Socioeconomic Inequality in Long-Term Care:

A comparison of three time periods in the Netherlands.

--Draft chapter--

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Abstract

As a result of the rapid ageing of societies, meeting the demands for long-term care has become increasingly difficult. In the Netherlands, informal care has been recognized as a key-element to compensate cut-backs in public care provision. Formal, informal and privately paid long-term care services, however, are not used equally across socioeconomic groups and whether these inequalities have been reduced or exacerbated over time has not been researched. This study therefore aims at investigating to what extent differences in the of formal, informal and privately paid care have changed over time. Data from the Longitudinal Aging Study Amsterdam (LASA) was used from three points in time that capture distinct periods in the recent development of the Dutch long-term care system (1995, 2005 and 2005). In total, 1810 home-dwelling age-peers between the age of 75 and 85 participated in this study. The results indicate that formal, informal and private care have decreased over time. The socioeconomic gradient in informal care and formal care use has increased over time, but no change was found for private care use. Informal care use decreased more steeply among lower socioeconomic groups, formal care increased only for the lower groups and private care was consistently used more by higher groups. These findings suggest that the inability of lower socioeconomic groups to receive private care is compensated by a more generous provision with formal care services.

## Introduction

In many western nations, the population ages rapidly: Across OECD nations, life expectancy has consistently increased throughout the 20th century and continues to increase further. In 1960, less than 9% of the population was above 65 years old, compared to 17% in 2015 (OECD, 2017). As a result of population ageing, it becomes increasingly difficult to meet the demands for adequate long-term care (LTC) across countries, but particularly in countries with a high coverage of institutionalized care (Spasova et al., 2018). The Netherlands has among the highest expenses for formal LTC within the OECD countries due to their traditionally high use of institutionalized care (OECD, 2017). Similar to other Northern and Western European nations, policies that aim at sustaining LTC in the Netherlands have focused on reducing costs by increasing eligibility thresholds and limiting coverage of LTC services (Gianino et al., 2017). Informal care, the provision of care services by members of one's social network, has been recognized as a key-element to compensate these cutbacks in formal care (Agree & Glaser, 2009), The type of care that is accessible, however, differs between members of socioeconomic groups: Among individuals with a higher socioeconomic status (SES), for instance, it is more common to have the financial resources to replace formal with private care (Szebehely & Trydegård, 2012).

This raises the question whether changes in LTC provision also affect socioeconomic groups differently, either strengthening or weakening inequalities in the use of care. While it has been argued that accessibility of LTC services becomes increasingly difficult for lower SES-groups (Janssen, Jongen, & Schroder-Back, 2016), researchers also emphasized the relative generousity of the Dutch LTC system towards them (Tenand, Bakx, & van Doorslaer, 2018). So far, however, no study has yet investigated changes in the SES-gradient in informal, formal and private care use over historical time. The present study therefore aims at providing this

knowledge by investigating how the SES-gradient in long-term home care use has changed in the Netherlands between 1995, 2005 and 2015, three points in time that capture the substantial changes in the long-term care system. This not only provides insight into the extent and the development of socioeconomic inequalities in long term care, but also provides implications for policies that aim at reducing socioeconomic inequality in long-term care.

**Socioeconomic status differences in long term care use**

The socioeconomic status refers to the relative social position of an individual and is most commonly indicated by one's education, income and occupational status (Grundy & Holt, 2001). While the link between SES and mental or physical health is well-established, research on the impact of SES on long-term care utilization is relatively scarce and inconclusive, which can be attributed partly to differences in how socioeconomic differences are taken into consideration by different health care systems (Luppa et al., 2009). It has been argued that in more generous and universal care systems, for instance, SES-differences are relatively negligible compared to more scarce, market-based systems (Albertini & Pavolini, 2015). The LTC system of the Netherlands is indeed considered particularly equitable (Duell, Koolman, & Portrait, 2017) and generous towards lower SES-groups (Tenand et al., 2018), which, together with the similarly structured systems in northern European countries, has been recognized as the 'nordic model' (Kraus et al., 2010).

The SES indicator that is used to investigate differences in care use can also play a role. Particularly, the effects of income and education on LTC use can differ, as the former refers to one's current financial capital, while the latter represents a lifetime-asset that might also influences one's ability to acquire the desired care. Consequently, Albertini and Pavolini (2015) found that in Denmark, where care provision is relatively universal, having higher education was associated with less formal care use, whereas no effect of income was found. Despite the

mentioned inconsistencies, for the Netherlands there is clear evidence that both formal and informal care are more often used among lower SES-groups, indicated by lower income or education (Broese van Groenou, Glaser, Tomassini, & Jacobs, 2006; Hage et al., 2015; Jacobs, Broese van Groenou, Aartsen, & Deeg, 2018; Kunst, Meerdink, Vaenik, Polder, & Mackenbach, 2007).

**Developments in the Dutch LTC system**

The LTC provision in the Netherlands is among the most generous and universal, but also one of the most expensive among OECD countries: In 2015, 3.7% of GDP was spent on LTC, which was far above the OECD average of 1.3% and is expected to increase to 7.1% by 2060 (European Commission, 2015). Consequently, the development of the Dutch LTC system is characterized by the tension between cost-containment and maintaining universal and sufficient care provision (da Roit, 2012). The availability of potential informal caretakers that do not yet provide LTC services is considered high (de Boer & Timmermans, 2007). Recognizing this potential, reforms of the Dutch LTC system have focused on enhancing personal responsibility as well as social responsibility to compensate for the introduced budget cuts (Maarse & Jeurissen, 2016).

In 1995, the personal budget (persoonsgebonden budget) was introduced, which was fully available to the public by 2001. Individuals could choose to receive a budget to buy care themselves instead of the regular care provision. This budget was 25% lower than that of regular care provision with the argumentation that it could be used more efficiently by the care recipient. In 2003, ‘common care’ (gebruikelijke zorg) was formally considered, which means that co-residing family members were expected to take care responsibilities(da Roit, 2012)

In 2007, the social support act (Wet Maatschappelijke Ondersteuning, Wmo) was introduced with the aim to enhance individual responsibility for long-term care. Responsibility

for formal domestic care was transferred to municipalities, along with significant budget cuts. The decentralization of care responsibilities has increased competition among care providers, due to the stronger incentive of local communities to save money (Maarse & Jeurissen, 2016). While this led to lower payment of care providers, it likely helped maintain sufficient LTC coverage: In 2008, only 6 percent of persons older than 75 years indicated that they were not receiving sufficient care (Mot, Aouragh, de Groot, & Mannaerts, 2010). This might also be a result of a better consideration of the individual situation of the care recipient by local communities compared to a centralized and standardized procedure (da Roit & Thomése, 2016).

Another substantial reform was introduced in 2015, when the Exceptional Medical Expenses Act (*Algemene Wet Bijzondere Ziektekosten, AWBZ*), which was in place since 1968 and covered most LTC services, was entirely abolished and replaced by the long-term-care act (Wet langdurige zorg, Wlz). However, the coverage of the Wlz is limited to residential care for the most severe cases. Thus, more individuals need to stay at home and receive domestic care through the Wmo, whereas personal homecare has become a responsibility of health insurers (Jongen, Schröder-Bäck, & Schols, 2017) . Limitations of public care provision, however, are accompanied by national and local governments' efforts to improve informal care provision through educating potential care providers and improving collaboration between informal and formal care providers (VWS, 2015).

The 2015 reform can be considered the most drastic change of the LTC system (Jongen et al., 2017). However, even with this reform taken into consideration, Eggink, Ras, and Woittiez (2017) expect an annual increase in LTC expenditure by 3.5% from 2014 to 2030.

**Implications for long term care use**

The recent reforms of the Dutch LTC system indicate that like in most European countries there is a trend towards retrenchment of public care provision. Thus, together with the increasing

demand for LTC services, it can be expected that formal care use was lower in the 2015 cohort, compared to 2005 and 1995 (hypothesis 1a).

With regards to informal care, there are conflicting trends that either suggest an increase or a decrease in use. Scarcity of formal care resources might be compensated by an increasing substitution with informal care (Bonsang, 2009). This is also suggested by cross-country comparisons showing more informal care use when public resources are limited (Heger & Korfhage, 2018). Governmental efforts in the Netherlands to enhance social responsibility and exploit unused informal care potential further imply an increase of informal care use over time. In Sweden, declines in public care provision have indeed been associated with an increasing use of informal care (Szebehely & Trydegård, 2012). However, Balia and Brau (2014) argued that across Europe, the substitution effect of informal care for formal care is negligible. While informal caregivers can take over simple tasks, professional support for high care demands are more difficult to replace, leading to a more complementary role of informal care (Wagner & Brandt, 2017).

The availability of informal caretakers is hindered by the decreasing relative number of people in working age that can provide informal care (Colombo, Llena-Nozal, Mercier, & Tjadens, 2011).Thus, while the substitution implies an increase over time, the availability of caretakers suggests a decrease. For the Netherlands, de Boer and Timmermans (2007) expected informal care supply and demand to remain in balance. It can be expected that these conflicting trends have indeed compensated each other, and that informal care use remains stable between 1995, 2005 and 2015 (hypothesis 1b). Other than informal care, individuals might also have turned more towards buying LTC services privately. There is a general trend towards privatization of care services in Europe (Spasova et al., 2018), although there are substantial cross-country differences in the use of private care (Pommer, Woittez, & Stevens, 2007). Due to

trends towards more wealth at older age (Statistics Netherlands, 2017), and competitive prices for professional care, we expect a linear increase in private care use between 1995, 2005 and 2015 (hypothesis 1c), even if this might be hindered to some degree by the financial crisis of 2013 (Barrett & O'Sullivan, 2014).

**Implications for changes in the SES-gradient in LTC care uses**

The reforms of the Dutch LTC system are characterized by budget cuts, decentralization of care responsibilities and increasing personal responsibility. These might all impact socioeconomic groups differently, depending on source of care that is used. As the decision for the use of a specific source of long-term care depends on the availability of other types, all three (formal, informal and private care) and their relationship have to be considered.

With regards to formal care, budget cuts likely result in an overall lower formal care use over time (da Roit & Thomése, 2016; Swinkels, Suanet, Deeg, & Broese Van Groenou, 2015). However, the scarce resources might be more concentrated on the lower SES-groups. Tenand et al. (2018) emphasize that in 2012, distribution of formal care resources focused strongly on the poor, even beyond what would be expected based on individual needs. This likely continued after the 2015 reform, however in the public discussion, concerns have been voiced that the increasing complexity of the system and stronger focus on a recipient's responsibility particularly disadvantaged lower SES-groups (Jongen et al., 2017). Similarly, with the transfer of care responsibilities towards municipalities, individuals have to negotiate their desired care provision instead of following a standardized procedure, which could be more difficult for the already disadvantaged groups (Janssen et al., 2016). Investigating the impact of the 2007 reform, da Roit and Thomése (2016), however, found that scarcity of municipal budgets led to a decrease in formal care use, irrespective of the participant's income. When comparing educational groups, they found that inequalities in formal care use disappeared after the reform. This was attributed to

the better consideration of individual care situations by municipalities that compensate higher SES-advantages in negotiating and acquiring care resources. Still, it is unclear whether the 2015 reform had similar effects, as it is considered the more disruptive change in the LTC system (Jongen et al, 2017). As municipalities have to face more care demands with an even more limited budget, it might also become more difficult to maintain SES-equality, but there is no evidence yet to confirm this. Therefore, in line with da Roit and Thomese's (2016) conclusions, we still expect that there is no difference between SES-groups with regards to changes in LTC use in 1995, 2005 and 2015 (hypothesis 2a).

When formal care services are less available, those in need for support have to rely on other types of care. Despite the efforts of local and national governments to mobilize social resources, the high care demand is likely not covered by informal care alone (Janssen et al., 2016). Buying care privately therefore becomes a more attractive alternative, but is only accessible for those with sufficient financial means. Research has indeed suggested that a decline in formal care provision is associated with more private care use in higher SES-groups and more informal care in lower SES-groups and by informal care for those with a lower status (Rostgaard & Szebehely, 2012). This might even be exacerbated by the transfer of care responsibilities to municipalities: Due to the strong incentive to remain within budget and the individual consideration of each client's situation (Maarse & Jeurissen, 2016), possible alternatives to formal care might be more thoroughly investigated and their use required, if possible. As private care is largely inaccessible to them, individuals with lower income might thus more often be forced to mobilize their informal care network, even in situations where it would be undesirable and burdensome for the caretakers. This has been the case in Sweden, where those with longer education increasingly turn to private care and those with shorter education more often receive care from family members (Rostgaard & Szebehely, 2012). Similarly, we expect a widening of

the SES-gradient in both informal and private care use in 2015, compared to 2005 and 1995, with informal care being more used among lower SES groups (hypothesis 2b) and private care more among higher (hypothesis 2c).

**Individual determinants of long-term care use**

Potential changes in the SES-gradient in LTC are possibly not explained exclusively by developments in the LTC system. The use of care also depends on individual factors that determine if an individual needs care, is willing to use care and has access to it (Andersen & Newman, 2005). If such individual factors have changed unequally between SES-groups over time, this might also impact the SES-gradient in LTC use.

First, whether someone uses care highly depends on one's health status. The SES-gradient in health impairments is firmly established, although its strength depends on the type of impairments that are investigated (Lampert & Hoebel, 2019). In the Dutch context, a lower socioeconomic status has been associated with more functional limitations among older people (Hoogendijk, Heymans, Deeg, & Huisman, 2018). In 2010, lower SES groups lived 14 more years in poor health compared to high SES groups (Busch & voan der Lucht, 2012) . While health impairments have increased in absolute numbers, they have decreased when the same age groups are compared, which can be attributed to improvements in health care and lifestyles of older adults (OECD, 2017). Mackenbach et al. (2018) found that in Western Europe from 2002 to 2014, self-assessed health and objectively measured functional limitations were improving disproportionally in higher SES-groups, thus increasing the SES gradient over time. Similarly, Hu et al. (2016) found a trend towards increasing SES-inequality in self-assessed health in Europe from 1990 to 2010. While these findings indeed suggest that unequal gains in health impact the SES-gradient in LTC use, we expect that these alone do not explain changes in the SES-gradient due to the drastic effects of the long-term care reforms. Thus, the SES-gradient in

long-term care use persists even when health differences between socioeconomic groups are taken into account (hypothesis 3a).

In order to receive informal care, one must have a willing friend or family-member that provides care. Thus, a change in the SES-gradient in LTC use might also be the result of SES-differences in the availability of social network resources. Informal care is most often provided by spouses (Wong, Elderkamp-de Groot, Polder, & van Exel, 2010), followed by children and children-in-law (Pinquart & Sörsensen, 2011; van der Wolf, van Hooren, Waterink, & Lechner, 2019). Being married at older age is more common among higher SES-groups (Broese van Groenou et al., 2006). In lower SES-groups, however, children are more often care providers. Trends towards more individualization, less late-life partnerships (Reher & Requena, 2018) and lower informal caregiver availability (Colombo et al., 2011), however, likely affected all socioeconomic groups. Thus, we expect that the SES-gradient in LTC use persists when social network resources (children or partner) are taken into account (hypothesis 3b).

## Method

### Participants

Data from the Longitudinal Aging Study Amsterdam (LASA) was used in this study. LASA is an ongoing study of older adults in the Netherlands since 1992 that investigates physical, cognitive, emotional and social functioning (Hoogendijk et al., 2016). Three cohorts of participants aged 55 to 84 participated in this study: Cohort 1 (baseline n=3107) started in 1992, cohort 2 (baseline n=1002) in 2002 and cohort 3 (baseline n=1023) in 2012. For all cohorts, additional measurement waves were conducted every three years. Participants were recruited in three culturally distinct regions in the west, north-east and south of the Netherlands so as to reflect the national distribution of urbanization and religiosity. Those that agreed to be interviewed were visited at home by professional interviews who conducted regular interviews

and clinical measurements that took about two hours to complete. The sample used for this study includes participants from three years of measurement in 1995, 2005 and 2015 that were living at home and were between 75 and 85 years old. With this selection, no participant provides more than one observation, allowing cross-sectional comparisons between years of measurement. If a participant did not respond during the measurement, the responses of the previous or following measurement were included. The total number of observations in this study was 1810, with 1471 complete cases (81.2%)

**Measures**

**Outcomes.** Care utilization was measured separately for formal, informal and private care. Participants were asked to indicate if they receive personal or household care and if so, from which source. They could indicate sources from 11 predefined categories. The options 'district nurse', elderly/home/alpha help and personal home/hospital care for either personal or domestic care indicated the use of formal care and was coded as a binary variable (0=no formal care, 1=formal care). Informal care was indicated by a partner, child, friends, neighbors, other household members and other family members outside of the household, resulting in a binary variable (0=no informal care, 1=informal care). Finally, privately paid care could be indicated (0=no private care, 1=private care).

**Socioeconomic status.** Socioeconomic status was measured by two indicators: education and income. During baseline measurements, participants were asked to state their highest level of education from a list of 9 options which were then recoded to three education levels: Low (elementary school or no education), medium (lower vocational, intermediate education or intermediate vocational education) and high (secondary school, higher vocational education, college, or university). Income was measured using participants' monthly net household income for each wave. Participants were asked to state their income from a list of 12 options, ranging

from €454 - 567 euro in the lowest category to €2270 or more in the highest. For each option, the average of the maximum and minimum was used in order to express the variable in euros. For example, for every participant in the group from €454 to €567, an income of €510.50 was registered. Household incomes from participants that do not live alone were multiplied by 0.7 to make them comparable to incomes from single-person households. Inflation correction was applied to make incomes comparable over time, with 2015 as baseline year and adjusted (higher) incomes in 2005 and 1995. For testing hypothesis 2, Income was transformed to categorical variables (0=less than €1096, 1=between €1097 and €1640, 2=more than €1641).

Physical functioning was measured by 6 questions about the difficulty of daily activities based on Katz et. al. (1963): Walking up and down stairs, using public transport, cutting toenails, dressing and undressing, sitting down and standing up and walking outside for five minutes. Responses that indicated the difficulty of each task were measured on a 5-point scale: 1. No, I cannot [perform this task] 2. Only with help, 3. Yes, with much difficulty, 4. Yes, with some difficulty, 5. Yes, without difficulty. The physical functioning scale was created by adding the item scores to create a scale from 6 (poor) to 30 (good functioning).

Partner status was measured by asking whether participants have a relationship with a partner either inside or outside the household, which results in a dichotomous variable (0=no partner, 1=partner).

Children in proximity was measured by asking participants that have children if those live within 30 minutes travelling distance, which results in a variable with two options (0=no children, 1=children in proximity).

**Analyses**

Descriptive statistics of independent and dependent variables were calculated for each year of measurement (1995, 2005 and 2015) and socioeconomic group (low, medium and high

income and education). Differences in average scores were analyzed using t-tests and $\chi^2$-tests, comparing each SES-group to the previous one. Increases and decreases in long-term care use (hypothesis 1) were evaluated using logistic regression models with LTC use (informal, formal or private care) as the outcome variable, year of measurement as the independent variable and age/gender as control variables.

Hypothesis 2 was tested using a stepwise logistic regression approach for each outcome variable (informal, formal and private care). These three models were also built separately for income and education as indicator for socioeconomic status, resulting in a total of six models. For each model, age and gender were included as control variables. In the first step, year of measurement (2015 vs 2005 and 1995) and the SES-indicator were included. Income and education were dummy-coded to compare high to low and medium to low income or education, respectively. In the second step, the interaction between the SES-indicator and year of measurement was included. A significant interaction indicated an increase of the SES-gradient for the respective type of care. Post-hoc analyses were performed to investigate the effect of measurement on LTC use for high, medium and low SES groups separately (following the procedure for hypothesis 1). In the next step, the sources of care that were not used as outcome variable were included as predictors in order to evaluate whether changes in the SES-gradient were mediated by the use of other types of care. Similarly, social network resources (children in proximity and partner status) and physical functioning were included in the last step to evaluate whether changes in the SES-gradient were explained by SES-differences in physical functioning (hypothesis 3a) or social network resources (hypothesis 3b).

## Results

### Descriptive Statistics

The descriptive statistics of all variables included in the analysis are summarized in table 1. Changes in LTC use over time (hypothesis 1) were evaluated using separate logistic regression models with informal, formal and private care as the respective outcomes and year of measurement (1995 vs 2005 and 2005 vs 2015) as the independent variable, controlling for age and sex. The results show that informal care use decreased both between 1995 and 2005 (OR=.699, p<.01) and between 2005 and 2015 (OR=.63, p<.001). Formal care use increased from 1995 to 2005 (OR=1.75<.001) and decreased between 2005 and 2015 (OR=.744, p=.02). Finally, private care did not change significantly between 1995 and 2005, but decreased between 2005 and 2015 (OR=.626, <.01).

----insert table 1 about here----

Table 2 provides an overview of all variables per socioeconomic group. Across years of measurement, informal care is significantly less used among medium (OR=.895, p=.046) and high compared to low education (OR=.401, p<.001). Similarly, formal care is significantly less used by those with medium, OR=.640, p<.001 or high education (OR=.494, p<.001). Finally, private care is used more by those with medium (OR=1.839, p<.001) and high education, (OR=5.528, p<.001).

----insert table 2 about here----

**Changes in the SES-gradient of LTC use**

To evaluate whether LTC use changed unequally between socioeconomic groups (hypothesis 2), a stepwise logistic regression modeling approach was used with informal, formal and private care as outcome variables. The final models are presented in table 3.

The model for formal care shows that there was a significant interaction between year of measurement and medium (OR=.414, p=.006), resp. high compared to low education (OR=.317, p=.020), and between year of measurement and medium (OR=.302,p=.006), resp. high compared

to low income (OR=.362, p=.009). This indicates that the SES-gradient in formal care increased, thus rejecting hypothesis 2a. Post-hoc analyses revealed that formal care use only increased for lower income (OR=1.315, p=.043) and education (OR=1.252, p<.039) groups. This SES-gradient persisted with the inclusion of informal care, private care, children in proximity, partnerstatus and physical functioning. Thus, the use of other types of care or differences in health or social networks cannot explain the change in the SES-gradient of formal care (hypothesis 3).

For informal care, there was a significant interaction between year of measurement and high (OR=.301, p=.047) compared to low education and between year of measurement and high (OR=.455, p<.046) compared to low income. This indicates that the SES-gradient in informal care use has changed towards less use among highly educated individuals, thus confirming hypothesis 2b. Post-hoc analyses revealed that a decrease in informal care use could be observed only for those with medium (OR=.737, p=.004) and high education (OR=.514, p=.003) and medium (OR=.655,p=.004) or high income (OR=.576, p<.001), whereas no significant change in informal care use was observed for those with low education. The observed interaction remained significant even after formal care, private care, children in proximity, partnerstatus and physical functioning were included, indicating that the change in the SES-gradient in informal care use cannot be explained by the use of other forms of LTC or by SES-differences in health or social networks (hypothesis 3b).

Finally, for private care there was no significant interaction effect between year of measurement and income or education, indicating that the SES-gradient in private care did not change, rejecting hypothesis 2c. Thus, higher educated individuals consistently use more private care across all years of measurements (hypothesis 3c).

----insert table 3 about here----

## Discussion

The present study investigated whether long-term care use in the Netherlands changed unequally between socioeconomic groups between three periods in which the long-term care system changed substantially (1995, 2005 and 2015). The findings of this study indeed confirm a widening of this SES-gradient for formal and informal, but not for private care.

Between 2005 and 2015, long-term care use from all sources (informal, formal and private) decreased. While the decrease in formal care was expected, this was apparently not compensated with an increase in informal care or private care. These findings are remarkable given the focus of LTC reforms in the Netherlands on mobilizing informal care resources and limiting costs for formal care provision. The overall decreasing use of long-term care might indicate that individuals who are no longer eligible for formal care are unable or unwilling to turn to their family (Grootegoed & van Dijk, 2012) or buy care services privately. This might outweigh governmental efforts to mobilize informal caregivers.

The use of LTC services did, however, changed disproportionally between SES-groups. Informal care use decreased for higher SES-groups and remained stable for lower SES-groups. Formal care use, in contrast, increased only for lower SES-groups. The SES-gradient remained unchanged only for private care: Buying LTC services privately remains almost exclusively the choice for individuals from higher socioeconomic backgrounds. While it was expected that inequalities in informal care use have increased, that this was also the case for formal care was surprising. Based on these findings, concerns that lower SES-groups become underprovided with long-term care cannot be confirmed. Rather, it raises the question whether the LTC system, as Tenand and Bakx (2018) frame it, “overshoots” its target of ensuring sufficient provision to disadvantaged groups. The disproportionally higher use of informal and formal care by the lower SES groups could not be explained by differences in health or social network resources. Thus, the difference in care provision might not be justified based on the higher needs of lower SES-

groups. However, one can also argue that the SES-gradient in private care use is better taken into consideration and compensated after the reform. As Da Roit & Thomese (2016) argue, the decentralized care provision by municipalities might be more considerate of individual disadvantages such as lower income or difficulties with handling the complex care procedure. As municipalities are much closer to the prospective care recipient and have freedom in allocating care resources, they might actively compensate disadvantages that would go unnoticed in a centralized procedure. Comparisons with other countries with similar 'nordic' care systems further emphasize the relative generosity of the Dutch system towards lower socioeconomic groups. Rostgaard & Shebehely (2012) argue that in Sweden and Denmark, where formal care is used equally across SES-groups, those with lower SES might be coerced to mobilize their informal care network, whereas the Dutch system seems to constrain their informal care burden by allocating more formal care resources to them.

Definite conclusions about the causal mechanisms behind changes in LTC use, however, cannot be made based on the present findings. Other than a difference in access to LTC services, it is also possible that there is a lower care need among higher SES-groups, even with comparable health impairments. Due to technical advancements, it might have become possible to longer remain independent, for instance through the use of home delivery services, prostheses or vehicles. Higher SES-groups might disproportionally benefit from these advances due to financial resources or better ability to acquire and use this technology (Weiss et al., 2018).

**Implications for further studies**

The present study has highlighted that SES-differences in LTC use are not yet well understood, but also provides direction for future research that aims at improving our understanding. First, it is crucial to investigate the role of additional determinants of LTC use that

impact socioeconomic differences in care use. This study has provided a starting point, but there are more factors worth investigating.

First, the present study considers only characteristics of the care recipient, while the caregiver and his or her attitude, normative beliefs and relationship with the recipient are important to consider as well (Broese van Groenou & de Boer, 2016). These factors all impact to what extent a potential informal caregiver can and will provide sufficient and adequate care. A better understanding will provide important implications for the mobilization of potential informal care resources.

Second, more detailed insights into the process of and reasons behind care acquisition are necessary. The present study merely considers which determinants are present and which sources of care are used at a given moment. Why a particularly type of care is chosen is not known. Longitudinal studies aiming at understanding this process can provide more insight into the causal mechanisms that lead to the acquisition of the different types of care.

Third, follow-up studies might investigate the use of care in more detail by considering the intensity of care provision (e.g. hours per week) and the type of care services provided. For instance, research suggests that household care is most often provided by family, whereas personal care and nursing care is more often provided by professional caretakers. Trends in the prevalence of care provision might differ from changes in intensity or care activities. For instance, as a result of cut-backs in formal care provision, family members might be more willing to take physical care of their relatives. Lastly, while the effects of SES-indicators on care use are relatively clear in this study, with both income and education having similar effects, a systematic review by Luppa et al. (2009) has shown that they are less conclusive in other studies. Agree and Glaser (2009) point out that one's socioeconomic status has diverging effects on care use between countries. Therefore, cross-country studies comparing the SES-gradient in care use

within different LTC systems are needed in order to better understand how system characteristics impacts changes in the SES-gradient over time. This will also allow for a better generalization of results from single-country studies.

**Strengths and Weaknesses.**

The Longitudinal Aging study Amsterdam offers a rich dataset that covers a span of more than 20 years, which makes it suitable to draw conclusions about long-term changes in the use of LTC services. Furthermore, the data allows for the consideration of social network characteristics, physical health, education and income. Importantly, it enables a detailed investigation of LTC use that considers the difference between publicly provided and privately bought professional care. This distinction is seldomly made, even in large-scale studies like the Survey of Health, Ageing and Retirement in Europe (SHARE), but, as the present study has shown, is highly relevant for understanding SES-differences in LTC use. Despite these changes, the research design used in this study also comes with some limitations and methodological considerations.

First, the present study investigates measurements with a 10-year interval. While this provides insight into long-term changes in care use, conclusions about the immediate and short-term effects of LTC policies are limited. Both the 2007 and 2015 reform take place between the last two years of measurement and their individual effects can therefore distinguished. Furthermore, not all effects of the 2015 reform are visible in the year of its introduction, particularly as municipalities have to take on large responsibilities that they are likely need to adjust to. Short-term improvements in efficiency or sustainability of care provision above the desired budget might therefore also have implications for the SES-gradient in care.

Second, the scope of the statistical models used in the present study is limited due to the available sample size. While the LASA dataset offers the considerations of additional relevant information

(e.g. household and personal care, cognitive and mental health), these could not be included due to the lack of sufficient statistical power. For the same reason, institutionalized care could also not be considered in this study, but is important to consider as the de-institutionalization between 1995 and 2005 is likely responsible for the increase in formal home care in that same period.

**Concluding remarks**

The present study represents a valuable contribution to understanding, how long-term care changes over time and what role SES-differences play in this change. Despite concerns about the consequences of policy changes for disadvantaged groups, the findings suggest that they are well considered by the Dutch LTC system. However, this might potentially lead to another group that becomes disadvantaged due to a lack of consideration by the care system. This could be for instance highly educated individuals that have limited social and financial resources and might be overlooked. A more extensive body of research is needed in order to generalize findings and develop appropriate policy strategies to help maintain the balance between sustainability, coverage and equity of the care system. This will also help determine whether action has to be taken and which actions are most appropriate in addressing these problems. A wide range of interventions can be thought of (e.g. more caregiver support, adjusting the distribution of care provision). However, which actions will effectively reduce inequalities depends strongly on the reasons behind their emergence. Policymakers and researchers should both further observe and investigate these trends in order to counteract existing and emerging inequalities and to guarantee that no socioeconomic group is left behind.

## Tables

Table 1:

*Means and percentages of all variables per year of measurement.*

| | 1995 | | 2005 | | 2015 |
|---|---|---|---|---|---|
| Age at interview | 79.9 | | 79.5 | | 79.4 |
| Gender (% female) | 50.6 | *** | 59.1 | * | 58.4 |
| Informal care (%) | 28.0 | ** | 21.4 | | 16.7 |
| Formal Care (%) | 24.4 | *** | 34.4 | *** | 23.0 |
| Private care (%) | 21.6 | | 19.3 | * | 14.0 |
| Education % low | 49.2 | ** | 38.0 | *** | 22.2 |
| % medium | 39.6 | ** | 47,8 | * | 53.5 |
| % high | 11.2 | * | 14.2 | ** | 24.3 |
| Income (euro) | 1341.7 | *** | 1567.4 | | 1531.7 |
| Physical functioning (6-30) | 25.4 | | 25.2 | ** | 26.5 |
| Children in proximity (% yes) | 80.9 | | 81.8 | | 78.3 |
| Partner (% yes) | 52.9 | | 50.9 | ** | 60.3 |

*p<.05, **p<.01, ***p<.001, asterisks indicate significant difference with the following measurement

Table 2:

*A: Means and percentages of all variables per education group.*

| | 1995 | | | | | 2005 | | | | | 2015 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Education | | | | | Education | | | | | Education | | | | |
| | Low | | medium | | high | low | | medium | | high | low | | medium | | high |
| Age at interview | 80.4 | *** | 79.4 | * | 80.2 | 79.6 | | 79.4 | | 79.6 | 79.9 | * | 79.2 | | 79.3 |
| Gender (% female) | 63.3 | *** | 39.1 | | 35.2 | 77.0 | *** | 49.8 | | 42.3 | 69.9 | | 62.8 | *** | 38.3 |
| Informal care (%) | 29.7 | | 28.2 | | 20.5 | 23.4 | | 20.5 | | 16.7 | 26.7 | | 17.8 | *** | 5.2 |
| Formal Care (%) | 30.7 | *** | 18.9 | *** | 14.8 | 43.5 | *** | 28.1 | | 30.8 | 35.2 | ** | 22.1 | | 13.9 |
| Private care (%) | 14.2 | ** | 23.1 | *** | 50.0 | 12.9 | | 17.9 | *** | 41.0 | 2.9 | ** | 13.0 | ** | 26.1 |
| Income (euro) | 1127.4 | *** | 1402.1 | *** | 2060.7 | 1344.9 | *** | 1628.7 | *** | 1913.9 | 1317.8 | *** | 1498.3 | *** | 1756.1 |
| Children in prox. (%yes) | 85.8 | * | 79.0 | * | 65.5 | 88.2 | | 80.3 | | 71.4 | 88.1 | | 77.5 | | 73.3 |
| Partner (% yes) | 45.8 | *** | 63.0 | * | 48.9 | 40.7 | ** | 56.3 | | 60.3 | 52.4 | | 61.3 | | 65.2 |
| Physical functioning (6-30) | 24.3 | *** | 26.4 | | 26.4 | 24.1 | ** | 25.7 | | 26.3 | 24.9 | *** | 26.7 | | 27.0 |

*p<.05, **p<.01, ***p<.001, asterisks indicate significant difference with the following measurement

*B: Means and percentages of all variables per education group.*

| | 1995 | | | | | 2005 | | | | | 2015 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Income | | | | | Income | | | | | Income | | | | |
| | Low | | medium | | high | low | | medium | | high | low | | medium | | hig |
| Age at interview | 80.3 | ** | 79.6 | | 79.5 | 79.4 | | 79.3 | | 79.0 | 79.1 | | 79.0 | | 79.1 |
| Gender (% female) | 55.7 | *** | 40.6 | | 42.3 | 64.4 | | 56.3 | | 57.1 | 78.0 | ** | 58.2 | | 50.0 |
| Informal care (%) | 28.3 | | 32.9 | | 23.9 | 32.2 | * | 20.3 | | 19.9 | 16.9 | | 19.4 | * | 8.7 |
| Formal Care (%) | 33.1 | *** | 16.9 | | 13.5 | 43.7 | * | 29.7 | * | 18.0 | 42.4 | ** | 28.8 | | 12.2 |
| Private care (%) | 8.9 | *** | 22.2 | *** | 46.0 | 8.0 | | 14.6 | *** | 31.7 | 3.4 | | 12.2 | | 19.2 |
| Education % low | 64.9 | *** | 44.0 | *** | 16.6 | 51.7 | | 44.3 | *** | 19.3 | 39.0 | | 27.6 | *** | 9.3 |
| % medium | 32.2 | *** | 49.3 | | 47.2 | 44.8 | | 36.8 | | 55.3 | 55.9 | | 62.2 | * | 47.1 |
| % high | 2.9 | * | 6.8 | *** | 36.2 | 3.4 | | 8.9 | *** | 25.5 | 5.1 | | 10.2 | *** | 43.6 |
| Children in prox.(%yes) | 88.7 | * | 81.5 | ** | 67.8 | 85.7 | | 82.7 | | 78.2 | 82.0 | | 84.7 | * | 73.2 |
| Partner (% yes) | 50.3 | ** | 63.3 | | 57.7 | 56.3 | | 51.9 | | 50.9 | 45.8 | | 60.2 | | 65.7 |
| Physical functioning (6-30) | 24.53 | ** | 25.95 | | 26.61 | 23.48 | * | 25.43 | ** | 26.80 | 25.49 | | 26.71 | | 27.26 |

*p<.05, **p<.01, ***p<.001, asterisks indicate significant difference with the following measurement

Table 3:
*The effect of SES (education, income), wave and individual determinants on long-term care use.*

| | Education | | | Income | | |
|---|---|---|---|---|---|---|
| | Informal care | Formal | Private | Informal | Formal | private |
| Wave | .806 | 1.233 | .664 * | .756 * | 1.219 | .597 ** |
| Age | 1.072 * | 1.121 *** | 1.061 * | 1.071 * | 1.135 *** | 1.061. |
| Gender | 1.193 | 1.033 * | 1.575 * | 1.320 | 1.189 | 1.439 |
| Education/ income | .966 | .964 | 2.009 *** | 1.030 | .763. * | 2.527 *** |
| *Medium* | | | | | | |
| *High* | .739 | 1.253 | 6.910 *** | 1.008 | .841 | 7.682 *** |
| Education/ Income*Wave | .705 | .432 * | .853 | .904 | .333 * | 1.041 |
| *Medium* | | | | | | |
| *High* | .245 * | .240 ** | .505 | .343 ** | .291 ** | .634 |
| Informal care | | .307 *** | .476 *** | | .302 *** | .453 *** |
| Formal care | .309 *** | | 479 | .297 *** | | . 103 *** |
| Private care | .467 *** | .094 *** | .096 *** | .436 *** | .099 *** | |
| Children | 1.553 * | 1.118 | .610 *** | 1.735 * | 1.135 | .635 ** |
| Partner | 1.486 *** | .498 *** | .683 ** | 1.436 * | .508 *** | .707 |
| Physical func. | .907 *** | .831 *** | .929 *** | .908 *** | .836 *** | .924 *** |
| Log likelihood | 1223.272 | 957.358 | 1033.75 | 1102.540 | 839.095 | 905.889 |

*p<.05, **p<.01, ***p<.001

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