at 3 months, 15 months and 27 months after admission, for the construction of a new dichotomous variable ‘ACP initiation’ for every measuring point. We categorized ACP initiation at the different time points into four groups of ACP trajectories throughout the two-year stay or stay until death: no ACP (never), ACP from admission on (initiated within the first 3 months after NH admission), ACP initiation during year 1 (> 3 months and <= 15 months after admission), and ACP initiation during year 2 (> 15 months and <= 27 months after admission). Only residents for whom data on ACP initiation at three time points were available were included in further analyses. The
categories ACP initiation during year1 and ACP initiation during year2 were collated to one category delayed ACP initiation for further analyses.

Physical health was defined using Katz-ADL, survival time in months and total number of medications. Residents with an MMSE score lower than 16 out of 30, and a KATZ score for disorientation greater than or equal to 6 out of 8 – showing a daily disorientation in time and place – and who were unable to respond adequately to the questionnaire, were considered to have dementia symptoms. (S.I.).

Medications were recorded using the brand or generic name in a data-entry program, based on the official register of medications on the market from the Belgian Centre for Pharmaceutical Information. The medication was translated into the Anatomical Therapeutic Chemical (ATC) classification (WHO ATC/DDD index, the current version of each year of data entering). Focus was on anatomical main groups (first ATC level) and therapeutic subgroups (second ATC level). Due to difficulties in the collection of the medication charts at year1, data on medication of year1 were not suitable for further analyses. Therefore, we compared medication use at two time points: at admission and year2.

Data analysis

We used SPSS 23.0 (IBM Statistics Inc., Chicago, IL) for all statistical analyses. We described residents’ characteristics using descriptive statistics, and explored factors influencing ACP initiation at NH admission with independent samples t-tests, crosstabs and chi². We used ACP initiation at NH admission as outcome variable in logistic regression analyses.
We explored differences between the prevalence of ACP initiation at admission, year1 and year2, and the prevalence of analgesics and lipid modifying agents at admission and year2, with Cochran’s Q and McNemar tests. We examined associations between ACP initiation and dementia with crosstabs and chi², associations with physical health with One Way ANOVA.

We explored associations of ACP initiation with the evolution of the prevalence of analgesics and lipid modifying agents between admission and year2 with Cochran-Mantel-Haenszel and McNemar tests. A statistical significance level of p < 0.05 was set.

Ethical considerations
The ethics committee of Antwerp University Hospital and Antwerp University approved the study protocol (EC-number 13/43/420).

The board of directors and the supervising GP of the NH signed a study agreement.
Resident, or their proxy decision maker in case of dementia, signed an informed consent.

Results
Research population
For 741 residents in 67 NHs informed consent was obtained at NH admission. Mean Katz ADL was 14.69 (range 6-24), and 34% suffered from dementia. (Table 1.) After two years, 342 of the participating residents were still alive, resided in a participating NH, and confirmed informed consent. In this group, mean Katz ADL was 16.12, and 46% suffered from dementia (data not shown).

Advance Care Planning (ACP)

ACP initiation at NH admission: At NH admission, ACP was initiated for 22% of the participants (n=741). A higher MMSE score increased the odds of having ACP
initiation at NH admission with 3.5% per point on the MMSE. No associations were found with physical health. (Table 2.)

**ACP initiation at three time points:** Longitudinal data on ACP initiation at three time points were available for 323 of the 342 residents who were still alive in year 2. ACP was never initiated during the two-year stay for 38% of the residents, for 22% ACP was initiated at NH admission, for 21% during year 1, and for 19% during year 2. (Table 3).

ACP initiation was associated with dementia symptoms, and the direction of this relationships depended on the measurement time: at NH admission, ACP was initiated for 23% of residents without dementia symptoms and 16% of residents with dementia symptoms, while during year 1 and year 2, ACP was initiated for respectively 34% and 53% of residents without dementia symptoms, in relation to 38% and 64% of residents with dementia symptoms (p = 0.003). (Figure 1.) No associations were found with physical health (data not shown).

**Associations of ACP initiation with medication use:** At NH admission, 34% of the residents used analgesics and 28% used lipid modifying agents. Between admission and year 2, the use of analgesics increased significantly (34%-42%, p = 0.001) and the use of lipid modifying agents decreased significantly (28%-21%, p = 0.009). (Table 3.) A significant increase in the use of analgesics between admission and year two was found in residents with delayed ACP initiation (p = 0.002). (Figure 2.) This relationship remained after controlling for dementia with Cochran Mantel-Haenszel tests. ACP initiation was not related to the decreasing use of lipid modifying agents (data not shown).

**Discussion**
Main findings

ACP initiation: ACP was initiated at NH admission for 22% of the residents, and postponed for 40% (i.e. for 21% postponed to year1, for 19% to year2). Moreover, for 38% ACP was never initiated during the two-year stay. The timing of ACP initiation differed significantly for residents with and without dementia symptoms. Residents without dementia symptoms were more likely to have ACP initiated at NH admission or not at all, while residents with dementia symptoms were more likely to have ACP initiation later on during their stay in the NH.

Medication use: This study confirms our a priori hypothesis that analgesic use increases in residents for whom ACP has been initiated, but only for residents with delayed ACP initiation. The hypothesis regarding the association between ACP initiation and a decreasing use of lipid modifying agents was not confirmed.

Strengths and limitations

To the best of our knowledge, this is the first study providing baseline and follow-up data on ACP initiation and its associations with physical health, dementia symptoms and medication use in an observational study with strong design. Moreover, the timing of ACP initiation – or the ‘onset’ – has not been measured before.

A few limitations apply to this study. Firstly, only 323 residents were available for the analyses of admission and follow-up data, mainly due to death, which is common in this frail population. Secondly, this study describes a trend and an indication of the timing of ACP initiation in NHs. This is not a study of the prevalence of normative ACP, but an
empiric approach of the practices in the field of ACP, and also the absence of ACP. Neither
content, nor quality of ACP were studied. The concept and outcomes of ACP substantially
vary between countries, which complicate comparison with international studies. Finally,
data on the use of analgesics describe the prevalence and not the initiation of those
medications. Furthermore, pain assessment is crucial to determine if the increasing use of
analgesics indicates better pain treatment. Therefore, further research is necessary to clarify
these aspects.

Interpretation of the findings

ACP initiation: Concordant with earlier studies of ACP engagement in older adults,
we found a low prevalence of ACP initiation at every measuring point (7, 23, 24).
Furthermore, Bollig et al. found that the majority of residents without dementia had not
been engaged in ACP at all (25). In the current study, these residents were more likely to
have ACP initiation at NH admission or not at all. Various explanations for not initiating
ACP in NH residents are possible: residents were unwilling to discuss their preferences or
rejected ACP, existing pre-admission arrangements for end-of-life care (e.g. ADs) may
need no further discussion, residents trust their relatives and NH staff to make important
decisions for them, in their best interest, residents were unaware of the possibility to
discuss their preferences for future care, or ACP was not embedded in routine care (24-27).
Research has demonstrated that lack of knowledge of ACP is an important barrier to
engage in or successfully implement ACP. Informing residents and their family about ACP
and the ACP policy within the NH is crucial for residents to be able to share their
preferences for future care adequately (24). Probably, the minority for whom ACP was
initiated at NH admission, were more aware of the possibilities of ACP. Consistent with the
findings of Harrison et al., physical health was not associated with ACP initiation in this
study (23). Thus, physical decline or illness cannot explain ACP initiation at admission. This
supports the previous assumption of an increased awareness. However, physical decline as
self-reported reason for admission was associated with ACP initiation at admission. This
finding suggests a possible importance of subjective recognition of physical decline to ACP
initiation.

For most residents with dementia, ACP was initiated later than three months after
admission. Earlier studies confirm that residents are less likely to participate in ACP if they
have cognitive impairment (23). This ‘delayed’ initiation can be explained by difficulties in
determining the optimal timing of ACP due to prognostic uncertainty, or unwillingness to
participate in ACP because the resident is in denial of his diagnosis or he does not feel the
urge to discuss his preferences for future care (28). When this resident loses his decision-
making capacity, end-of-life decisions will have to be made by a family member or proxy
decision maker. In this context, it is vital that preferences are known and residents are
engaged in ACP before their health deteriorates and/or the first signs of dementia appear
(12).

Medication use: Concordant with earlier studies, we found a significant increase in
the use of analgesics, which are considered to be always appropriate at the end-of-life (29,
30). This increasing use of analgesics was associated with ACP initiation, which might
indicate an increased attention for pain treatment. This finding has not yet been described in
literature, and thus creates opportunities for further research. In accordance with Morin et
al., we found a decrease in the use of lipid modifying agents, which might indicate a
practice of deprescribing \(^{(29)}\). However, this decrease was not associated with ACP initiation.

*Implication for practice / research*

This study highlights the necessity of an early onset of ACP in NH residents, and particularly in those with dementia. The low prevalence of ACP initiation at every measuring point implicates that ACP is not embedded into routine care yet. The recently developed consensus definition of ACP and recommendations for its application \(^{(5)}\) may be an important impulse to register ACP in the nursing chart and to clarify which aspects of ACP were discussed with the resident himself, his family, and/or the healthcare team.

Our findings regarding medication use may create an opportunity to discuss adequate treatment of pain and other symptoms and deprescribing of ‘futile’ medications at the end of life. Further research is necessary to confirm the association between ACP and an increasing use of analgesics and to explore the influence of other mediating factors, such as pain. ACP conversations may create opportunities to discuss adequate pain and other symptom treatment and deprescribing at the end of life.

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**Declarations of interest:** The authors declare no conflict of interest.
References


Figure 1. ACP initiation in residents with and without dementia symptoms

ACP was initiated at admission for 23% of residents without dementia symptoms compared to 16% in those with dementia symptoms. In year 1 and 2 the proportion of residents with dementia symptoms for whom ACP was initiated was resp. 38% and 64%, compared to resp. 34% and 53% in those without dementia symptoms. These findings indicate that the proportion of residents with dementia symptoms for whom ACP was initiated at admission was lower than for those without dementia. In year 1 and 2 the proportion of residents with dementia symptoms exceeded the proportion of residents without dementia symptoms and increased stronger.
Figure 2. Evolution of the use of analgesics between admission and year 2 in the 3 groups of ACP initiation

Analgesic use increased significantly in the group of residents for whom ACP initiation was delayed to year 1 or year 2.
Supplementary File S.I. Validated measuring tools and cut off used in this study

More information on the topic, subtopics, cut off and range of the validated measuring tools used in this study.
Table 1. Socio-demographic characteristics of the baseline population

<table>
<thead>
<tr>
<th>Characteristics of the baseline population</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=741</td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td>mean (range)</td>
</tr>
<tr>
<td></td>
<td>83.94 (65-105)</td>
</tr>
<tr>
<td><strong>Gender % (n):</strong></td>
<td></td>
</tr>
<tr>
<td>female</td>
<td>65.7 (486)</td>
</tr>
<tr>
<td>male</td>
<td>34.3 (254)</td>
</tr>
<tr>
<td><strong>Most important reason for admission %</strong></td>
<td>(n):</td>
</tr>
<tr>
<td>physical decline</td>
<td>64.4 (415)</td>
</tr>
<tr>
<td>increased care needs</td>
<td>57.4 (372)</td>
</tr>
<tr>
<td>cognitive decline</td>
<td>36.2 (234)</td>
</tr>
<tr>
<td>increased caregiver burden</td>
<td>16.0 (102)</td>
</tr>
<tr>
<td>(risk of) social isolation</td>
<td>10.6 (68)</td>
</tr>
<tr>
<td>explicit wish of the resident</td>
<td>10.6 (68)</td>
</tr>
<tr>
<td>partner deceased</td>
<td>3.8 (24)</td>
</tr>
<tr>
<td>increasing need for palliative care</td>
<td>1.3 (8)</td>
</tr>
<tr>
<td><strong>Living situation before admission % (n):</strong></td>
<td>n=641</td>
</tr>
<tr>
<td>alone</td>
<td>61.6 (394)</td>
</tr>
<tr>
<td>with partner and children</td>
<td>31.2 (231)</td>
</tr>
<tr>
<td>other</td>
<td>7.2 (16)</td>
</tr>
<tr>
<td><strong>Highest education % (n):</strong></td>
<td>n=637</td>
</tr>
<tr>
<td>no education</td>
<td>4.9 (32)</td>
</tr>
<tr>
<td>primary school</td>
<td>18.9 (119)</td>
</tr>
<tr>
<td>Level</td>
<td>Percentage (%)</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>low secondary</td>
<td>44.3 (283)</td>
</tr>
<tr>
<td>high secondary</td>
<td>22.7 (143)</td>
</tr>
<tr>
<td>higher - university</td>
<td>9.2 (60)</td>
</tr>
</tbody>
</table>

**Stay before admission % (n):**

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>hospital</td>
<td>43.7 (318)</td>
</tr>
<tr>
<td>at home</td>
<td>21.9 (159)</td>
</tr>
<tr>
<td>other</td>
<td>34.5 (250)</td>
</tr>
</tbody>
</table>

**Katz ADL mean (SD) (6-24)**

14.69 (4.507)

**Dementia symptoms‡ % (n)**

34.0 (251)

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‡ according to the resident or his proxy decision maker in case of dementia, more than one answer possible

‡ based on MMSE-score (cut-off < 16), ability to respond to the questionnaire, and the combination of the KATZ scores for disorientation in time and place (≥6 on 8 points)
### Table 2. ACP initiated at NH admission and its associated characteristics

<table>
<thead>
<tr>
<th>ACP initiated at NH admission</th>
<th>No ACP n=573</th>
<th>ACP n=168</th>
<th>p-value*</th>
<th>Univariate OR(95%CI)</th>
<th>Multivariate OR(95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMSE (mean)</td>
<td>18.03</td>
<td>19.82</td>
<td>0.017</td>
<td>1.034(1.008-1.060)</td>
<td>1.035(1.007-1.064)</td>
</tr>
<tr>
<td>Reason for admission: physical decline (%)</td>
<td>60.8</td>
<td>75.5</td>
<td>0.001</td>
<td>1.986(1.315-2.999)</td>
<td>1.776(1.149-2.744)</td>
</tr>
<tr>
<td>Age (mean)</td>
<td>83.79</td>
<td>84.48</td>
<td>0.239</td>
<td>1.016(0.989-1.043)</td>
<td></td>
</tr>
<tr>
<td>Gender: female</td>
<td>67.1</td>
<td>60.7</td>
<td>0.123</td>
<td>0.757(0.530-1.080)</td>
<td></td>
</tr>
<tr>
<td>Living alone before admission (%)</td>
<td>51.3</td>
<td>59.5</td>
<td>0.061</td>
<td>1.396(0.985-1.978)</td>
<td></td>
</tr>
<tr>
<td>Dementia symptoms (%)</td>
<td>35.5</td>
<td>30.1</td>
<td>0.198</td>
<td>0.783(0.539-1.137)</td>
<td></td>
</tr>
<tr>
<td>Education: &gt;= high college (%)</td>
<td>29.3</td>
<td>32.9</td>
<td>0.413</td>
<td>1.182(0.792-1.765)</td>
<td></td>
</tr>
<tr>
<td>KATZ-ADL (mean)</td>
<td>15.67</td>
<td>15.45</td>
<td>0.593</td>
<td>0.990(0.953-1.028)</td>
<td></td>
</tr>
<tr>
<td>Survival time in months (mean)</td>
<td>19.52</td>
<td>18.58</td>
<td>0.265</td>
<td>0.989(0.971-1.008)</td>
<td></td>
</tr>
<tr>
<td>Total number of medications (mean)</td>
<td>8.92</td>
<td>9.11</td>
<td>0.565</td>
<td>1.013(0.969-1.059)</td>
<td></td>
</tr>
</tbody>
</table>

*Nagelkerke $r^2$: 0.046  *Independent samples t-test for means, chi$^2$ for percentages
Multivariate controlled for age and female gender
Table 3. ACP initiation, analgesics and lipid modifying agents at NH admission and its evolution to year1 and year2

<table>
<thead>
<tr>
<th></th>
<th>at admission</th>
<th>year1</th>
<th>year2</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient driven ACP:</strong> resident expressed a wish or preference for future care† % (n)</td>
<td>20.3 (68)</td>
<td>36.4 (114)</td>
<td>56.0 (186)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Physician driven ACP:</strong> written physician’s order (GP orders)‡ % (n)</td>
<td>10.6 (33)</td>
<td>33.7 (105)</td>
<td>53.0 (176)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>ACP (patient driven or physician driven) % (n)</strong></td>
<td>22.3 (72)</td>
<td>36.2 (114)</td>
<td>56.1 (192)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Initiation of ACP % (n):</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACP initiation at NH admission</td>
<td>22.3 (72)</td>
<td>22.3 (72)</td>
<td>22.3 (72)</td>
<td></td>
</tr>
<tr>
<td>ACP initiation during year1§</td>
<td>/</td>
<td>21.4 (69)</td>
<td>21.4 (69)</td>
<td></td>
</tr>
<tr>
<td>ACP initiation during year2§</td>
<td>/</td>
<td>/</td>
<td>18.6 (60)</td>
<td></td>
</tr>
<tr>
<td>ACP not initiated</td>
<td>77.7 (251)</td>
<td>56.3 (182)</td>
<td>37.8 (122)</td>
<td></td>
</tr>
<tr>
<td><strong>Analgesics (N02¶) % (n)</strong></td>
<td>34.2 (117)</td>
<td>NA (143)</td>
<td>41.8 (143)</td>
<td>0.001</td>
</tr>
<tr>
<td><strong>Lipid modifying agents (C10¶) % (n)</strong></td>
<td>27.8 (95)</td>
<td>NA (72)</td>
<td>21.1 (72)</td>
<td>0.009</td>
</tr>
</tbody>
</table>

*McNemar for paired comparison of proportions in two groups, Cochran’s Q in three groups
NA = Not available
† Based on the following question which was to be answered by the responsible nurse: “Did the resident express an explicit wish or preference for future care?”
Based on the following question which was to be answered by the responsible nurse: “Did the GP write down orders for future treatment in the medical file?”

collated to one category ‘delayed ACP initiation’ for further analyses

ATC codes: N02 analgesics, C10 lipid modifying agents
Figure 1. Timing of ACP initiation in residents with and without dementia symptoms

*Chi²
Figure 2. Evolution of the use of analgesics between admission and year 2 in the 3 groups of ACP initiation

<table>
<thead>
<tr>
<th>ACP</th>
<th>At admission</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP from admission on n=72</td>
<td>43%</td>
<td>42%</td>
</tr>
<tr>
<td>Delayed ACP initiation n=129</td>
<td>26%</td>
<td>64%</td>
</tr>
<tr>
<td>No ACP n=122</td>
<td>37%</td>
<td>40%</td>
</tr>
</tbody>
</table>

p=1.000*  p=0.002*  p=0.585*

*McNemar

Figure 2

583x825mm (72 x 72 DPI)