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# Does independent needs assessment limit use of publicly financed long-term care?

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## ABSTRACT

In health care the assessment of patients' needs is typically entrusted to health care providers. By contrast, in publicly financed long-term care (LTC) needs assessment is often delegated to an independent assessor. One rationale offered for independent needs assessment in LTC is to limit the scope for moral hazard and supplier-induced demand, which may be particularly strong in case of public LTC insurance. We study whether independent needs assessment restricts use of publicly financed LTC at the intensive margin (i.e. after people are being assessed to be eligible for receiving care). Therefore, we link nationwide Dutch administrative datasets about individual LTC use and eligibility decisions by the independent assessment agency in 2012. We find for virtually all types of care, all population subgroups, and all regions that LTC use by patients was substantially less than the maximum amount of care allowed by the independent assessor. This suggests that in the Netherlands independent needs assessment in LTC does not impose a binding constraint on use once a person is considered eligible for care. Still, independent needs assessment may have reduced LTC use at the extensive margin. A significant proportion of the applications for care (16 %) was rejected. In addition, the independent assessment may deter some people from applying.

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## 1. Introduction

Traditionally, the needs of patients are assessed by their health care providers. But these providers may be self-interested and have superior information about patients' needs, resulting in principal-agent problems for the patient and the third-party payer [1]. In the presence of comprehensive health insurance, this may result in moral hazard and supplier-induced demand.

Independent needs assessment may be especially popular in the presence of public long-term care (LTC) financing because moral hazard and supplier-induced demand are particularly likely in this context. LTC enables the elderly and the disabled to cope with their limitations. Receiving more care and support than strictly needed is likely to generate positive marginal benefits for patients because it is offering additional comfort. Moreover, if LTC providers are paid fee-for-service and are allowed to perform needs assessment themselves, they may be inclined to induce more demand for their services than strictly necessary. Hence, if due to the presence of comprehensive LTC insurance the marginal costs for patients are

low, the risk of moral hazard and supplier-induced demand may be particularly high for LTC services.

These problems may be reduced by delegating the assessment of patients' needs to an independent assessor. Independent needs assessment is uncommon in health care, but frequently used in LTC, particularly in countries with a comprehensive public LTC financing scheme, such as the Netherlands, Belgium, Germany, Japan, Norway and Switzerland [2–5].

We will examine whether independent needs assessment is indeed likely to constrain LTC demand in the context of the Dutch public LTC insurance scheme. Independent needs assessment has two roles. First, it determines whether a person is eligible (the extensive margin). Second, conditional on being eligible the assessor restricts the use of care by specifying a maximum amount of care (the intensive margin). In this paper we study the intensive margin, i.e. does the maximum amount of care set by the assessor limit the amount of care used by people? We are able to study this because the assessment only limits use if the actual care used by people is close to the maximum amount of care set by the assessor. If this maximum is not binding, implying that most people use less care than they are entitled to, then it is unlikely that this restriction limits demand. By contrast, if most eligible people use the maximum admitted amount of care, this implies that the restriction is binding and it may indeed have served as a demand constraint.

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The Dutch institutional setting allows us to study this phenomenon with precision because both the eligibility decision by the assessor and the actual use of LTC are administered for each patient and can be linked at the individual level.

We use these nationwide data to examine whether the amount of home care used by a patient equals the maximum admitted amount by the independent agency. We find for virtually all types of care, all population subgroups, and all regions that LTC use by patients was substantially less than the maximum amount of care admitted by the independent assessor. This suggests that in the Dutch context at the intensive margin independent needs assessment in LTC hardly limits LTC use. Due to a lack of data we leave for future research whether independent needs assessment may have reduced LTC use at the extensive margin. In 2009 a significant proportion of the applications for care (16 %) were rejected by the assessment agency [6]. Rejections occur because the applicant does not fulfill the eligibility requirements or quits the assessment procedure, or because the assessor refers the applicant to care financed through other financing schemes.

Our paper contributes to the literature in two ways. First, to our knowledge it is the first study that analyzes the role of an independent needs assessor in rationing access to care in detail using quantitative data. Second, using population data at the individual level, our study is the first to analyze the non-take-up, i.e. the maximum amount of care admitted by the assessor minus the actual use of care by the patient. Our paper therefore contributes to the understanding of non-take-up of health insurance benefits and its determinants (see e.g. [7,8]). Our paper is organized as follows. First, we discuss the rationale for independent needs assessment. Next, we briefly describe the Dutch context of public LTC insurance. Then we explain how we analyze the potential impact of the assessment agency on constraining LTC use, followed by a presentation and discussion of the empirical results.

## 2. Rationale for independent needs assessment

The choice for independent needs assessment in health care depends on whether its potential benefits outweigh its potential costs. The main benefit is that it reduces potential bias in the assessment resulting from provider interests or patient demand. When providers and recipients have an interest in providing or obtaining more or more expensive care than strictly needed, independent needs assessment may reduce overprovision and inefficiently high expenditures. This effect may be amplified if insurance reduces the marginal cost of consuming LTC for the recipient. These potential benefits, however, have to be weighed against the monetary costs of assessments and auditing as well as the time costs involved. In addition, the independent assessor may also be biased due to pressure by stakeholders, financial restrictions or regulations, and may be less able to make an appropriate needs assessment because the assessor may be less informed about the specific needs of the patient than a provider due to a less personal and frequent contact with the patient.

The choice for an independent assessment or an assessment done by a provider depends on the characteristics of the health care that the assessment is needed for and on other factors. At least five factors can be distinguished that are relevant for determining the feasibility and desirability of independent needs assessment. First, since independent assessment takes time, it is only possible when care is not urgent (i.e. for elective care). Second, if the need for care cannot be defined precisely there is more room for moral hazard and inducing demand, in which case the bias in the providers' decisions may be larger. An independent assessor may create more transparency and equity in the eligibility criteria for obtaining care. Third, an independent assessor is more attractive

if there are benefits from overuse for providers and patients, e.g. under fee-for-service contracts, positive marginal benefits for the patient from overuse and the government or an insurer pays a large share of the costs. Fourth, an independent assessor is less beneficial if there are other restrictions on supply (e.g. provider budgets) and demand (e.g. co-payments) as these restrictions also work to limit supplier-induced demand and moral hazard. Fifth, the value of an independent assessment is higher when the assessor has the ability and the incentives to act in the interest of its principal. External pressure e.g. because applicants may challenge eligibility decisions in court, may cause a rational independent assessor to be more lenient than its principal desires [9].

These five factors mean that independent needs assessment in the context of LTC is feasible, because LTC is often for persisting rather than urgent problems, and that is desirable because there is likely much room for moral hazard and supplier induced demand. There are two reasons for this. First, the demand for LTC is not only a function of someone's functional limitations, but perceptions and personal circumstances, e.g. the availability of informal support, matter too. Hence, the need for care often cannot be defined precisely. Second, in the case of LTC insurance, services for which marginal costs are higher than the benefits for society or the third-party payer may be welfare-increasing for individual providers and patients.

## 3. Long-term care in the Netherlands

Public LTC insurance pays for 94 % (2012 figure) of all LTC expenditures in the Netherlands; the remainder is financed through the Social Support Act [10]. People who are eligible for public LTC insurance benefits can choose between receiving these services in kind or to take out a cash benefit that is equal to roughly 75 % of the costs if the care were provided in kind [11].

Until 1998, LTC providers were responsible for the assessments of people's needs for care covered by the public LTC insurance scheme. To reduce the influence of providers on LTC use, in 1998 this task was entrusted to regional independent assessment agencies. In 2005, all regional assessment agencies were merged into a central agency for needs assessment (CIZ) to reduce the prevailing regional variation in needs assessment. Since then CIZ has carried out or audited the needs assessment for public LTC insurance benefits. It does so according to rules set by the Ministry of Health [12,13].

Eligibility for LTC covered through public LTC insurance is usually requested by the applicant or someone who does the application on their behalf. Eligibility depends on the health and health-related limitations of the applicant. Until 2015, many other aspects such as living conditions, social environment, psychic and social functioning of the applicant, the presence of other professional services and informal care that the patient receives were also taken into account [14–16]. To get insight in these aspects of the application, the assessor uses the information provided on the application form and may gather information on the criteria listed about, e.g. via health care providers or through a home visit. In some cases (e.g. after a hospitalization) in which the need for home care is straightforward to establish, the assessment is sometimes delegated to a home care provider. In these cases, CIZ has the role of an auditor [13].

Home care providers are private entities, which are either for-profit or not-for-profit [11]. Home care providers are paid for every hour of care provided. These fee-for-service contracts mean that they have incentives for overprovision. The providers are contracted by regional single payers, each of which is constrained by an annual budget that is set at the national level. Regional payers do not bear any financial risk for LTC expenses and do not compete for

consumers, and therefore have little incentive to monitor the efficiency of care. The regional provider budgets, however, may limit LTC use because they constrain the total amount spent on LTC. Non-public data from the Dutch Health Care Authority show that from 2011 to 2013 all 32 single payers spent at least 98.3% of the regional budget per year, which suggest that the regional budgets may act as a demand constraint. Nevertheless, only a few individuals were on waiting lists during the period (2012) we studied [17].

In addition to regional budgets, income-related co-payments may also restrict publicly financed LTC demand, although Dutch co-payments are relatively low in comparison to other countries [2,18].

The key question addressed in this paper is whether independent needs assessment effectively restricts publicly financed LTC demand at the intensive margin in the presence of other potential demand constraints (i.e. regional providers budgets and co-payments).

#### 4. Empirical analysis

##### 4.1. Methods and data

At the intensive margin the assessor can reduce LTC demand for each of the types of LTC that is used. In home care the assessor specifies a range of hours to each client. This range contains a lower and an upper bound of hours care per week. The upper bound is the maximum admitted amount of publicly financed care the client is allowed to receive. If clients use less hours of care, then the maximum admitted amount then we conclude that the assessment does not limit LTC use.

To investigate this, we use a nationwide administrative dataset that encompasses about 600,000 individuals being eligible for receiving home care in the Netherlands for 13 four-week periods in 2012. We link three sets information at the individual level through a unique person ID created by Statistics Netherlands. The first dataset contains the eligibility decisions made by the independent assessor (CIZ). These decisions specify for which types and amounts (in hours) of home care the individual is eligible for. We study four types of home care: personal care, nursing, group assistance and individual assistance. The second dataset records the

**Table 2**  
Use of personal care conditional on eligibility in 2012.

|   | n (% of total) <sup>b</sup> | % who use care in kind <sup>c</sup> | Median number of hours used (%) <sup>d</sup> | Take-up share between 90%–100% <sup>e</sup> | Take-up share > 100% <sup>f</sup> |
|---|-----------------------------|-------------------------------------|--|---|-----------------------------------|
| Eligibility (hours per week) <sup>a</sup> |                             |                                     |  |   |                                   |
| 0–2                                       | 622,261 (18.3 %)            | 61.0 %                              | 1.0  | 18.2%                                       | 3.3 %                             |
| 2–4                                       | 957,594 (28.1 %)            | 64.3 %                              | 2.3  | 17.6%                                       | 4.0 %                             |
| 4–7                                       | 934,245 (27.4 %)            | 71.2 %                              | 4.0  | 10.9%                                       | 3.0 %                             |
| 7–10                                      | 423,490 (12.4 %)            | 74.7 %                              | 6.3  | 14.0 %                                      | 3.2 %                             |
| 10–13                                     | 179,077 (5.3 %)             | 71.6 %                              | 8.8  | 16.1%                                       | 4.1 %                             |
| 13–16                                     | 106,154 (3.1 %)             | 64.8 %                              | 11.3   | 18.3 %                                      | 4.7 %                             |
| 16–20                                     | 57,818 (1.7 %)              | 58.9 %                              | 14.6   | 19.2%                                       | 3.8 %                             |
| 20–25                                     | 112,454 (3.3 %)             | 70.0 %                              | 16.6   | 20.2%                                       | 4.7 %                             |
| > 25                                      | 14,486 (0.4 %)              | 28.2 %                              | 23.2   | –   | –                                 |

Note: results for other types of home care are available upon request.

<sup>a</sup> Categories of hours the client is eligible for. If the individual changed from one category to another during a four-week period, the individual is assigned to the highest category.

<sup>b</sup> n refers to number of observations in a category where every observation is for a four-week period, hence there are 13 periods in 2012. The percentage between brackets represents the share: the number of observations per category divided by all observations for this type of care.

<sup>c</sup> The percentages in this table are calculated using monthly observations. Hence, they are all lower than the average reported in Table 1 (79.3%), which is calculated over the entire year.

<sup>d</sup> Individuals who used at least some care provided in kind only.

<sup>e</sup> Refers to the number of observations where clients have take-up shares between 90%–100% of the maximum admitted amount of eligible hours. For example, if the maximum admitted amount of hours is 16 h per four week-period (category 2–4) we calculated the take-up share between 90–100% as the number of observations where clients use 15 and 16 h, and 60% of the observations where clients use 14 h, and divide it by the total number of observations for that category. For the last category there is no fixed maximum admitted amount of hours.

<sup>f</sup> Number of observations where clients use more than 100% of the maximum admitted amount of eligible hours divided by the total number of observations. For the last category there is no fixed maximum admitted amount of hours.

**Table 1**  
Eligibility for home care and use of care in kind in 2012, unique individuals.

|                       | Number  | % care in kind <sup>a</sup> | % cash benefit | % no care |
|-----------------------|---------|-----------------------------|----------------|-----------|
| Type of home care     |         |                             |                |           |
| Personal care         | 404,508 | 79.3                        | 14.3           | 6.4       |
| Nursing               | 187,823 | 81.4                        | 10.0           | 8.6       |
| Individual assistance | 194,533 | 58.7                        | 32.2           | 9.1       |
| Group assistance      | 106,934 | 62.6                        | 24.9           | 12.5      |

<sup>a</sup> CBS (2018) [19].

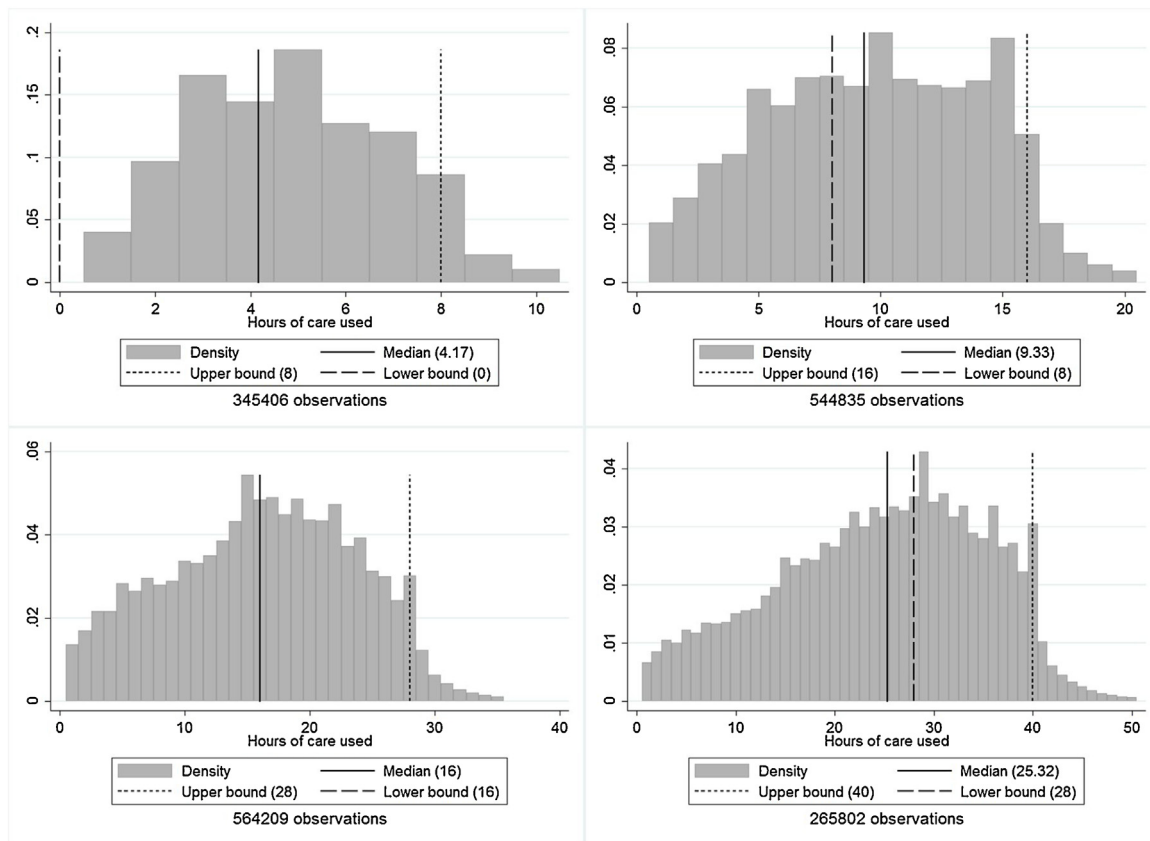
actual use of care. This data comes from the Central Administration Office (CAK) of the public LTC insurance scheme. It contains the number of hours of home care that was provided in-kind as it was billed by the providers. Third, we link background characteristics from other administrative sources. These background characteristics are the age, gender, the region of residence, the household composition, household income and prior health care expenditures of all users.

About two-thirds of the individuals who are eligible for home care are elderly who either have a somatic or a psychogeriatric condition that causes functional limitations requiring home care. The other individuals are young disabled who have a psychiatric disorder, or a sensory, physical or mental handicap. Of all individuals, 55 percent lives with a spouse or a child while 45 percent lives alone; 58 percent is female. Finally, the eligible population is rather poor on average: more than half is in the first three income deciles [19].

We analyze if the restrictions that are imposed by independent assessors limit their use by calculating the take-up ratio: the amount of care that a person used divided by the amount that this person was eligible for. If this take-up ratio is lower than 1, the restrictions that the independent assessor imposed were not binding for this person. We calculate this ratio for each type of home care. Subsequently, we use ordinary least squares regressions to regress the take-up ratio on background characteristics to find out if the ratio varies systematically across subgroups in the population.

##### 4.2. Results

LTC use is in most cases lower than the maximum amount of care as admitted by the assessor. As shown in Table 1, a substantial



**Fig. 1.** Use of personal care by individuals eligible for 0 to 8 h (upper left), 8–16 h (upper right), 16–28 h (lower left) and 28–40 h (right) per four-week period. Note: The graphs depict only individuals who used some care that was provided in kind and who used less than 125 % of the maximum number of hours. The median is calculated using all observations of individuals who used some care that was provided in kind. The results for individuals eligible for more than 40 h of personal care per four-week period and for other types of home care are available upon request.

share of the eligible individuals does not use LTC at all, varying from 6.4 percent for personal care to 12.5 percent for group assistance. Furthermore, a small group opts for a cash benefit while the largest group uses care that is provided in kind at some point during the year (see Table 1).

Of the individuals using care in kind at some point, only very few individuals take up an amount of care that is close to the maximum amount they are eligible for. This is illustrated for personal care in Table 2 and Fig. 1. For example, as shown in Fig. 1 (lower right panel), the majority of people entitled to receiving 28–40 hours of personal care took up less care than the lower bound of 28 h (the median individual using about 25 h), and the same observation holds for patients entitled to less personal care (other panels) and other types of home care.

There is much variation in how much of the home care that someone is eligible for is used (Table 2). What share is used varies across types of care and by the amount that the person is eligible for. For instance, median use is 1 h for individuals who are eligible for 0–2 h of personal care per week. That is, for this group, use is equal to 100 % of the average of 0 and 2 (the upper and lower bound of the category). Yet, median use by individuals who are eligible for 10–13 h is only 8.75 h of care (76 % of 11.5). Furthermore, the proportion of the sample for whom eligibility is binding, i.e. who use between 90–100 % of the total amount of hours they are eligible for, ranges between only 10–20 % of the population. A small proportion (3–5 %) of the home care users receives more care than the maximum admitted amount, which suggests that in practice the maximum is not always strictly applied. Figures for the other types of home care (i.e. nursing, individual assistance and group assistance) show highly similar patterns as the ones pre-

sented here for personal care and are available through the online supplement.

The regression analyses reveal that the take-up ratio not only differs by the type of home care and the number of the hours one is eligible for, but also across subgroups of users, and that the overall means hide substantial heterogeneity (Table 3). For example, the take-up ratio increases with age, is lower for men, and for individuals with children, with a spouse, and with somatic condition, and for those who are living in rural areas and are not of foreign descent. There is also regional variation. For example, for personal care there is a difference of 19 percentage points between the regions with the highest and the lowest average take-up ratio, i.e. an 11-minute difference per hour of care for which someone is eligible. These results suggest that various subgroups in the population experience different barriers to use home care, or that these subgroups are treated differently by independent assessors.

There are only a few subgroups for which the predicted take-up ratio is close to 1 and hence the restrictions from the eligibility assessment may be binding (e.g. those from Turkish descent) and those are small in size. In sum, for virtually all types of care, all population subgroups, and all regions patients use less home care than they are eligible for, indicating that for the majority of home care users the restrictions on the number of hours imposed by the assessor may not be effective in constraining demand for publicly financed home care.

## 5. Discussion

There are several potential explanations for the low uptake of public LTC benefits among eligible people. First of all, other public



**Table 3**  
Regression results.

|  | Take-up ratio personal care <sup>a</sup> |
|--|--|
| Age 18–64  | –0.051 (0.001)**                         |
| Age 65–69  | –0.036 (0.001)**                         |
| Age 70–74  | –0.021 (0.001)**                         |
| Age 75–79  | –0.013 (0.001)**                         |
| Age 80–84  | Reference category                       |
| Age 85–89  | 0.007 (0.001)**                          |
| Age 90–94  | 0.019 (0.001)**                          |
| Man  | –0.016 (0.000)**                         |
| Woman  | Reference category                       |
| Deceased before 1 January 2014                           | 0.009 (0.001)**                          |
| Survived until 1 January 2014                            | Reference category                       |
| Time to death, in months                                 | 0.000 (0.000)                            |
| Not of foreign descent                                   | Reference category                       |
| Foreign descent: Western countries                       | 0.090 (0.003)**                          |
| Foreign descent: Turkey                                  | 0.135 (0.003)**                          |
| Foreign descent: Morocco                                 | 0.028 (0.002)**                          |
| Foreign descent: Suriname                                | 0.015 (0.004)**                          |
| Foreign descent: Netherlands Antilles and Aruba          | 0.001 (0.001)                            |
| No Children  | Reference category                       |
| Children   | –0.008 (0.001)**                         |
| Number of children                                       | 0.001 (0.000)**                          |
| Household size   | 0.000 (0.000)                            |
| No spouse/spouse lives in another household              | Reference category                       |
| Spouse lives in the same household                       | –0.038 (0.000)**                         |
| Municipality: very strongly urbanized                    | Reference category                       |
| Municipality: strongly urbanized                         | –0.024 (0.001)**                         |
| Municipality: moderately urbanized                       | –0.029 (0.001)**                         |
| Municipality: little urbanized                           | –0.031 (0.001)**                         |
| Municipality: rural                                      | –0.032 (0.001)**                         |
| Somatic condition  | Reference category                       |
| Psychogeriatric condition                                | 0.042 (0.001)**                          |
| Psychiatric condition                                    | 0.030 (0.001)**                          |
| Physical disability                                      | 0.051 (0.001)**                          |
| Mental disability  | 0.036 (0.002)**                          |
| Sensory disability                                       | 0.017 (0.002)**                          |
| Health care expenditures in previous year (in 1000 euro) | 0.000 (0.000)**                          |
| Intercept  | 0.890 (0.002)**                          |
| Regions <sup>b</sup>                                     | Yes                                      |
| Time <sup>b</sup>  | Yes                                      |
| Amount of care <sup>b</sup>                              | Yes                                      |
| Income: 5% categories <sup>b</sup>                       | Yes                                      |
| Number of observations                                   | 2,050,715                                |

Note: results for other types of home care are available upon request.

<sup>a</sup> Individuals who used at least some care provided in kind only.

<sup>b</sup> Both regressions included 31 indicators for single-payer regions and 12 indicators for the second through the 13th four-week period. In addition, the regression for personal care contained 9 indicators to control for the number of hours the individual is eligible for and 19 indicators for the lowest 19 5% categories based on standardized household income.

policies such as copayments and regional budget restrictions may partly explain this. A potential consequence of a longer period of tight regional budgets is a constrained supply side, resulting in a lack of access to services by patients. Second, the assessment rules or the assessor’s interpretation may be too generous. Third, informal care, which is a close substitute for formal home care in some cases, may play a role. Further research is needed to understand the role of each of the causes of the discrepancy between the amount of care people actually use and are eligible for.

The limited impact of independent needs assessment on LTC use raises the question about its effectiveness, at least within the Dutch context. If moral hazard and supplier induced demand are effectively counteracted by budgetary restrictions and co-payments, independent needs assessment may only be necessary on the extensive margin to prevent non-eligible people from using LTC altogether, but not on the intensive margin. Thus, given the few users whose LTC use is close to the maximum, it may be sufficient to assess the type of care needed but not the number of hours per

week, while leaving the allocation of the budget among users to the payers or the providers. At the extensive margin independent needs assessment in the Dutch LTC system may effectively block some people from using care altogether. It is not clear, however, to what extent and for which people the independent needs assessment poses barriers to access care. To investigate this, data are required on which applications are rejected, but these data are currently not available for research.

A reform of Dutch system LTC financing that was implemented in 2015 may shed further light on the impact of independent needs assessment on LTC use. As part of the reform, most home care was transferred from the public LTC insurance scheme to either the public health insurance scheme (personal and nursing care) or the municipalities (social support and personal assistance with activities of daily life). Consequently, for personal and nursing care independent needs assessors have been replaced by providers, whereas for social support and personal assistance they have been replaced by municipalities. The effect of abolishing the independent needs assessment cannot be separated from the effects of other parts of the 2015 reform [20]. Yet, our finding that independent needs assessment had a limited impact on the intensive margin of home care use before the reform suggests that abolishing this may not have had a substantial effect on the use by existing users.

Finally, the limited effect of needs assessment on the intensive margin of home care use in the Netherlands also raises questions about the effectiveness of the independent assessment in other countries, where the demand and supply of LTC are often more restricted through other measures [18]. Furthermore, our findings suggest that setting objective eligibility criteria is not enough for ensuring that the actual use follows the same rules, as we find that non-take-up is considerable and the extent of non-take-up varies across subgroups in the population.

## 6. Conclusion

Comprehensive LTC insurance may give rise to moral hazard and supplier-induced demand. A strategy that often used for publicly financed LTC – but not for other types of health care – is to organize an independent needs assessment. Such an independent assessment may counter moral hazard and supplier-induced demand by determining which types and which amount of LTC a person really needs.

Although the extent of moral hazard and supplier-induced demand in publicly financed LTC cannot be established, we are able to investigate whether independent needs assessment effectively restricts LTC use at the intensive margin. If independent needs assessment does not impose a binding constraint on LTC use, it is highly unlikely that it reduces moral hazard and supplier-induced demand among those who are eligible for care. Hence, this would remove an important reason for organizing the independent needs assessment.

We find that independent needs assessment does not seem to be effective in constraining publicly financed LTC use once people are considered eligible for receiving care. The uptake of the LTC benefits varies across subgroups, but virtually all subgroups use only part of the LTC for which they are eligible. The variation in uptake is associated with the patient’s personal and household characteristics and his or her region of residence.

## Declaration of competing interest

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## References

- [1] Arrow K. Uncertainty and the welfare economics of medical care. *American Economic Review* 1963;53(5):941–73.
- [2] Bakx P, Chernichovsky D, Paolucci F, Schokkaert E, Trottmann M, Wasem J, Schut F. Demand-side strategies to deal with moral hazard in public insurance for long-term care. *Journal of Health Services Research & Policy* 2015;20(3):170–6.
- [3] Goncalves J, Weaver F. Home care, hospitalizations and doctor visits. University of Geneva working paper series, no. 14–09–5. Geneva: University of Geneva; 2014.
- [4] Tamiya N, Noguchi H, Nishi A, Reich M, Ikegami N, Hashimoto H, Shibuya K, Kawachi I, Campbell J. Population ageing and wellbeing: lessons from Japan's long-term care insurance policy. *Lancet* 2011;378(9797):1183–92.
- [5] Willemé P, Geerts J, Cantillon B, Mussche N. Long-term care financing in Belgium. In: Costa-Font J, Courbage C, editors. *Financing long-term care in Europe. Institutions, markets and models*. Houndmills, Basingstoke: Palgrave Macmillan; 2012.
- [6] CIZ. *Trendrapportage landelijke indicatiestelling AWBZ 2009*. Driebergen: CIZ; 2010.
- [7] Arrighi Y, Davin B, Trannoy A, Ventelou B. The non-take up of long-term care benefit in France: a pecuniary motive? *Health Policy* 2015, <http://dx.doi.org/10.1016/j.healthpol.2015.07.003>.
- [8] Guthmuller S, Jusot F, Wittwer J. Improving takeup of health insurance program: a social experiment in France. *Journal of Human Resources* 2014;49(1):167–94.
- [9] Prendergast C. The limits of bureaucratic efficiency. *Journal of Political Economy* 2003;111(5):929–58.
- [10] CBS. *Gezondheid en zorg in cijfers 2014*. The Hague: CBS; 2015.
- [11] Mot E. The Dutch system of long-term care. Centraal plan bureau document, no. 204. The Hague: CPB; 2010.
- [12] RMO. *Indicatiestelling: omstreden toegang tot zorg*. The Hague: RMO; 2010.
- [13] Lindeboom M, van der Klaauw B, Vriend S. Audit rates and compliance: a field experiment in care provision. *Journal of Economic Behavior & Organization* 2016;131:160–73.
- [14] Rijksoverheid. *Beleidsregels indicatiestelling AWBZ 2012; 2011* [Accessed on 12 June 2019] <http://wetten.overheid.nl/BWBR0030849/geldigheidsdatum.02-01-2012>.
- [15] Rijksoverheid. *Beleidsregels indicatiestelling wlz 2015; 2014* [Accessed on 12 June 2019] <http://wetten.overheid.nl/BWBR0036073/geldigheidsdatum.23-04-2015>.
- [16] Diepstraten M, Douven R, Wouterse B. Can your house keep you out of a nursing home? *Health Economics* 2020;29(5):540–53.
- [17] CVZ. *Wachtlijstonderzoek AWBZ. Factoren die van invloed zijn op de betrouwbaarheid van wachtlijstinformatie*. Diemen: CVZ; 2013.
- [18] OECD. *Help wanted? Providing and paying for long-term care*. OECD health policy studies. Paris: OECD; 2011.
- [19] CBS. *Monitor langdurige zorg; 2018* [Accessed on 12 June 2019] [mlzstatline.cbs.nl](http://mlzstatline.cbs.nl).
- [20] Bakx P, Garcia-Gomez P, Rellstab S, Schut F, van Doorslaer E. *Hervorming langdurige zorg: trends in het gebruik van verpleging en verzorging*. Netspar Design Paper 141; 2020.