Are Nursing Homes a Protective Environment Against Mortality for the Elderly ?

Delphine Roy*

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Abstract

Exploiting a French survey linked with vital statistics data, we look at whether similar elderly people with disabilities, especially cognitive impairments, die earlier when they live in the community than when they are institutionalized in a nursing home. We highlight a list of risk factors that are associated with an increased likelihood of short- or medium-term death at home. We show that once we match similar individuals at home and in nursing homes and that we control for a rich array of health and environment factors, we no longer see an increased risk of death for nursing home residents. Additionally, some risk factors, notably being underweight, having fallen in the past year, and, for people above 75, cognitive limitations, are mitigated for people in nursing homes. Nursing homes could therefore provide a protective environment against these factors.

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*Institut des politiques publiques (PSE-GENES), 48 boulevard Jourdan, 75014 Paris, France (e-mail: delphine.roy@ipp.eu). I gratefully acknowledge financial support from the Caisse Nationale de Solidarité pour l'autonomie (*CNSA*) for this research, as part of a research contract from December 2019 to December 2022. I thank my supervisors Antoine Bozio and Jérôme Wittwer, as well as Arthur Guillouzouic, Patrick Aubert and Léa Toulemon from the IPP and participants in a CNSA webinar in may 2022 for their questions and comments on an earlier draft of this paper.

1 Introduction

The context is well-known : the arrival of the baby-boom generations at ages where loss of autonomy becomes more frequent will create an unprecedented need for care. Meanwhile, at the very moment when the demographic wave is approaching, public policies on autonomy are being urged to take an "Ageing in place" turn that corresponds both to the desire of the majority of elderly people to "age in place", and to a more global desire to promote home care and deinstitutionalization—as evidenced, on three different levels, by the "ambulatory shift" in the healthcare sector over the last ten years, Opinion 128 of the Conseil Consultatif National d'Ethique on the ethical challenges of ageing, which spoke out against the "concentration" of the elderly in nursing homes and advocated "alternatives to nursing homes", and successive UN reports on the rights of people with disabilities, highly critical of institutional care.

The covid-19 pandemic, like the 2003 heatwave before it, showed that elderly people living in residential care are a particularly fragile population at risk of death when an event with a strong negative impact on health occurs. In normal times, excluding epidemics or heatwaves, the death rate in nursing home facilities is already much higher than at home: in France, one resident in five present in a given year dies before December 31 of that year (Muller and Roy, 2018). This is, of course, primarily due to their age (86 on average) and deteriorated health, which cause both their move to an institution, and their increased risk of death.

And yet, if families continue to turn to nursing homes to care for their elderly parents, it's with a view to protecting them. Requests for institutional care are often motivated by a perceived higher risk of accident if the elderly person remains at home, or because their state of health requires frequent care or continuous monitoring. The causal effect implicitly attributed to nursing homes in these motivations is a protective effect against the risk of accidents, aggravation of pathologies, and ultimately, death. This effect is particularly pronounced for Alzheimer's patients and other people with cognitive disorders, for whom the risk of endangerment is perceived as high if the person remains at home alone.

In this paper, I address the issue of whether or not, and to what extent, nursing homes appear to protect elderly patients from the risk of mortality, compared to similar patients remaining at home, especially patients with neurodegenerative diseases such as

Alzheimer's.

We now have a particularly rich database for studying senior mortality in France, thanks to the follow-up administrative data of senior mortality in the "Care" surveys, carried out every year since 2015 by Insee and DREES. The "Care" surveys were face-to-face surveys on a representative sample of the population aged 60 or over in mainland France, at home ("Care-Ménages" survey, 10,600 observations) and in institutions ("Care-Institutions" survey, 3,300 observations).

Thanks to the database created by these two stacked and harmonized surveys, we can study the determinants of mortality at home and in institutions, and see whether they are the same or whether some differ.

There is a fairly extensive literature on the determinants of the probability of death or length of life, particularly for patients with dementia (see for example (Helmer et al., 2001), and their bibliography). From this literature, we note that the variables that can have a statistically significant effect on the probability of death in the elderly can be classified into four groups. An important advantage of the Care surveys is that they contains a large amount of information on individuals, making it possible to cover all these factors.

1. factors describing the individual's state of health: existence of pathologies, mental health, build (underweight, obesity), physical activity, eating habits, etc. ... ;

2. In addition to gender and age, other demographic factors: some articles find an effect of the presence of a cohabiting spouse, the number of children, the number of brothers and sisters, ethnic origin, migratory background..;

3. socio-economic factors: social background, level of education, previous profession, income, etc.;

4. environmental factors: benefits of public policies to help people live independently, family environment, formal and informal help received, medical follow-up, frequency of social interactions, etc. These are the factors on which public policies can have a direct influence, and will therefore be the subject of the most in-depth investigations in this line of research.

With regard to the effect of public policies, a review of the literature (Phelan et al., 2015) shows that home interventions such as "care plan", such as the one implemented

by the personalized autonomy benefit (APA) in France, had only a very weak effect on the probability of hospitalization[1]. It is therefore likely that, *a fortiori*, their effect on the probability of death is nil or undetectable.

This paper contributes to two strands of the literature. First, they add to the epidemiological literature on mortality factors, or frailty factors. We examine a very wide array of factors thanks to rich survey data with little or no measurement error or missing value on the outcome data (death). We show that the risk factors for death are the same for people living in an institution and those living at home, albeit to different extents.

Secondly, we add to the literature on the pros and cons of institutionalization. We show that certain risk factors, notably being underweight, having fallen in the past year, and cognitive limitations or Alzheimer's disease, are attenuated for people in residential care. Nursing homes would therefore be a protective environment against these factors.

The remainder of the paper is organized as follows. The next section (section 2) describes the institutional context, as well as the data and and methods we use. Section 3 presents the results. Section 4 discusses the results and concludes.

2 Context and data

We begin by contextualizing the institutionalized elderly population in France. Then we describe the data we use. Finally, we outline the 3 econometric approaches that I use to best compare the effect of various factors, including living in an institution, on the two populations : linear probability models (LPM), Cox duration models and matching on the LPM models, in order to better control for the selection effect of being in an institution.

2.1 Institutional context

There are regional variations in the use of nursing home, but France's rate of institutionalization is rather high on average : 8% of people over 75 live in a nursing home. This proportion rises to 21% among those aged 85 or over. Around 600,000 people live in permanent accommodation, excluding assisted living facilities. Of these, 90% live in one of France's 7,400 nursing homes, which are medicalized establishments partly financed by

[1]"A significant reduction in hospital admissions was not found in any of the included studies, although one study did observe a reduction in hospital days".

the French health insurance system. That's more than the entire population of the city of Lyon, for example (523,000 inhabitants in 2017).

85% of the elderly people living in our facilities are women. On average, they are 85 years old, and 40% are over 90. 91% are dependent: they need help with one or more basic activities of daily living, such as bathing, dressing, eating... Over 90% of residents need help with toileting, for example. 55% of residents are highly dependent ("disability level (GIR) 1 or 2": confined to bed or an armchair, or with impaired mental functions, they need help with most activities of daily living, or constant supervision (Balavoine, 2022).

In addition to needing daily care, nursing home residents are generally in poor health, with an average of eight pathologies. 91% suffer from neuropsychiatric disorders (dementia, depression, behavioral problems, etc.), and around 1/3 from Alzheimer's disease or related disorders.

The decision to move into an institution is often the result of a multiplicity of factors, many of them cumulative: epidemiological (loss of autonomy leading to a need for assistance), social (presence or absence of family caregivers), environmental (adaptation of the home and neighborhood) and economic (availability and affordability of professional care).

The main reason is often that the person's need for help exceeds what can be provided at home. The Direction de la recherche, des études, de l'évaluation et des statistiques (Drees) has estimated that the median professional assistance time for a person with severe loss of autonomy at home is 9 hours a week, to which must be added more than 35 hours of assistance from family and friends. However, the maximum amount of the personalized autonomy benefit (APA) for home care is €1,956 per month, enough to finance a maximum of 19 hours per week of home help[2]. Without extraordinary financial resources, staying at home when dependence becomes significant is impossible without the presence and availability of family caregivers.

2.2 Data

2.2.1 A unique linked dataset covering both institutional settings

We use the CARE surveys from 2015-2016, which contain information on 10 000 individuals aged 60 or above living in the community ("Care-Ménages"), and 3 000

[2]83.2 hours per month, at the current minimum rate of 23.5 euros per hour.

living in care homes ("Care-Institutions"), making it representative of the entire French population of that age range. It is a unique dataset because it combines survey data with a wide scope of administrative data gathered from numerous sources: tax data, healthcare consumption data, long-term care benefits data, and mortality follow-up data, coming directly from the Etat Civil, the registry office registering births, marriages and deaths.

The "Care Ménages + Institutions" database is built by stacking data from the two Care surveys. It therefore contains 13,890 observations: the 10,628 observations from the "Care-Ménages" (Care-M) survey and the 3,262 observations from the "Care- Institutions" (Care-I) survey. As most "general population" surveys only cover people living at home, this database represents a rare opportunity to study both populations together, using homogeneously constructed data.

The Care surveys, matched with these vital statistics data for the years following the survey, enables us to study the mortality factors at work in the two cohorts of people surveyed: in 2015 at home, and in 2016 in care homes.

The previous survey that made this possible was the 2008-2009 "Handicap-Santé" survey, but the homogenization work between home and institution had only been carried out on a few variables. The "Care" survey therefore enables us to take stock of the situation of people aged 60 or over in France in 2014-2015. The scope of both surveys includes:

- People living in "ordinary housing", that is, in the community (surveyed in Care-M)
- People living in assisted living facilities(surveyed in Care-M)
- People living in nursing homes (Ehpad), non-medicalized retirement homes (EHPA non Ehpad) and long-term care units (USLD) (surveyed in Care-I)

People outside the scope of the two surveys combined are those living in collective housing other than that specifically dedicated to the elderly: workers' hostels, psychiatric hospitals, religious institutions, etc. These types of housing concern few people over 60, and are concentrated in the youngest age groups (60-75).

Questionnaire data was collected using a standardized questionnaire covering medical information (diseases, a thorough description of functional limitations, activity restrictions, healthcare use), socioeconomic characteristics (household composition, educational level, income) and a description of the environment (home layout and facilities, assistive devices).

Types and levels of formal and informal care, provided by professionals and relatives, were also recorded.

The mortality analysis was carried out on both sub-populations, together and separately. The datasets covering elderly people both in institutions and at home enables us to recover very precisely the INSEE mortality quotients for 2016 (see descriptive statistics section), except at very high ages where mortality is higher in the Care survey.

2.2.2 Some of the community respondents move to nursing homes before their death

Throughout this paper, it should be borne in mind that the home/institution distinction is measured at the time of the survey: among those surveyed at home, a certain number will move to an institution before dying, without it being possible to know who. Some preliminary work of LTC benefit recipients (APA) identified around 200 Care-Ménages respondents who were beneficiaries of the personalised autonomy benefit at home who became beneficiaries of the benefit in an institution in the 18 months following the survey. We will include this information in further analysis, because it blurs the "treatment" made up of living in an institution. but no follow-up information is available for people who were not beneficiaries of the benefit at home at the time of the Care-Ménages survey.

If some of the "control" group are actually treated, it means that the difference between NH residents and community dwellers who do not move to a nursing home would probably be larger than what we observe with some control individuals becoming treated during the follow-up period.

We should redo the analysis excluding these observations, but moving to a nursing home after an adverse event such as a fall or an hospital stay (and eventually dying, or not) is a relevant outcome for our analysis : removing these observations would mean to underestimate the risks for community dwellers. We will return to this question in the discussion section.

3 Descriptive statistics

3.1 Mortality quotients estimated from survey data

First, we check that we find the same mortality quotients in our sample as those of the Institut national de la statistique et des études économiques (INSEE) for 2016, except at very high ages where mortality is higher in the CARE survey.

The probability of death exactly one year after the survey was accurately recalculated thanks to the availability of individual survey dates by DREES.

One-year probabilities of death can be compared with INSEE morality quotients for 2016, which are also defined as the probability of dying before reaching age N+1, conditional on being alive at age N. They are published by sex and age. The probabilities of death at one year, calculated on stacked and weighted Care-households and Care-institutions, are remarkably close to the INSEE mortality quotients (figures 1.1, 1.2 and 1.3). However, there is instability at very high ages (¿95 years), especially for men, whose numbers are lower, as well as excess mortality among Care respondents between around 84 and 90 years, even after weighting. In the absence of a better explanation, we'll consider this to be sampling error.

As a result, in our regressions, we will use the mortality quotient as the expected probability of death at each age, by sex. In fact, we felt it more appropriate to use this externally known value for the population as a whole as a reference, rather than the value calculated on our sample, which, although close, is subject to sampling error.

3.2 Death rates at 1 and 3 years by place of residence and individual characteristics

At the time of writing, 2020 mortality data were not yet available. We could therefore observe deaths 4 years after the survey for Care-M, and 3 years after the survey for Care-I. Death rates are consistent with INSEE values for 2017.

The estimated numbers and rates of death after 1, 2, 3 and 4 years (for Care-M) are presented in 1 and 2. These overall rates can be considered as a reference for the rates by individual characteristics presented in appendix.

All the descriptive statistics tables are presented in the appendix: first for the entire

population, then at home and in institutions separately. These are cumulative probabilities: people who died in the first year are included in those who died after 2 years, etc.

3.3 A measurement problem for people who die abroad

The rate of death at 3 or 4 years is lower the further away the person was born: at home, 10% for those born in France, 9% for those born in the European Union (EU), 7% for those born in the Maghreb and 6% for those born in the rest of the world. This effect is further reinforced in a regression, "all else being equal".

One might be tempted to justify this correlation by an immigrant selection effect, and invoke a whole literature on the "migrant mortality paradox"[3] (Khlat and Guillot, 2017).

Unfortunately, further analysis reveals that people born abroad outside the EU are clearly in poorer health than others (for example, on the declared health indicator (cf. table 4), and that the cause of the apparent greater longevity of immigrants is rather to be explained by a data problem: the difficulty of registering deaths that occurred abroad in the French civil registry. A proportion of migrants return to their country of origin after retirement and die there, and as a recent note from the Ministry of Solidarity and Social Affairs emphasized in response to a parliamentary question, the exchange of information on deaths between civil registries in different countries is still highly imperfect, particularly outside the EU [4]. This hypothesis is corroborated by the fact that the diminishing effect of birth abroad on the probability of death is much stronger in the 60-80 age group than at older ages, when the probability of returning to one's country of origin becomes lower.

In what follows, we will therefore restrict the analysis to people born in France, to prevent the apparent under-mortality of foreign-born people from biasing the results. As the situation of elderly immigrants is a subject in its own right, it would be interesting to devote a specific paper to the state of health, loss of autonomy and assistance received by

[3]The 'migrant mortality paradox' concept emphasizes the contradiction between the inferior mortality levels and disadvantaged socioeconomic conditions of migrants compared to natives. The predominant hypothesis for this paradox is that of the 'healthy migrant effect', according to which individuals who migrate are among the healthiest of their population of origin. An alternative explanation is the 'salmon-bias' hypothesis, which assumes that migrants tend to return to their home country whenever they become seriously ill, leaving behind the healthiest members of the community.

[4]"For French pensioners living abroad, in the absence of reliable civil status data enabling automatic input into the national system of identifiers, pension funds have had to develop "certificates of life". Recipients of retirement pensions paid by French pension schemes can continue to receive this income even when they are established abroad, with no minimum residence requirement in France. Thus, for pensioners living abroad, certificates of life must be produced, as pension funds have no automated knowledge of deaths." https://www.senat.fr/questions/base/2019/qSEQ190108451.html

people aged 60 or over who have immigrated to France, in comparison with the situation of people born in France.

3.4 Time to death with and without Alzheimer's disease

With duration analyses, the most common in epidemiological literature on mortality, we can visualize life spans according to individual characteristics. Figure 4 shows life spans from t_0, the survey date, at home and in institutions, for men and women (weighted data). This representation allows us to visualize the gap between the survival of people at home and in care homes. It should be borne in mind that this is not an "all things being equal" analysis, and that people in residential care are much older, and in poorer health at t_0. In residential care, 70% of men are still alive at t_0+400 days (just over a year), compared with 75% of women. At home, survival rates at t_0+400 days are close to 100% for both men and women (with a slight advantage for women). The difference across genders is secondary compared to the difference between home and institution, even without control variables. The survival of people declaring Alzheimer's disease or not, at home and in a nursing home, can be visualized in figure 5. In residential care, 72% of people declaring Alzheimer's disease are still alive at t_0+400, compared with 85% of people not declaring Alzheimer's disease. At home, the survival rate at t_0+400 is better than in an institution for people declaring Alzheimer's disease, but a long way from that for people not declaring Alzheimer's disease (88% and 99% respectively). In descriptive terms (Kaplan-Meier estimator), we can see that the gap between people with Alzheimer's disease and those without is smaller in institutions: essentially because people in institutions without Alzheimer's are older and in poorer health than people without Alzheimer's at home. An analysis of durations "all other things equal" must therefore be carried out.

4 Empirical strategy

After having removed the people born abroad from our sample, there remains 11 591 observations on which to run the regressions. When we restrict ourselves to respondents aged 75 or above (see section 4.4), there are still 7 598 observations on which to run the analysis.

4.1 A series of nested linear probability models

We first run a series of regressions of the probability of death after 1 and 3 years, introducing the INSEE mortality quotient as an explanatory variable, instead of gender and age exponentiated, which is often done in the epidemiological literature. The idea is to take the true probability of death observed in the population as the expectation of death conditional on sex and age, and not the probability of death that would be re-estimated by regression on the data, which may be subject to sampling hazards, as seen above.

The dependent variable equals 1 if the respondent is registered as dead 1 year (resp. 3 years) after being surveyed. The exact survey date and, when applicable, the exact date of death are present in the data. Tables comparing successive specifications with added variables, leading to the "parcimonious" specification adopted as a baseline, are presented in the appendix.

Model 0 only includes a constant and the INSEE mortality quotient in 2016, for a given age and gender. Model 1 introduces my main variable of interest, living in a institution or not, and demographic covariates. Because sex and age are already accounted for in the mortality quotients, these are mainly the number of children, and whether the person lives in a couple or not. Model 2 adds a wide array of health controls : physical, sensory, cognitive limitations; perceived health status ; the Katz index of disability[5] ; the MH5 mental health socre (in 3 brackets) ; having a chronic ill ness or not ; having fallen in the past year ; having been hospitalized in the past year ; not having been to the GP in the

[5]The Katz indicator is used to assess a person's ability to perform six activities of daily living: toileting; dressing; going to and using the toilet; lying down or getting out of bed and sitting up or getting out of the chair; controlling bowel movements and urine; eating pre-prepared food. This indicator distinguishes individuals into eight groups. Being "dependent in the Katz sense" means being classified in a group other than "A".

- Group A: the person is independent in all six activities;
- Group B: dependent on a single activity;
- Group C: the person is dependent for two activities, including "grooming";
- Group D: dependent for three activities, including "grooming" and "dressing";
- Group E: dependent for four activities, including "grooming", "dressing" and "going to and using the toilet";
- Group F: the person is dependent for five activities, including "grooming" and "dressing", "going to the toilet and using it" and "lying down or leaving your bed and sitting up or leaving your seat";
- Group G: the person is dependent for all six activities;
- Group H: the person is dependent on at least two activities but cannot be classified in any of the above categories.

past year, one dummy for being a "long-term illness" beneficiary, meaning having a medical condition that entitles the patient to be 100% refunded for the treatments associated with that condition; one for a diagnosis of Alzheimer's disease; and one indicating whehter the patient is under legal protection (guardianship or trusteeship).

Model 3 adds socioeconomic variables, mainly income and education. Model 4 adds variables indicating the level of social support received : frequency of contacts with relatives or friends. The Care surveys showed that NH residents received a non negligible amount of care and visits from relatives, and that this played an important role in their mental well-being (Besnard and Abdoul-Carime, 2020)

Model 5 adds information on receiving informal care : one dummy for moral support and the other for help with everyday tasks. Finally, our baseline model is model 6, in which we only keep the significant variables from the previous models.

4.2 The Cox duration models

We compare the previous results with those of duration analyses, in which the dependent variable is the time between the survey and the death of the respondent, which is censored when the person is still alive after 3 years. The advantage of duration models is that they allow us to use all the information contained in the date of death, and not just whether the person is dead after N years. The longer the time span, the more interesting it becomes to use time-to-death as the relevant information, because at some point, all or almost all the respondents will be dead.

It is not the case with the available data that span only 3 years, so we use duration models as a robustness check rather than as our main specification. The main reason is that Cox duration models impose rather strong hypotheses on the relationships between the variables (proportional hazards in particular), and their results are not easily interpretable.

4.3 The matching procedure

Finally, given the selection we observe between institutionalized and community-based patients, we start by performing a propensity score matching procedure which yields weights that we use in the linear regressions in which the outcome variable is death after 1 or 3 years, while the variable of interest (the "treatment" variable) is a binary variable indicating whether the persons lives at home or in a nursing home.

The outcome variable (her,e death) must be independent from the treatment (here living in a nursing home) conditional on the propensity score. Only variables that influence simultaneously the treatment decision and the outcome variable should be included in the propensity score estimation (Caliendo and Kopeinig, 2008). The intuition is that once we have taken into account all observable factors that account for both living in a nursing home and dying within 3 years of the survey, we can estimate the causal effect of living in a nursing home on the probability of death. This is credible here, since we observe and include in the regressions a large and varied number of health variables, which are the major predictor of both treatment and outcome, plus other important determinant of both such as age, gender, living in a couple, number of children, type of limitation (physical, sensory or cognitive), Alzheimer's disease... We also include income brackets and a binary variable indicating Katz disability in the propensity score estimation.

The wide range of observable variables, and the fact that the factors that explain both institutionalization and death, i.e., health variables, are observable, allow the matching procedure to yield very satisfactory results (see appendix 2).

We use two alternative sets of weights, estimated with 2 different matching procedures : full matching based on a propensity score, and gbm matching. Results are robust to the use of either.

4.4 Re-estimating the model on respondents aged 75 or above only

Finally, we rerun the same regressions on respondents aged 75 or above only, because they're more comparable across living arrangements. People who enter nursing homes before the age of 75 have very specific characteristics, including having encountered some level of disability before 60, psychiatric conditions, social isolation, or economic disadvantage, which makes the comparison with people of the same age living in the community less relevant.

Indeed, we know from another analysis of the Care surveys (Roy, 2023) that the characteristics of nursing home residents and community dwellers converge after 75, including in their health characteristics. Comparing the death rates after the age of 75, when death is more frequent and the 2 populations more comparable, seems like the best estimation strategy.

5 Results

This section presents our main results, which are based on the empirical approach described in the previous section. Complete tables containing all the regression coefficients with unmatched LPM models and Cox regressions are presented in appendix 2. Here, we present the results on the matched sample, which are the closest to a causal effect of being institutionalized.

Results after matching, with an "institution" dummy but no interactions, are presented in table 5. This table displays the nested models coefficients and show how the "institution" dummy's coefiicient changes when controls are added. Table 6 shows the baseline model, with the main factors identified in the previous analysis interacted with the "institutions dummy".

Finally, we rerun the same regression on respondents aged 75 and above only, which are the most relevant population for our analysis. Results are presented in table 7.

5.1 The effect of the "institution" dummy tends to disappears when health and social environment controls are added

First and foremost, the effect of the "living in an institution" dummy variable (compared to all types of household at home) is no longer significant at the 5% threshold on the whole sample, and it disappears event at the 10% threshold in the specifications with social relations and informal care. In our baseline models, it remains significant at the 10% level, but clearly, with better health control or better measurement of the informal care / social interactions variables, the unobserved variables included in the "institution" dummy can be accounted out of the regression.

This means that, once we control for the probability of death at each age and for each gender, and for a rich array of factors measuring health status and autonomy, we can remove enough of the unobserved differences that account for the fact that people living in institutions have a higher probability of death than those living at home, that it makes the "institution" dummy statistically insignificant. More should be done to better understand this result.

This is a strong results compared to descriptive statistics and it implies that it was in fact the deteriorated health status of the nursing home residents that caused the apparent

positive effect of living in a nursing home on mortality.

Now we turn to the main factors of mortality and interact the most important of them with the "institution" dummy to better understand the mechanisms that could account for these differences.

5.2 The main determinants of mortality, in both setting

The variables that have the greatest impact both at home and in an institution are those that indicate a very poor state of health.

- being dependent in the sense of Katz
- poor" or "very poor" self-reported health (sdsanté = 4 or 5). Among all the health variables introduced into the model, it is interesting to see that this one always stands out, and this can be seen as further proof of the empirical validity of self-reported health
- claim to be on ALD. Indeed, ALD indicates serious pathologies
- being underweight
- having been hospitalized in the past year.

In addition to loss of autonomy, three "objective" risk factors stand out: being underweight, on long-term illness payment (ALD), or having made a recent hospital stay; and a "subjective" factor, i.e. declaring oneself to be in poor or very poor health. On the other hand, having fallen during the past year is never significant, either at 1 or 3 years, and neither at home nor in an institution, even though falls are often presented as a factor triggering a series of negative health events, sometimes leading to death, in frail people.

5.3 Some determinants of mortality are observed in the community, but not in residential care

A number of variables have an impact at home but not in nursing homes, when regressions are run separately on each subsample (without matching weights) - see Appendic 4 :

- at three years, answering by proxy (proxyoui)

- at three years, having a cognitive functional limitation (lfcog) is very significant at home, but not at all in residential care.

- at three years, declaring oneself very limited in daily activities (sdimi1)

- at one year, but especially at three years, being in psychological distress (MH score¡55: variable trmh-m55) is associated with better survival at home, while not answering the questions on psychological well-being is associated with a higher probability of death. This latter result is easily explained, since the people who don't answer the module are those whose state of health or ability to communicate is too degraded to be able to answer for themselves. On the other hand, it is hard to understand why people with a particularly low psychological well-being score would have a higher survival rate than those with an average or high score. One hypothesis would be that self-reported general health (sdsanté) captures both physical and psychological health, and therefore that for the same general health status, people reporting poorer psychological health would be in better physical health, and therefore at less risk of death in the short term.

Once the other factors controlled for in these regressions have been taken into account, the items on this list are not associated with a higher probability of death in an institution, whereas they are at home.

Given the difference in the effect of cognitive limitations observed between home and institutions, we repeat the regression separately according to place of living, introducing an indicator variable for Alzheimer's disease (declarative variable in the individual questionnaire): the results are presented in Appendix 2.

In appendix 4, we check that these effects remain when using duration models, which are more traditional in epidemiology. In the next section, we explore the interaction between institutionalization and the various factors associated with death that were revealed by the first regressions, in particular being underweight, having been hospitalized and declaring a cognitive limitations or Alzheimer's.

5.4 In nursing homes, the effects of being underweight, having been hospitalized and cognitive limitations are offset

In an attempt to synthesize the analysis of the differentiated effect of mortality factors between home and institution, we perform the same regressions, but introduce an interaction term between being in an institution ("Insti" variable) and the factors that seemed to have an effect, in the previous regressions. This allows us to see whether, for the population as a whole, there are different statistical links between the variables and the probability of death (resp. time to death, in the Cox regressions) depending on whether people live at home or in an institution. We can't conclude from this that nursing homes have a protective effect, but we can question the origin of these correlations.

The results without matching are presented in Appendix 2. Here, we analyse the results after matching, presented in tables 6 (for the entire population born in France) and 7 (for the 75+ only).

We find that:

- being on ALD, dependent as defined by Katz, having a cognitive limitation, being underweight or having been hospitalized in the year has the same effect at home or in an institution (coefficient of interaction not significant) ;
- on the other hand, for being underweight, having been hospitalized in the past year and having a cognitive limitations, the effect is canceled in institutions: the coefficient is significant and positive for people at home (reference modality), and negative and significant for the interaction with being in an institution. For cognitive limitation, the coefficient of the interaction is significant at the 10% threshold only for the entire sample, but significant at the 5% threshold for the 75+ old, which is the subsample we believe to be of main interest.
- the interaction between the "Alzheimer's disease" and "institution" dummies is negative but not statistically significant. We would like to have more statistical power and a more reliable measurement of the diagnosis to see if it would become significant.

It means that the three factors (being underweight, having been hospitalized and having a cognitive limitation) increase the probability of dying for people living at home, but that

for people living in nursing homes, the total effect is the sum of the two coefficients, i.e. close to zero. We find the same result as previously, when they had little or no effect in the regression on nursing home residents only. This result is compatible with a protective effect of institutionalization for people with these signs of frailty, even if we cannot conclude on the causal character of the relationship.

This would also be consistent with the primary motivation of families who seek nursing homes for patients with cognitive limitations or after a hospital stay, essentially to protect them.

On the whole, the probability of death in residential care is more homogeneous, irrespective of risk factors and pathologies. Two mechanisms may explain this phenomenon: first, the health of virtually all residents is similarly deteriorated, which is not the case at home, where health situations are much more heterogeneous; second, this could also be a homogenizing effect of the facility, which protects residents from accidents and provides daily medical monitoring.

6 Discussion

These are only preliminary results, with several aspects requiring further investigation, that we will carry out with extra time and data.

6.1 Some respondents at home move to a nursing home afterwards, blurring the control and treatment groups

First and foremost, our main variable of interest is measured at the time of the survey, but it can change over time : some of the respondents identified as "at home" will eventually move to a nursing home before their death. This could bias our results because some of our "control" population is actually "treated".

Indeed, some preliminary work on LTC benefit recipients (APA) living in the community identified around 200 "Care-Ménages" respondents who were beneficiaries of the LTC benefit at home and became beneficiaries of the benefit in an institution in the 18 months following the survey. We will include this information in further analysis, because it blurs the "treatment" made up of living in an institution. The problem is that for community dwellers who were not LTC benefits recipients, no follow-up information is available : there

is no way of knowing if they moved to a nursing home or not.

If some of the "control" group are actually treated, it means that the difference between NH residents and community dwellers who do not move to a nursing home would probably be larger than what we observe in our regressions with some control individuals becoming treated during the follow-up period.

As a robustness check, we will redo the analysis excluding these observations. But is is not entirely satisfactory either : moving to a nursing home after an adverse event such as a fall or an hospital stay (and eventually dying, or not) is a relevant event for our analysis : removing these observations would mean to underestimate the risks of death for community dwellers.

6.2 Removing recently arrived NH patients to remove the "crisis" situations ?

Another potential confounding factor is the fact that people often arrive in a nursing home following a crisis such as the death of a spouse, having fallen or been hospitalized for other reasons that make staying at home impossible, and that also starkly increase the risk of dying. It's a well-known stylized fact that death rates in nursing homes are particularly high during the first months of stay, and stabilize afterwards (Fizzala, 2017).

This is why we will also redo our analysis using only the nursing home residents who have lived there for at least 6 months or one year. Choosing one year would also mean that the variables "having been hospitalized over the past year" and "having fallen over the past year" would be more meaningful, because the fall or hospital stay would have occurred *while the person was already residing in the nursing home*, and not at home before the person was institutionalized.

We should therefore also rerun our matching procedures between the subsample of people who have lived in their current setting, home or nursing home, for more than six months or one year, to compare comparable, relatively stable situations and not stable situations at home with post-crisis situations in nursing homes.

6.3 Using healthcare consumption to better measure health and health outcomes

Some measurement error also remains in the health use and health status variable used in this paper, because they are only measured through the questionnaire, sometimes by proxy response. In further research, we will use the linkage of the Care surveys with healthcare consumption data (Système National des Données de Santé, SNDS) to better control for health events over the year before the survey (hospitalizations with their exact dates, drug consumption...). The SNDS data also contains administrative information on Alzheimer's diagnosis that will also be useful to remove measurement error and might help us to get more conclusive results on the effect of nursing homes for these patients.

7 Conclusion

Although these results are still preliminary, they might contribute to the debate on public policies regarding elderly frail people in two ways.

First, a list of risk factors that should alert care teams and carers, especially in the community. We highlight a list of risk factors that should alert care teams and carers, and lead to close monitoring, as they are associated with an increased likelihood of short- or medium-term death at home. The risk factors common to people living at home and in institutions are poor or very poor declared health, a long-term illness (ALD) recognized by the French health insurance system, being underweight, or severe loss of autonomy (measured by the Katz index). An analysis by duration models confirms these results.

Most of these risk factors are well-known, such as having been hospitalized in the past year. Transitions periods such as returning from a hospital stay are always critical moments for care, and the current organization of the French system, strongly compartmentalized between hospitals and home care, often leaves gaps in care at such crucial moments, which should urgently be addressed.

Second, a discussion of the benefits of institutionalization: are the risk factors observed at home mitigated when people live in an institution, due to more intensive care and a secure environment? We show that once we match similar individuals at home and in nursing homes and that we control for the probability of death at each age and for each

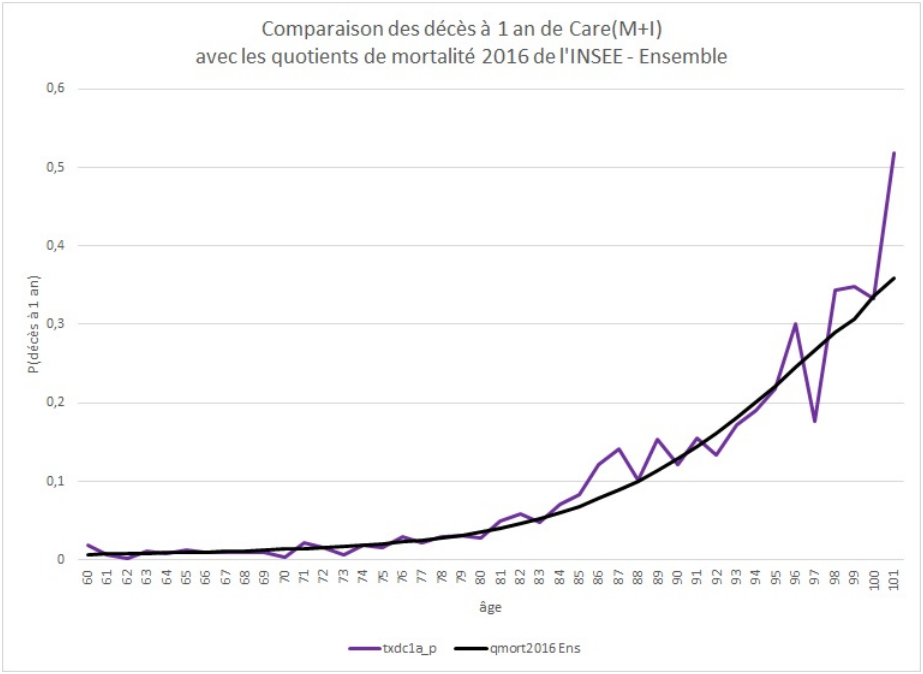
gender, and for a rich array of factors measuring health status and autonomy, we no longer see an increased risk of death for nursing home residents.

This is a strong results compared to descriptive statistics and it probably implies that it was in fact the deteriorated health status of the nursing home residents that caused the apparent positive effect of living in a nursing home on mortality. Indeed, we find three factors that are linked with excess mortality at home but not in an institution, and seem robust whatever the model specification : being underweight, having been hospitalized over the past year and, for people above 75, cognitive limitations.

This result is compatible with a protective effect of institutionalization, even if we cannot conclude from these regressions that the link is causal. This would be consistent with the primary motivation of families seeking nursing homes for these patients, essentially to protect them. More should be done to better understand these results, with more comparable samples and additional data, and this will be the object of further research, as highlighted in the discussion section.

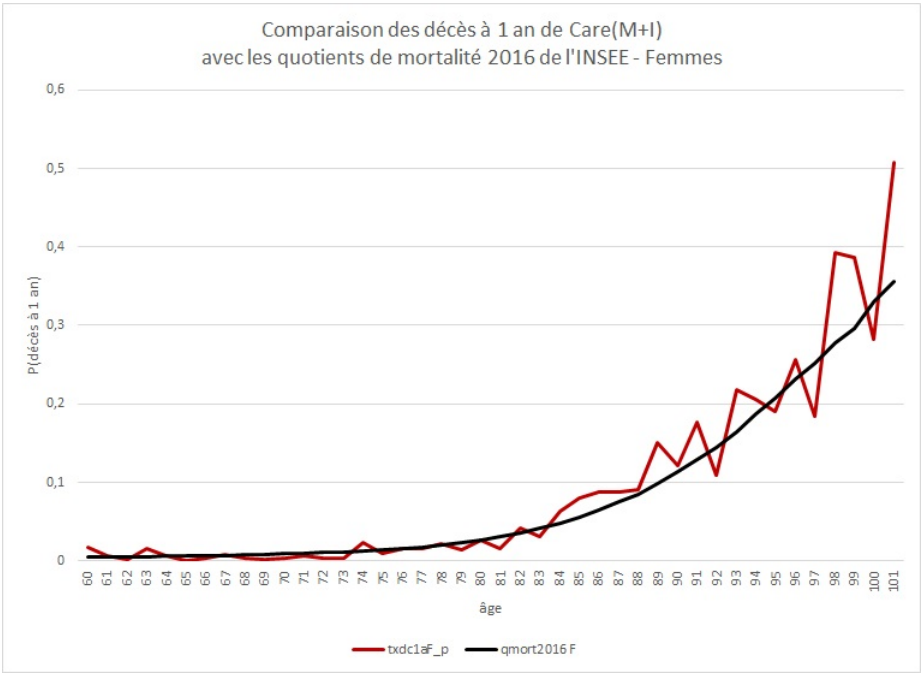
Figures and tables

Figure 1 – Comparison Care M+I / INSEE mortality quotient for 2016 (men + women)



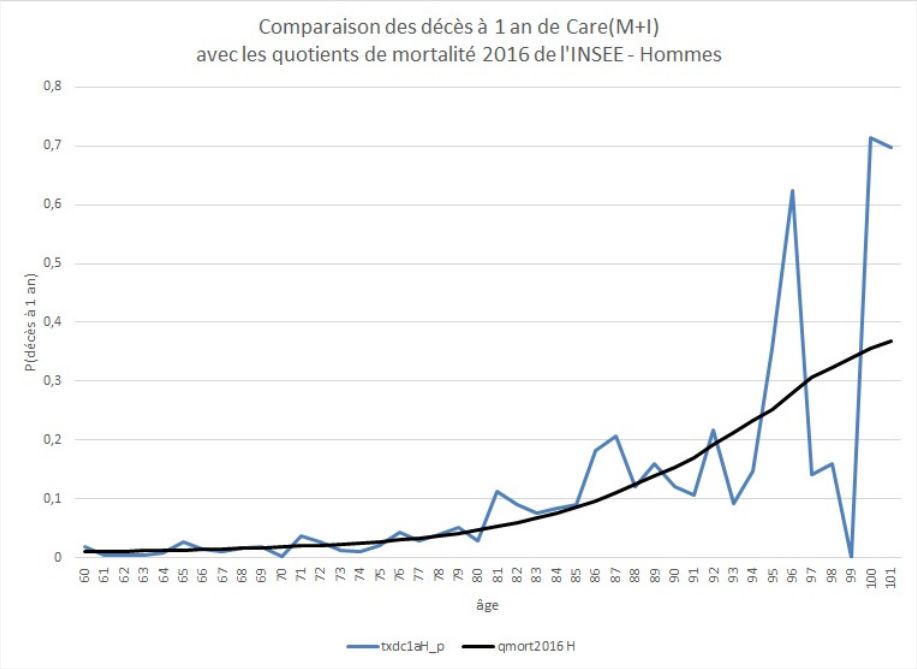
Source : Care-M survey matched with vital statistics, reweighted to account for not-found individuals, and Care-I,

Figure 2 – Comparison Care M+I / INSEE mortality quotient for 2016: Women



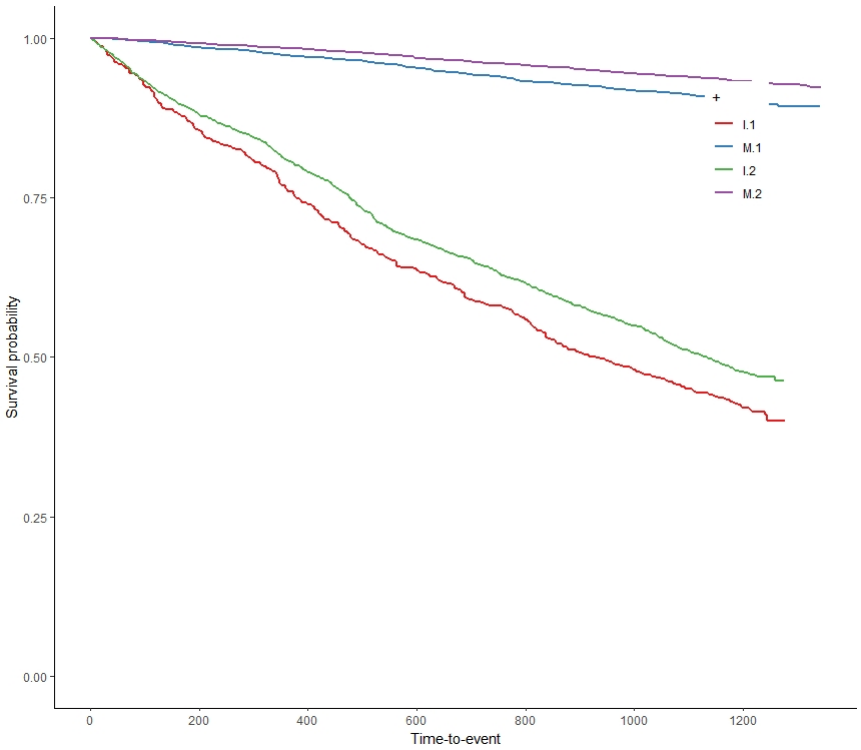
Source : Care-M survey matched with vital statistics, reweighted to account for not-found individuals, and Care-I.

Figure 3 – Comparison Care M+I / INSEE mortality quotient for 2016: Men



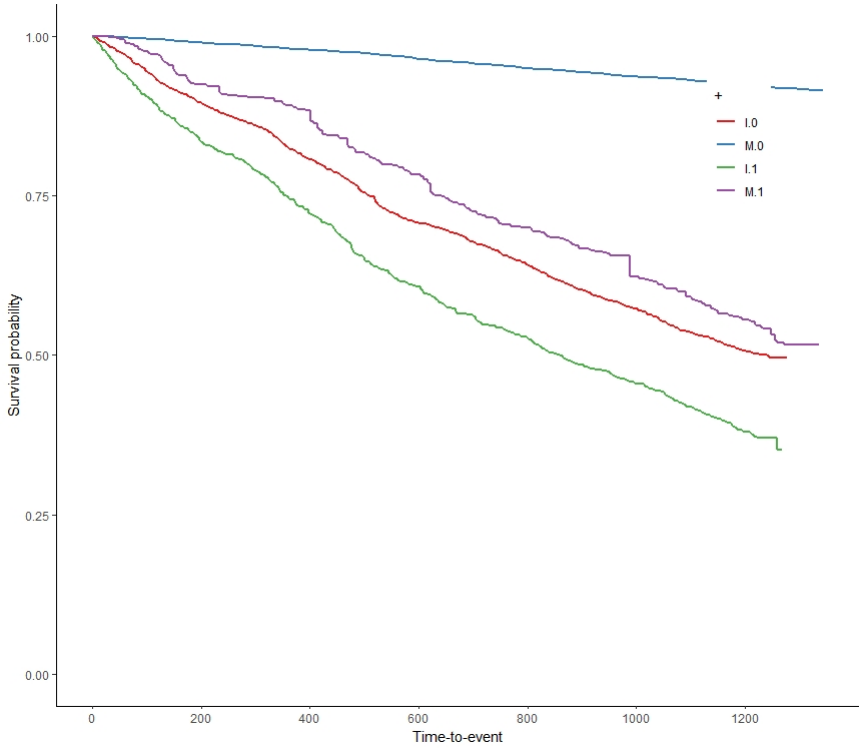
Source : Care-M survey matched with vital statistics, reweighted to account for not-found individuals, and Care-I.

Figure 4 – Life duration M/F, at home and in an institution



Sources : Care-M surveys matched with vital statistics, reweighted to account for non-discoveries, and Care-I,

Figure 5 – Life duration at home and in care homes, with and without Alzheimer's disease



Sources : Enquêtes Care-M appariée avec l'état civil, repondérées pour tenir compte des non-retrouvés, et Care-I,

Table 1 – Number of deaths in the sample

Setting	N	ND at 1 yr	ND at 2 yrs	ND at 3 years	ND at 4 years
Institution	3251	792	1308	1722	
Home	9671	597	1168	1689	2227
Total	12922	1389	2476	3411	

Reading : Of the 3251 respondents to the "Care-Institution" survey, 792 died within 1 year of interview. ND = number of deaths.
Source : Care-M surveys matched with vital statistics, reweighted to account for not-found individuals, and Care-I.

Table 2 – Number of deaths (ND) in the population estimated from the survey data

Setting	N	ND at 1 yr	ND at 2 yrs	ND at 3 years	ND at 4 years
Institution	588 542	143 658	237 929	311 370	
Home	14 444 265	375 235	786 718	1 126 871	1 531 618
Total	15 032 807	518 893	1 024 647	1 438 241	

Source : Care-M surveys matched with vital statistics, reweighted to account for not-found individuals, and Care-I.

Table 3 – Estimated death rates (DR) at N years

Setting	1 year DR	2 years DR	3 years DR	4 years DR
I	0.24	0.40	0.53	
M	0.03	0.05	0.08	0.11

Source : Care-M surveys matched with vital statistics, reweighted to account for not-found individuals, and Care-I.

Table 4 – Self-reported health of people born outside of the EU and North Africa

	How is your health in general?					
Place of birth	**Very good**	**Good**	**Fair**	**Bad**	**Very bad**	**Total**
Fr, UE or North Af.	13.20	41.11	33.41	10.27	2.02	
Rest of the world	14.07	32.64	32.49	17.25	3.55	
Total (thousands)	1 913	5 866	4 818	1 542	304	14 440

Source : Care-M survey matched with vital statistics.

Table 5 – Probability of death after 3 years : baseline model on matched sample

	Model 0 m	Model 1 démo m	Model 2 santé m	Model 3 éco m	Model 4 ent m	Model 5 aides m	Model 6 parcim m
(Intercept)	0.331 ***	0.327 ***	-0,100	-0,083	-0,040	-0,049	-0.118 **
	(0.018)	(0.042)	(0.052)	(0.059)	(0.063)	(0.062)	(0.045)
qinsee_saplaf	1.687 ***	1.657 ***	1.316 ***	1.315 ***	1.291 ***	1.293 ***	1.453 ***
	(0.122)	(0.131)	(0.121)	(0.120)	(0.121)	(0.121)	(0.115)
nenf_0		-0.082 *	-0,003	0,002	-0,008	-0,007	
		(0.038)	(0.035)	(0.035)	(0.037)	(0.036)	
nenf_1		0,053	0,047	0,048	0,043	0,044	
		(0.034)	(0.028)	(0.029)	(0.029)	(0.029)	
nenf_3		0,043	0,034	0,034	0,032	0,032	
		(0.033)	(0.029)	(0.030)	(0.029)	(0.029)	
nenf_4p		0,076	0,073	0.074 *	0,064	0,065	
		(0.042)	(0.038)	(0.037)	(0.035)	(0.035)	
npenf_1		0,007	0,026	0,024	0,024	0,024	
		(0.047)	(0.039)	(0.039)	(0.037)	(0.037)	
npenf_3		0,065	0,064	0,060	0,058	0,057	
		(0.046)	(0.037)	(0.036)	(0.036)	(0.036)	
npenf_4		-0,055	-0,036	-0,035	-0,027	-0,027	
		(0.043)	(0.038)	(0.038)	(0.037)	(0.037)	
npenf_5		0,045	0,055	0,056	0,059	0,058	
		(0.049)	(0.043)	(0.044)	(0.046)	(0.046)	
npenf_610		-0,004	0,002	0,003	0,011	0,012	
		(0.041)	(0.034)	(0.034)	(0.034)	(0.033)	
npenf_10p		-0,073	-0,075	-0,074	-0,063	-0,063	
		(0.050)	(0.045)	(0.045)	(0.045)	(0.045)	
veufancien		-0,028	-0,016	-0,015	-0,013	-0,014	
		(0.024)	(0.021)	(0.022)	(0.021)	(0.021)	
veufrecent		-0,047	-0,034	-0,034	-0,035	-0,035	
		(0.048)	(0.038)	(0.037)	(0.037)	(0.036)	
insti		**0,031**	**0.053 ***	**0.054 ***	**0,049**	**0,045**	**0.054 ***
		(0.024)	**(0.022)**	**(0.022)**	**(0.026)**	**(0.027)**	**(0.022)**
proxyoui			0,046	0,048	0,046	0,043	0,039
			(0.024)	(0.024)	(0.025)	(0.026)	(0.025)
projur_c			-0.089 **	-0.083 **	-0.089 **	-0.088 **	
			(0.030)	(0.030)	(0.029)	(0.029)	
dpd_katzac			0.127 ***	0.127 ***	0.124 ***	0.124 ***	0.122 ***
			(0.023)	(0.023)	(0.023)	(0.023)	(0.024)
lfsens			0.065 *	0.059 *	0.058 *	0.059 *	0.069 *
			(0.026)	(0.025)	(0.025)	(0.025)	(0.027)
lfphys			0.088 *	0.075 *	0.073 *	0.071 *	0.090 *
			(0.036)	(0.035)	(0.035)	(0.035)	(0.035)
lfcog			0.050 *	0.050 *	0.048 *	0.048 *	0,039
			(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
zerochro			0,035	0,035	0,032	0,033	
			(0.022)	(0.022)	(0.022)	(0.022)	
sdlimi_1			0,008	0,005	0,007	0,006	-0,006
			(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
sdlimi_2			-0,019	-0,020	-0,019	-0,019	-0,031
			(0.027)	(0.027)	(0.028)	(0.028)	(0.027)
sds_tb			-0,028	-0,034	-0,033	-0,033	-0,036
			(0.047)	(0.048)	(0.048)	(0.048)	(0.048)
sds_bb			-0,003	-0,004	-0,001	-0,001	-0,002
			(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
sds_mm			0.076 **	0.077 **	0.077 **	0.077 **	0.080 **
			(0.025)	(0.025)	(0.024)	(0.024)	(0.026)
sds_tm			0.090 *	0.090 *	0.089 *	0.091 *	0.101 *
			(0.040)	(0.040)	(0.039)	(0.038)	(0.041)
chuteoui			-0,019	-0,017	-0,018	-0,018	
			(0.020)	(0.020)	(0.020)	(0.020)	
aldoui			0.087 ***	0.086 ***	0.083 ***	0.083 ***	0.075 ***
			(0.019)	(0.019)	(0.019)	(0.019)	(0.018)
trmh_m55			-0,026	-0,026	-0,024	-0,024	-0,027
			(0.026)	(0.026)	(0.026)	(0.026)	(0.027)
trmh_p80			0,045	0,048	0,048	0,048	0.056 *
			(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
trmh_NA			0,053	0,051	0,049	0,051	0,050
			(0.031)	(0.031)	(0.036)	(0.036)	(0.032)
corpulshort_insuff			0.109 ***	0.110 ***	0.108 ***	0.107 ***	0.108 ***
			(0.023)	(0.023)	(0.023)	(0.023)	(0.022)
hospioui			0.094 ***	0.093 ***	0.093 ***	0.093 ***	0.089 ***
			(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
docteurnon			-0,016	-0,017	-0,024	-0,022	
			(0.038)	(0.038)	(0.038)	(0.038)	

	Model 0 m	Model 1 démo m	Model 2 santé m	Model 3 éco m	Model 4 ent m	Model 5 aides m	Model 6 parcim m
dipli_0				0,015	0,015	0,015	0,005
				(0.022)	(0.022)	(0.022)	(0.022)
dipli_becap				0,004	0,003	0,002	0,004
				(0.032)	(0.031)	(0.031)	(0.034)
dipli_bac				0,024	0,022	0,020	0,035
				(0.046)	(0.045)	(0.045)	(0.047)
dipli_bp2p				-0.133 **	-0.133 **	-0.137 **	-0.133 **
				(0.047)	(0.047)	(0.048)	(0.049)
trarevr_0_inf12k				-0,027	-0,027	-0,027	
				(0.031)	(0.031)	(0.031)	
trarevr_2_1624k				0,005	0,002	0,002	
				(0.026)	(0.026)	(0.026)	
trarevr_3_2436k				-0,018	-0,016	-0,016	
				(0.031)	(0.030)	(0.030)	
trarevr_4_sup36k				0,052	0,047	0,048	
				(0.039)	(0.038)	(0.038)	
voitfam_j					0,018	0,017	
					(0.032)	(0.032)	
voitfam_s					-0,022	-0,023	
					(0.024)	(0.024)	
voitfam_a					0,058	0.064 *	
					(0.031)	(0.032)	
voitfam_jms					-0,024	-0,016	
					(0.050)	(0.053)	
voitfam_zero					0,061	0,066	
					(0.053)	(0.055)	
voitami_j					-0,050	-0,050	
					(0.044)	(0.045)	
voitami_s					-0.074 *	-0.074 *	
					(0.033)	(0.033)	
voitami_a					-0,031	-0,031	
					(0.034)	(0.034)	
voitami_jms					0,007	0,008	
					(0.031)	(0.031)	
voitami_zero					-0,022	-0,020	
					(0.029)	(0.029)	
farensvt_1					-0,017	-0,019	
					(0.026)	(0.026)	
farensvt_3					0,016	0,012	
					(0.082)	(0.082)	
farensvt_nr					-0,012	-0,012	
					(0.034)	(0.034)	
aidentvq_mi						-0,022	-0,002
						(0.031)	(0.033)
aidentsou_mi						0,039	0,044
						(0.028)	(0.029)
N	11591	11591	11591	11591	11591	11591	11591
R2	0,067	0,082	0,192	0,197	0,202	0,203	0,185

Standard errors are heteroskedasticity robust. *** p <0.001; ** p <0.01; * p <0.05.

Table 6 – Probability of death after 3 years : model with interactions, on matched sample

	Spécif avec lfcog m1	Spécif avec Alz m1
(Intercept)	-0.163 *	-0.148 *
	(0.068)	(0.065)
qinsee_saplaf	1.439 ***	1.459 ***
	(0.112)	(0.112)
insti	**0.201 ***	**0.193 ***
	(0.085)	**(0.083)**
dpd_katzac	0.126 **	0.136 ***
	(0.041)	(0.040)
lfsens	0.111 *	0.122 *
	(0.049)	(0.049)
lfphys	0,061	0,059
	(0.054)	(0.052)
lfcog	**0.086 ***	
	(0.041)	
aldoui	0.115 ***	0.108 **
	(0.035)	(0.035)
trmh_m55	-0,084	-0,072
	(0.046)	(0.046)
trmh_p80	0,072	0,060
	(0.048)	(0.049)
trmh_NA	0,057	0.057 *
	(0.030)	(0.029)
corpulshort_insuff	**0.206 ***	**0.207 ***
	(0.037)	**(0.038)**
hospioui	**0.157 ***	**0.154 ***
	(0.038)	(0.038)
dipli_0	0,014	0,026
	(0.041)	(0.041)
dipli_becap	0,029	0,036
	(0.063)	(0.065)
dipli_bac	0,112	0,099
	(0.072)	(0.071)
dipli_bp2p	-0,165	-0.169 *
	(0.085)	(0.086)
sdlimi_1	0,006	0,012
	(0.028)	(0.028)
sdlimi_2	-0,025	-0,021
	(0.027)	(0.027)
sds_tb	-0,095	-0,096
	(0.080)	(0.076)
sds_bb	0,012	0,011
	(0.044)	(0.043)
sds_mm	0,045	0,046
	(0.046)	(0.047)
sds_tm	0,053	0,051
	(0.064)	(0.065)

insti:dpd_katzac	-0,004	-0,008
	(0.046)	(0.044)
insti:lfsens	-0,076	-0,086
	(0.054)	(0.054)
insti:lfphys	0,046	0,047
	(0.070)	(0.068)
insti:lfcog	**-0,059**	
	(0.046)	
insti:aldoui	-0,059	-0,051
	(0.039)	(0.040)
insti:trmh_m55	0.103 *	0,091
	(0.051)	(0.051)
insti:trmh_p80	-0,026	-0,020
	(0.057)	(0.058)
insti:corpulshort_insuff	**-0.164 *** **	**-0.164 *** **
	(0.042)	**(0.043)**
insti:hospioui	**-0.121 ** **	**-0.118 ** **
	(0.042)	**(0.042)**
insti:dipli_0	-0,029	-0,040
	(0.046)	(0.046)
insti:dipli_becap	-0,059	-0,066
	(0.069)	(0.071)
insti:dipli_bac	-0.193 *	-0.183 *
	(0.081)	(0.080)
insti:dipli_bp2p	0,073	0,075
	(0.095)	(0.096)
insti:sds_tb	0,076	0,077
	(0.098)	(0.095)
insti:sds_bb	-0,021	-0,019
	(0.049)	(0.049)
insti:sds_mm	0,065	0,064
	(0.051)	(0.051)
insti:sds_tm	0,077	0,081
	(0.074)	(0.075)
alz		**0,080**
		(0.047)
insti:alz		**-0,072**
		(0.050)
N	11591	11591
R2	0,198	0,197

Standard errors are heteroskedasticity robust. *** p <0.001; ** p <0.01; * p <0.05.

Table 7 – Probability of death after 3 years for people aged 75 and over : model with interactions, on matched sample

	Spécif avec lfcog m1	Spécif avec Alz m1
(Intercept)	-0.161 *	-0,130
	(0.081)	(0.078)
qinsee_saplaf	1.290 ***	1.315 ***
	(0.121)	(0.122)
insti	**0.257 ***	**0.228 ***
	(0.105)	**(0.103)**
dpd_katzac	0.115 **	0.137 ***
	(0.042)	(0.041)
lfsens	0,082	0,094
	(0.053)	(0.053)
lfphys	0,063	0,057
	(0.069)	(0.066)
lfcog	**0.122 ****	
	(0.044)	
aldoui	0.133 ***	0.128 ***
	(0.036)	(0.037)
trmh_m55	-0.106 *	-0,093
	(0.048)	(0.049)
trmh_p80	0,068	0,054
	(0.051)	(0.053)
trmh_NA	0.067 *	0.071 *
	(0.031)	(0.031)
corpulshort_insuff	**0.198 *****	**0.201 *****
	(0.036)	**(0.038)**
hospioui	**0.156 *****	**0.151 *****
	(0.039)	**(0.039)**
dipli_0	0,047	0,059
	(0.043)	(0.043)
dipli_becap	0,095	0,102
	(0.060)	(0.061)
dipli_bac	0,129	0,117
	(0.074)	(0.073)
dipli_bp2p	-0,168	-0,171
	(0.103)	(0.101)
sdlimi_1	0,010	0,019
	(0.031)	(0.030)
sdlimi_2	-0,021	-0,019
	(0.030)	(0.029)
sds_tb	-0,119	-0,114
	(0.090)	(0.083)
sds_bb	0,008	-0,001
	(0.047)	(0.047)
sds_mm	0,041	0,041
	(0.047)	(0.047)
sds_tm	0,030	0,025
	(0.063)	(0.064)

Standard errors are heteroskedasticity robust. *** p <0.001; ** p <0.01; * p <0.05.

insti:dpd_katzac	0,003	-0,015
	(0.048)	(0.046)
insti:lfsens	-0,069	-0,080
	(0.059)	(0.058)
insti:lfphys	0,026	0,033
	(0.093)	(0.091)
insti:lfcog	**-0.098 ***	
	(0.049)	
insti:aldoui	-0,080	-0,076
	(0.041)	(0.043)
insti:trmh_m55	0.125 *	0.114 *
	(0.053)	(0.054)
insti:trmh_p80	-0,022	-0,011
	(0.061)	(0.062)
insti:corpulshort_insuff	**-0.157 *****	**-0.159 *****
	(0.042)	**(0.044)**
insti:hospioui	**-0.114 ****	**-0.109 ***
	(0.044)	**(0.044)**
insti:dipli_0	-0,053	-0,064
	(0.048)	(0.048)
insti:dipli_becap	-0.139 *	-0.146 *
	(0.068)	(0.069)
insti:dipli_bac	-0.223 **	-0.214 *
	(0.084)	(0.083)
insti:dipli_bp2p	0,060	0,061
	(0.112)	(0.111)
insti:sds_tb	0,083	0,081
	(0.110)	(0.104)
insti:sds_bb	-0,012	-0,002
	(0.053)	(0.053)
insti:sds_mm	0,064	0,063
	(0.052)	(0.052)
insti:sds_tm	0,097	0,102
	(0.074)	(0.075)
alz		**0,078**
		(0.048)
insti:alz		**-0,075**
		(0.051)
N	7598	7598
R2	0,183	0,181

Standard errors are heteroskedasticity robust. *** p <0.001; ** p <0.01; * p <0.05.

References

Balavoine, Angélique, "Des résidents de plus en plus âgés et dépendants dans les établissements d'hébergement pour personnes âgées - Premiers résultats de l'enquête EHPA 2019," *Études et résultats*, 2022, *1237*.

Besnard, Xavier and Shirine Abdoul-Carime, "L'entourage des personnes âgées en établissements : relations familiales et sociales, aides reçues - Résultats de l'enquête CARE-Institutions (2016)," *Les dossiers de la Drees*, 2020, (71).

Caliendo, Marco and Sabine Kopeinig, "Some practical guidance for the implementation of propensity score matching," *Journal of Economic Surveys*, 2008, *22* (1), 31–72.

Davin, Bérengère, Xavier Joutard, and Alain Paraponaris, ""If You Were Me": Proxy Respondents' Biases in Population Health Surveys," February 2019. working paper or preprint.

Fizzala, Arnaud, "Les durées de séjour en EHPAD - Une analyse à partir de l'enquête auprès des Établissements d'hébergement pour personnes âgées (EHPA) 2011," *Les dossiers de la DREES*, 2017, *15*.

Helmer, C., P. Joly, L. Letenneur, D. Commenges, and J-F. Dartigues, "Mortality with Dementia: Results from a French Prospective Community-based Cohort," *American Journal of Epidemiology*, 10 2001, *154* (7), 642–648.

Khlat, Myriam and Michel Guillot, "Health and Mortality Patterns Among Migrants in France," *University of Pennsylvania Population Center Working Paper (PSC/PARC)*, 2017, *8*.

Li, Minghui, Ilene Harris, and Z. Kevin Lu, "Differences in proxy-reported and patient-reported outcomes: assessing health and functional status among medicare beneficiaries," *BMC Medical Research Methodology*, 08 2015, *15* (1).

Muller, Marianne and Delphine Roy, "L'Ehpad, dernier lieu de vie pour un quart des personnes décédées en France en 2015," *Etudes et Résultats*, July 2018, *1094*, 1–8.

Phelan, E.A., K.J. Debnam, L.A. Anderson, and S.B. Owens, "A systematic review of intervention studies to prevent hospitalizations of community-dwelling older adults with dementia," *Medical care*, 2015, *53*, 207–213.

Roy, Delphine, "Qui vit à domicile, qui vit en établissement parmi les personnes de 60 ans ou plus ? - Une comparaison à partir des enquêtes Care-Ménages et Care-Institutions," *Les dossiers de la DREES*, 2023, *104*.

Appendix 1 : Detailed descriptive statistics

Table 8 – Death rate after N years: descriptive statistics / health and autonomy variable - M et I

variables	modalités	n_PA	marge	txdc1a_p	txdc2a_p	txdc3a_p
moui	I	3251	588541.92	0.24	0.40	0.53
moui	M	9671	14444265.26	0.03	0.05	0.08
proxyoui	0	7031	10575313.03	0.02	0.04	0.06
proxyoui	1	5891	4457494.15	0.07	0.14	0.19
projur_c	0	11947	14779103.08	0.03	0.06	0.09
projur_c	1	975	253704.10	0.16	0.27	0.37
sexe	1	4628	6690432.60	0.04	0.08	0.10
sexe	2	8294	8342374.58	0.03	0.06	0.09
sexejv	1J	2304	4706989.59	0.02	0.03	0.04
sexejv	1V	2324	1983443.01	0.09	0.18	0.24
sexejv	2J	2637	5062180.25	0.01	0.01	0.02
sexejv	2V	5657	3280194.33	0.07	0.14	0.20
trage	age6064	1581	3388647.93	0.01	0.02	0.02
trage	age6569	1681	3569865.69	0.01	0.02	0.03
trage	age7074	1349	2306926.82	0.01	0.03	0.04
trage	age7579	1782	2097037.47	0.02	0.06	0.08
trage	age8084	1984	1643789.66	0.05	0.11	0.16
trage	age8589	2301	1195273.89	0.12	0.21	0.29
trage	age9094	1641	635895.63	0.15	0.31	0.42
trage	age9599	527	176433.74	0.26	0.45	0.59
trage	age100p	76	18936.35	0.44	0.63	0.80
nenftr		9	9661.16	0.00	0.02	0.04
nenftr	00	1985	1703938.72	0.04	0.08	0.12
nenftr	01	2666	2957360.36	0.04	0.08	0.11
nenftr	02	3879	5367477.56	0.03	0.05	0.08
nenftr	03	2412	3140908.69	0.03	0.06	0.08
nenftr	4p	1971	1853460.70	0.05	0.10	0.13
npenftr	0	2791	3102568.10	0.03	0.06	0.09
npenftr	1	1033	1511487.45	0.03	0.06	0.09
npenftr	10p	949	785166.39	0.06	0.12	0.17
npenftr	2	1790	2474057.16	0.03	0.06	0.08
npenftr	3	1343	1785504.36	0.03	0.05	0.08
npenftr	4	1377	1830426.22	0.02	0.05	0.07
npenftr	5	1040	1274274.35	0.03	0.06	0.09
npenftr	5-10	1975	2096820.68	0.04	0.09	0.11
npenftr	NR	624	172502.48	0.20	0.31	0.38
nais_fr	0	1331	1512551.21	0.03	0.05	0.07
nais_fr	1	11591	13520255.97	0.04	0.07	0.10
nais_ue	0	12324	14392637.32	0.03	0.07	0.10
nais_ue	1	598	640169.87	0.03	0.05	0.08
nais_magr	0	12415	14441629.92	0.03	0.07	0.10
nais_magr	1	507	591177.26	0.03	0.06	0.07
nais_row	0	12696	14751603.10	0.03	0.07	0.10
nais_row	1	226	281204.08	0.01	0.03	0.05
veuf	0	7777	11825017.28	0.02	0.05	0.07
veuf	1	5145	3207789.90	0.07	0.14	0.19
veufancien	0	8977	12434099.83	0.03	0.05	0.08
veufancien	1	3945	2598707.36	0.07	0.14	0.19
veufrecent	0	12435	14725102.54	0.03	0.07	0.09
veufrecent	1	487	307704.65	0.05	0.09	0.13
coupleok	0	7568	5651945.82	0.05	0.11	0.15
coupleok	1	5354	9380861.37	0.02	0.05	0.06
eencohab	0	12019	13793364.73	0.03	0.07	0.10
eencohab	1	903	1239442.45	0.04	0.08	0.10
typmen_moi	A_seul	4118	4546821.00	0.03	0.07	0.10
typmen_moi	B_cjslt	4480	8414743.81	0.02	0.04	0.06
typmen_moi	C_enfpascj	486	445041.57	0.07	0.15	0.18
typmen_moi	D_cjenf	417	794400.89	0.03	0.04	0.06
typmen_moi	E_autre	170	243258.00	0.04	0.06	0.11
typmen_moi	F_Insti	3251	588541.92	0.24	0.40	0.53
dipli	0Aucun	3326	2643359.00	0.06	0.11	0.15
dipli	1CEP	3917	3791589.58	0.04	0.09	0.13
dipli	2BECAP	2837	4491057.58	0.02	0.04	0.06
dipli	3BAC	1027	1641784.10	0.03	0.05	0.07
dipli	4BP2p	1169	2354031.72	0.02	0.03	0.05
dipli	5NR	646	110985.20	0.35	0.51	0.64
cs_c	1	1009	775676.96	0.07	0.13	0.18
cs_c	2	1077	1285234.56	0.03	0.07	0.12
cs_c	3	1213	2199267.29	0.03	0.05	0.07
cs_c	4	1754	2934031.14	0.02	0.05	0.06
cs_c	5	3661	4080104.80	0.03	0.06	0.09
cs_c	6	2790	2981241.91	0.04	0.07	0.10
cs_c	8	1114	682059.44	0.07	0.14	0.19
cs_c		304	95191.07	0.19	0.28	0.36

Table 9 – Death rate after N years: descriptive statistics / health and autonomy variable - M+I

variables	modalités	n_PA	marge	txdc1a_p	txdc2a_p	txdc3a_p
trarevdr	0 <12k	1449	923609.19	0.06	0.13	0.18
trarevdr	1 12-16k	2172	1396751.46	0.06	0.14	0.19
trarevdr	2 16-24k	3738	3560157.81	0.04	0.08	0.11
trarevdr	3 24-36k	3111	4379542.15	0.03	0.05	0.07
trarevdr	4 36k+	2452	4772746.57	0.02	0.04	0.06
sdlimi	1	5980	2669321.80	0.12	0.21	0.29
sdlimi	2	3303	3566160.36	0.04	0.07	0.10
sdlimi	3	3608	8775657.20	0.01	0.02	0.04
sdlimi	9	31	21667.82	0.04	0.08	0.15
groupelarge	1	676	138993.37	0.38	0.58	0.73
groupelarge	2	1656	414031.85	0.26	0.43	0.55
groupelarge	3	1060	319204.81	0.17	0.30	0.42
groupelarge	4	2276	1054648.26	0.07	0.15	0.21
groupelarge	5	1332	956364.93	0.06	0.10	0.18
groupelarge	6	5922	12149563.97	0.01	0.03	0.05
katzac	A	9690	14190865.60	0.02	0.05	0.07
katzac	B	700	235173.26	0.11	0.24	0.36
katzac	C	381	111918.63	0.18	0.32	0.45
katzac	D	288	80164.52	0.25	0.39	0.51
katzac	E	222	55982.05	0.21	0.37	0.47
katzac	F	787	174084.38	0.31	0.51	0.67
katzac	G	503	101592.02	0.47	0.64	0.73
katzac	H	351	83026.72	0.29	0.43	0.57
dpd_katzac	0	9690	14190865.60	0.02	0.05	0.07
dpd_katzac	1	3232	841941.58	0.24	0.40	0.52
lfsens	0	4364	7530789.16	0.02	0.04	0.05
lfsens	1	8558	7502018.02	0.05	0.10	0.14
lfphys	0	2422	7164519.92	0.01	0.02	0.03
lfphys	1	10500	7868287.26	0.06	0.11	0.16
lfcog	0	8264	13030677.40	0.02	0.05	0.07
lfcog	1	4658	2002129.78	0.13	0.22	0.29
alz	0	11347	14634046.05	0.03	0.06	0.08
alz	1	1575	398761.13	0.24	0.39	0.52
sdsante	1	664	1912410.75	0.01	0.02	0.03
sdsante	2	2998	5975677.52	0.01	0.03	0.04
sdsante	3	4941	5045473.61	0.03	0.08	0.11
sdsante	4	3450	1707065.86	0.10	0.18	0.25
sdsante	5	807	339128.28	0.21	0.30	0.38
sdsante	9	62	53051.16	0.13	0.18	0.33
sdchro	0	3110	5314361.65	0.02	0.04	0.06
sdchro	1	9757	9693035.73	0.04	0.08	0.12
sdchro	9	55	25409.80	0.11	0.16	0.28
sddou	1	2056	3910893.04	0.02	0.05	0.07
sddou	2	1220	2154215.28	0.02	0.04	0.06
sddou	3	1988	2719719.07	0.03	0.06	0.08
sddou	4	4171	4157822.59	0.04	0.08	0.12
sddou	5	2388	1556201.77	0.06	0.10	0.14
sddou	6	847	490811.08	0.08	0.12	0.16
sddou	7	52	9477.00	0.52	0.70	0.74
sddou	8	5	773.07	0.19	0.19	0.19
sddou	9	195	32894.29	0.32	0.47	0.59
sdchut	0	8219	11714170.70	0.03	0.05	0.07
sdchut	1	4663	3311600.27	0.06	0.12	0.17
sdchut	8	1	135.95	0.00	0.00	0.00
sdchut	9	39	6900.27	0.38	0.50	0.57
sdald	0	4859	8906593.59	0.01	0.03	0.04
sdald	1	7809	6082832.83	0.07	0.12	0.17
sdald	8	3	411.82	0.34	0.34	0.34
sdald	9	251	42968.94	0.25	0.41	0.51
docteurnon	0	12464	14156325.97	0.04	0.07	0.10
docteurnon	1	458	876481.21	0.02	0.03	0.03
hospioui	0	9302	12285862.76	0.02	0.05	0.07
hospioui	1	3620	2746944.42	0.08	0.14	0.19
trmh	55-80	5005	6648341.78	0.02	0.05	0.08
trmh	m55	3233	2279388.80	0.05	0.09	0.13
trmh	p80	2730	5542819.78	0.02	0.04	0.06
trmh	proxy	804	342338.37	0.23	0.36	0.47
trmh	refus	1150	219918.45	0.30	0.47	0.58
corpulence_b		1228	515600.90	0.11	0.19	0.25
corpulence_b	Insuffisance pondérale	1761	1736958.99	0.06	0.12	0.16
corpulence_b	Normale	3570	4719927.95	0.03	0.06	0.09
corpulence_b	Obésité	2477	2728180.03	0.02	0.04	0.06
corpulence_b	Surpoids	3886	5332139.31	0.03	0.06	0.08

Table 10 – Death rate after N years: descriptive statistics / environment variables - M+I

variables	modalités	n_PA	marge	txdc1a_p	txdc2a_p	txdc3a_p
voitfam_j	0	10922	12808874.12	0.03	0.07	0.09
voitfam_j	1	2000	2223933.06	0.04	0.08	0.12
voitfam_s	0	8057	9544494.10	0.03	0.07	0.10
voitfam_s	1	4865	5488313.09	0.03	0.07	0.10
voitfam_a	0	11151	12884460.55	0.03	0.07	0.10
voitfam_a	1	1771	2148346.63	0.03	0.06	0.09
voitfam_jms	0	12299	14623280.99	0.03	0.07	0.09
voitfam_jms	1	623	409526.20	0.08	0.13	0.20
voitfam_zero	0	12718	14923800.40	0.03	0.07	0.09
voitfam_zero	1	204	109006.78	0.06	0.15	0.19
voitfam_m	0	9537	10402058.29	0.04	0.08	0.10
voitfam_m	1	3385	4630748.89	0.03	0.05	0.07
voitami_j	0	11545	12948822.82	0.04	0.07	0.10
voitami_j	1	1377	2083984.36	0.02	0.05	0.07
voitami_s	0	9422	9361936.35	0.04	0.08	0.12
voitami_s	1	3500	5670870.83	0.02	0.04	0.06
voitami_a	0	11615	13862199.02	0.03	0.07	0.09
voitami_a	1	1307	1170608.16	0.05	0.09	0.13
voitami_jms	0	10994	14170377.69	0.03	0.06	0.08
voitami_jms	1	1928	862429.49	0.12	0.22	0.29
voitami_zero	0	11307	14229858.84	0.03	0.06	0.09
voitami_zero	1	1615	802948.35	0.10	0.20	0.25
voitami_m	0	9859	10649205.31	0.04	0.08	0.10
voitami_m	1	3063	4383601.87	0.02	0.05	0.07
voitami_nr	0	3155	572517.48	0.24	0.40	0.53
voitami_nr	1	96	16024.44	0.34	0.48	0.58
voitami_nr		9671	14444265.26	0.03	0.05	0.08
farensvt_1	0	8913	10524543.51	0.03	0.07	0.10
farensvt_1	1	4009	4508263.68	0.04	0.07	0.10
farensvt_2	0	6073	5134433.28	0.05	0.10	0.13
farensvt_2	1	6849	9898373.90	0.02	0.05	0.08
farensvt_3	0	12764	14881698.97	0.03	0.07	0.09
farensvt_3	1	158	151108.21	0.04	0.16	0.21
farensvt_nr	0	11093	14573369.97	0.03	0.06	0.08
farensvt_nr	1	1829	459437.22	0.23	0.37	0.47
aidentvq_mi	0	6417	12175843.62	0.02	0.04	0.05
aidentvq_mi	1	6505	2856963.56	0.11	0.20	0.28
aidentsou_mi	0	8159	13112508.54	0.02	0.05	0.06
aidentsou_mi	1	4763	1920298.65	0.13	0.22	0.32

Table 11 – Death rate after N years: descriptive statistics / socio-demographic variables - care-I

variables	modalités	n_PA	marge	txdc1a_p	txdc2a_p	txdc3a_p
moui	I	3251	588541.92	0.24	0.40	0.53
proxyoui	0	1140	207428.19	0.16	0.30	0.41
proxyoui	1	2111	381113.73	0.29	0.46	0.59
projur_c	0	2430	439774.88	0.25	0.42	0.55
projur_c	1	821	148767.03	0.22	0.37	0.48
sexe	1	822	149328.04	0.28	0.44	0.57
sexe	2	2429	439213.88	0.23	0.39	0.52
sexejv	1J	183	34286.33	0.15	0.27	0.36
sexejv	1V	639	115041.71	0.32	0.50	0.63
sexejv	2J	184	33113.04	0.13	0.21	0.28
sexejv	2V	2245	406100.85	0.24	0.41	0.53
trage	age6064	58	11059.86	0.03	0.10	0.27
trage	age6569	115	21177.25	0.13	0.27	0.33
trage	age7074	158	28980.07	0.17	0.24	0.32
trage	age7579	238	42503.97	0.19	0.32	0.43
trage	age8084	478	85178.22	0.19	0.34	0.45
trage	age8589	908	162819.94	0.23	0.40	0.53
trage	age9094	882	157593.93	0.29	0.47	0.61
trage	age9599	365	70096.75	0.33	0.49	0.65
trage	age100p	49	9131.93	0.48	0.73	0.74
nenftr	00	851	152730.51	0.20	0.34	0.46
nenftr	01	725	132113.37	0.29	0.44	0.56
nenftr	02	784	140719.47	0.25	0.41	0.53
nenftr	03	458	82098.72	0.25	0.40	0.55
nenftr	4p	433	80879.84	0.24	0.46	0.59
npenftr	0	906	163841.68	0.19	0.33	0.45
npenftr	1	219	40814.98	0.30	0.45	0.55
npenftr	10p	187	34859.78	0.21	0.41	0.59
npenftr	2	361	65219.38	0.24	0.39	0.52
npenftr	3	238	46960.65	0.20	0.35	0.49
npenftr	4	245	44093.12	0.26	0.40	0.49
npenftr	5	181	32420.06	0.30	0.50	0.62
npenftr	5-10	372	67360.86	0.24	0.42	0.54
npenftr	NR	542	92971.41	0.32	0.51	0.63
nais_fr	0	225	41543.07	0.29	0.46	0.56
nais_fr	1	3026	546998.85	0.24	0.40	0.53
nais_ue	0	3154	571169.43	0.24	0.40	0.53
nais_ue	1	97	17372.48	0.32	0.47	0.61
nais_magr	0	3151	570055.47	0.24	0.40	0.53
nais_magr	1	100	18486.45	0.31	0.50	0.60
nais_row	0	3223	582857.78	0.24	0.41	0.53
nais_row	1	28	5684.13	0.18	0.28	0.30
veuf	0	1223	219621.74	0.23	0.39	0.50
veuf	1	2028	368920.18	0.25	0.41	0.55
veufancien	0	1955	351441.60	0.24	0.40	0.51
veufancien	1	1296	237100.32	0.24	0.42	0.56
veufrecent	0	3061	554131.29	0.25	0.41	0.53
veufrecent	1	190	34410.63	0.21	0.34	0.48
coupleok	0	2842	514497.56	0.24	0.39	0.52
coupleok	1	409	74044.36	0.29	0.47	0.60
eencohab	0	3251	588541.92	0.24	0.40	0.53
typmen_moi	F_Insti	3251	588541.92	0.24	0.40	0.53
dipli	0Aucun	887	160355.53	0.23	0.39	0.51
dipli	1CEP	990	179766.12	0.23	0.41	0.56
dipli	2BECAP	386	72701.13	0.20	0.34	0.46
dipli	3BAC	198	39040.40	0.22	0.28	0.39
dipli	4BP2p	144	25693.53	0.14	0.28	0.38
dipli	5NR	646	110985.20	0.35	0.51	0.64
cs_c	1	304	53920.66	0.28	0.51	0.63
cs_c	2	231	41472.05	0.27	0.49	0.62
cs_c	3	216	40433.86	0.21	0.31	0.41
cs_c	4	249	45993.82	0.25	0.36	0.46
cs_c	5	897	160955.04	0.24	0.39	0.54
cs_c	6	655	119257.22	0.20	0.37	0.49
cs_c	8	429	80184.21	0.24	0.39	0.49
cs_c		270	46325.07	0.34	0.50	0.65

Table 12 – - Death rate after N years: descriptive statistics / health and autonomy variables - care-I

variables	modalités	n_PA	marge	txdc1a_p	txdc2a_p	txdc3a_p
trarevdr	0 <12k	562	103780.03	0.25	0.38	0.47
trarevdr	1 12-16k	827	147392.45	0.25	0.42	0.55
trarevdr	2 16-24k	1006	180306.29	0.22	0.40	0.55
trarevdr	3 24-36k	573	104795.80	0.24	0.39	0.51
trarevdr	4 36k+	283	52267.34	0.29	0.43	0.56
sdlimi	1	2058	370685.75	0.29	0.47	0.59
sdlimi	2	661	114905.87	0.18	0.31	0.45
sdlimi	3	517	100380.73	0.14	0.28	0.40
sdlimi	9	15	2569.56	0.25	0.42	0.55
groupelarge	1	577	102867.82	0.42	0.61	0.71
groupelarge	2	1084	187904.44	0.27	0.46	0.60
groupelarge	3	493	92075.16	0.24	0.40	0.51
groupelarge	4	415	76912.95	0.15	0.29	0.43
groupelarge	5	222	42665.26	0.12	0.20	0.32
groupelarge	6	460	86116.28	0.12	0.25	0.36
katzac	A	1191	220706.26	0.14	0.26	0.38
katzac	B	269	47548.89	0.17	0.34	0.47
katzac	C	164	30603.81	0.29	0.41	0.53
katzac	D	164	30881.15	0.28	0.45	0.60
katzac	E	167	29560.27	0.16	0.39	0.53
katzac	F	643	112574.82	0.32	0.53	0.67
katzac	G	409	72577.42	0.49	0.65	0.74
katzac	H	244	44089.30	0.26	0.43	0.56
dpd_katzac	0	1191	220706.26	0.14	0.26	0.38
dpd_katzac	1	2060	367835.66	0.31	0.49	0.62
lfsens	0	707	129098.55	0.15	0.29	0.39
lfsens	1	2544	459443.37	0.27	0.44	0.57
lfphys	0	93	17573.25	0.07	0.14	0.21
lfphys	1	3158	570968.67	0.25	0.41	0.54
lfcog	0	994	185550.01	0.15	0.28	0.41
lfcog	1	2257	402991.91	0.29	0.46	0.59
alz	0	2090	380125.56	0.21	0.36	0.48
alz	1	1161	208416.36	0.31	0.48	0.61
sdsante	1	78	15008.21	0.11	0.24	0.31
sdsante	2	670	121306.41	0.16	0.29	0.43
sdsante	3	1325	241304.16	0.21	0.37	0.48
sdsante	4	948	171593.70	0.32	0.51	0.65
sdsante	5	202	34725.01	0.46	0.64	0.69
sdsante	9	28	4604.42	0.17	0.36	0.50
sdchro	0	977	183723.40	0.18	0.34	0.47
sdchro	1	2236	398135.57	0.28	0.43	0.56
sdchro	9	38	6682.94	0.28	0.39	0.55
sddou	1	534	98279.69	0.19	0.38	0.49
sddou	2	314	54092.87	0.20	0.36	0.51
sddou	3	584	102277.85	0.23	0.38	0.51
sddou	4	971	176864.05	0.24	0.39	0.52
sddou	5	468	88484.99	0.28	0.44	0.55
sddou	6	128	25398.10	0.30	0.45	0.60
sddou	7	52	9477.00	0.52	0.70	0.74
sddou	8	5	773.07	0.19	0.19	0.19
sddou	9	195	32894.29	0.32	0.47	0.59
sdchut	0	1815	325642.00	0.22	0.38	0.50
sdchut	1	1396	255863.70	0.27	0.43	0.56
sdchut	8	1	135.95	0.00	0.00	0.00
sdchut	9	39	6900.27	0.38	0.50	0.57
sdald	0	950	180354.09	0.17	0.32	0.44
sdald	1	2047	364807.06	0.28	0.45	0.58
sdald	8	3	411.82	0.34	0.34	0.34
sdald	9	251	42968.94	0.25	0.41	0.51
docteurnon	0	3103	561341.35	0.25	0.41	0.54
docteurnon	1	148	27200.57	0.17	0.30	0.41
hospioui	0	2288	411376.06	0.22	0.38	0.50
hospioui	1	963	177165.86	0.30	0.46	0.59
trmh	55-80	912	166562.55	0.17	0.31	0.45
trmh	m55	663	118709.81	0.24	0.38	0.50
trmh	p80	326	61288.80	0.17	0.30	0.43
trmh	proxy	253	48279.84	0.34	0.51	0.62
trmh	refus	1097	193700.92	0.31	0.50	0.62
corpulence_b		755	135343.18	0.28	0.44	0.56
corpulence_b	Insuffisance pondérale	675	120534.50	0.33	0.50	0.62
corpulence_b	Normale	816	148218.84	0.20	0.36	0.51
corpulence_b	Obésité	339	62142.38	0.17	0.30	0.41
corpulence_b	Surpoids	666	122303.01	0.21	0.37	0.50

Table 13 – Death rate after N years: descriptive statistics / environment variables - care-I

variables	modalités	n_PA	marge	txdc1a_p	txdc2a_p	txdc3a_p
voitfam_j	0	3022	546021.20	0.24	0.40	0.53
voitfam_j	1	229	42520.72	0.26	0.41	0.58
voitfam_s	0	1873	337718.82	0.23	0.39	0.51
voitfam_s	1	1378	250823.10	0.26	0.42	0.55
voitfam_a	0	2840	515942.01	0.25	0.41	0.53
voitfam_a	1	411	72599.91	0.23	0.38	0.51
voitfam_jms	0	2973	539152.38	0.25	0.41	0.54
voitfam_jms	1	278	49389.54	0.20	0.32	0.42
voitfam_zero	0	3133	566232.42	0.24	0.40	0.53
voitfam_zero	1	118	22309.50	0.25	0.42	0.50
voitfam_m	0	2473	447562.33	0.25	0.40	0.53
voitfam_m	1	778	140979.58	0.24	0.41	0.53
voitami_j	0	3202	579320.29	0.25	0.41	0.53
voitami_j	1	49	9221.62	0.14	0.18	0.27
voitami_s	0	3058	554068.84	0.25	0.41	0.53
voitami_s	1	193	34473.07	0.18	0.31	0.45
voitami_a	0	2824	511944.88	0.24	0.40	0.53
voitami_a	1	427	76597.04	0.26	0.44	0.55
voitami_jms	0	2124	380499.09	0.24	0.39	0.52
voitami_jms	1	1127	208042.83	0.26	0.42	0.55
voitami_zero	0	2322	424999.64	0.24	0.40	0.52
voitami_zero	1	929	163542.28	0.25	0.42	0.54
voitami_m	0	2821	507901.28	0.25	0.41	0.54
voitami_m	1	430	80640.64	0.20	0.34	0.49
voitami_nr	0	3155	572517.48	0.24	0.40	0.53
voitami_nr	1	96	16024.44	0.34	0.48	0.58
farensvt_1	0	2609	470823.33	0.26	0.43	0.55
farensvt_1	1	642	117718.59	0.18	0.31	0.43
farensvt_2	0	2339	421209.59	0.27	0.44	0.56
farensvt_2	1	912	167332.33	0.18	0.32	0.46
farensvt_3	0	3235	586019.28	0.24	0.40	0.53
farensvt_3	1	16	2522.63	0.28	0.28	0.41
farensvt_nr	0	1647	303197.72	0.18	0.32	0.45
farensvt_nr	1	1604	285344.19	0.31	0.49	0.61
aidentvq_mi	0	845	155744.52	0.22	0.36	0.46
aidentvq_mi	1	2406	432797.40	0.25	0.42	0.55
aidentsou_mi	0	794	146091.68	0.22	0.36	0.47
aidentsou_mi	1	2457	442450.23	0.25	0.42	0.55

Table 14 – Death rate after N years: descriptive statistics / socio-demographic variables - care-M

variables	modalités	n_PA	marge	txdc1a_p	txdc2a_p	txdc3a_p
moui	M	9671	14444265.26	0.03	0.05	0.08
proxyoui	0	5891	10367884.84	0.01	0.03	0.05
proxyoui	1	3780	4076380.42	0.05	0.11	0.15
projur_c	0	9517	14339328.20	0.03	0.05	0.08
projur_c	1	154	104937.07	0.08	0.12	0.21
sexe	1	3806	6541104.56	0.03	0.07	0.09
sexe	2	5865	7903160.70	0.02	0.04	0.07
sexejv	1J	2121	4672703.26	0.01	0.03	0.04
sexejv	1V	1685	1868401.30	0.08	0.16	0.22
sexejv	2J	2453	5029067.21	0.01	0.01	0.02
sexejv	2V	3412	2874093.49	0.05	0.10	0.15
trage	age6064	1523	3377588.07	0.01	0.02	0.02
trage	age6569	1566	3548688.44	0.01	0.02	0.03
trage	age7074	1191	2277946.76	0.01	0.02	0.04
trage	age7579	1544	2054533.50	0.02	0.05	0.08
trage	age8084	1506	1558611.43	0.04	0.09	0.14
trage	age8589	1393	1032453.95	0.10	0.18	0.25
trage	age9094	759	478301.69	0.10	0.25	0.36
trage	age9599	162	106336.99	0.21	0.42	0.55
trage	zge100p	27	9804.42	0.40	0.53	0.85
nenftr		9	9661.16	0.00	0.02	0.04
nenftr	00	1134	1551208.20	0.03	0.06	0.09
nenftr	01	1941	2825246.99	0.03	0.06	0.09
nenftr	02	3095	5226758.09	0.02	0.05	0.07
nenftr	03	1954	3058809.97	0.02	0.05	0.06
nenftr	4p	1538	1772580.86	0.04	0.08	0.11
npenftr	0	1885	2938726.42	0.02	0.05	0.07
npenftr	1	814	1470672.47	0.02	0.05	0.07
npenftr	10p	762	750306.60	0.05	0.11	0.15
npenftr	2	1429	2408837.77	0.02	0.05	0.07
npenftr	3	1105	1738543.71	0.02	0.04	0.07
npenftr	4	1132	1786333.10	0.02	0.04	0.06
npenftr	5	859	1241854.29	0.03	0.05	0.08
npenftr	5-10	1603	2029459.82	0.04	0.08	0.10
npenftr	NR	82	79531.07	0.05	0.08	0.09
nais_fr	0	1106	1471008.14	0.02	0.04	0.06
nais_fr	1	8565	12973257.12	0.03	0.06	0.08
nais_ue	0	9170	13821467.88	0.03	0.06	0.08
nais_ue	1	501	622797.38	0.02	0.04	0.07
nais_magr	0	9264	13871574.45	0.03	0.05	0.08
nais_magr	1	407	572690.81	0.02	0.05	0.06
nais_row	0	9473	14168745.32	0.03	0.05	0.08
nais_row	1	198	275519.95	0.01	0.03	0.05
veuf	0	6554	11605395.55	0.02	0.04	0.06
veuf	1	3117	2838869.72	0.05	0.10	0.15
veufancien	0	7022	12082658.23	0.02	0.04	0.06
veufancien	1	2649	2361607.04	0.05	0.11	0.16
veufrecent	0	9374	14170971.25	0.03	0.05	0.08
veufrecent	1	297	273294.02	0.03	0.06	0.09
coupleok	0	4726	5137448.26	0.03	0.08	0.11
coupleok	1	4945	9306817.01	0.02	0.04	0.06
eencohab	0	8768	13204822.81	0.02	0.05	0.08
eencohab	1	903	1239442.45	0.04	0.08	0.10
typmen_moi	A_seul	4118	4546821.00	0.03	0.07	0.10
typmen_moi	B_cjslt	4480	8414743.81	0.02	0.04	0.06
typmen_moi	C_enfpascj	486	445041.57	0.07	0.15	0.18
typmen_moi	D_cjenf	417	794400.89	0.03	0.04	0.06
typmen_moi	E_autre	170	243258.00	0.04	0.06	0.11
dipli	0Aucun	2439	2483003.47	0.04	0.09	0.13
dipli	1CEP	2927	3611823.46	0.03	0.07	0.11
dipli	2BECAP	2451	4418356.45	0.02	0.04	0.05
dipli	3BAC	829	1602743.69	0.02	0.05	0.06
dipli	4BP2p	1025	2328338.19	0.01	0.03	0.04
cs_c	1	705	721756.31	0.05	0.11	0.14
cs_c	2	846	1243762.52	0.03	0.06	0.10
cs_c	3	997	2158833.43	0.03	0.05	0.07
cs_c	4	1505	2888037.32	0.02	0.04	0.05
cs_c	5	2764	3919149.76	0.02	0.05	0.07
cs_c	6	2135	2861984.69	0.03	0.06	0.08
cs_c	8	685	601875.23	0.05	0.10	0.15
cs_c		34	48866.00	0.05	0.07	0.08

Table 15 – Death rate after N years: descriptive statistics / health and autonomy variables - care-M

variables	modalités	n_PA	marge	txdc1a_p	txdc2a_p	txdc3a_p
trarevdr	0 <12k	887	819829.16	0.04	0.10	0.15
trarevdr	1 12-16k	1345	1249359.00	0.04	0.10	0.14
trarevdr	2 16-24k	2732	3379851.52	0.03	0.07	0.09
trarevdr	3 24-36k	2538	4274746.36	0.02	0.04	0.06
trarevdr	4 36k+	2169	4720479.23	0.02	0.04	0.06
sdlimi	1	3922	2298636.05	0.09	0.17	0.24
sdlimi	2	2642	3451254.49	0.03	0.06	0.09
sdlimi	3	3091	8675276.46	0.01	0.02	0.03
sdlimi	9	16	19098.26	0.01	0.03	0.09
groupelarge	1	99	36125.55	0.24	0.47	0.77
groupelarge	2	572	226127.40	0.25	0.40	0.51
groupelarge	3	567	227129.65	0.14	0.26	0.39
groupelarge	4	1861	977735.31	0.07	0.14	0.20
groupelarge	5	1110	913699.66	0.05	0.10	0.17
groupelarge	6	5462	12063447.69	0.01	0.03	0.05
katzac	A	8499	13970159.34	0.02	0.05	0.07
katzac	B	431	187624.37	0.09	0.22	0.33
katzac	C	217	81314.81	0.13	0.29	0.42
katzac	D	124	49283.37	0.23	0.36	0.45
katzac	E	55	26421.79	0.27	0.35	0.42
katzac	F	144	61509.56	0.28	0.49	0.67
katzac	G	94	29014.60	0.43	0.60	0.72
katzac	H	107	38937.42	0.33	0.44	0.59
dpd_katzac	0	8499	13970159.34	0.02	0.05	0.07
dpd_katzac	1	1172	474105.92	0.19	0.33	0.45
lfsens	0	3657	7401690.61	0.01	0.03	0.05
lfsens	1	6014	7042574.65	0.04	0.08	0.11
lfphys	0	2329	7146946.67	0.01	0.02	0.03
lfphys	1	7342	7297318.59	0.04	0.09	0.13
lfcog	0	7270	12845127.40	0.02	0.04	0.06
lfcog	1	2401	1599137.87	0.09	0.16	0.22
alz	0	9257	14253920.49	0.02	0.05	0.07
alz	1	414	190344.77	0.16	0.30	0.43
sdsante	1	586	1897402.54	0.01	0.02	0.02
sdsante	2	2328	5854371.11	0.01	0.02	0.03
sdsante	3	3616	4804169.45	0.03	0.06	0.10
sdsante	4	2502	1535472.16	0.08	0.15	0.20
sdsante	5	605	304403.26	0.19	0.26	0.35
sdsante	9	34	48446.74	0.13	0.16	0.31
sdchro	0	2133	5130638.25	0.01	0.03	0.04
sdchro	1	7521	9294900.16	0.03	0.07	0.10
sdchro	9	17	18726.85	0.05	0.07	0.18
sddou	1	1522	3812613.34	0.02	0.04	0.06
sddou	2	906	2100122.41	0.02	0.04	0.05
sddou	3	1404	2617441.22	0.02	0.05	0.06
sddou	4	3200	3980958.54	0.03	0.07	0.10
sddou	5	1920	1467716.78	0.04	0.08	0.12
sddou	6	719	465412.97	0.07	0.10	0.14
sdchut	0	6404	11388528.70	0.02	0.04	0.06
sdchut	1	3267	3055736.57	0.05	0.10	0.14
sdald	0	3909	8726239.50	0.01	0.02	0.03
sdald	1	5762	5718025.77	0.05	0.10	0.15
docteurnon	0	9361	13594984.63	0.03	0.06	0.08
docteurnon	1	310	849280.64	0.01	0.02	0.02
hospioui	0	7014	11874486.70	0.02	0.04	0.06
hospioui	1	2657	2569778.56	0.06	0.12	0.16
trmh	55-80	4093	6481779.23	0.02	0.05	0.07
trmh	m55	2570	2160678.99	0.04	0.08	0.11
trmh	p80	2404	5481530.98	0.02	0.04	0.05
trmh	proxy	551	294058.53	0.21	0.33	0.45
trmh	refus	53	26217.54	0.16	0.25	0.28
corpulence_b		473	380257.72	0.04	0.10	0.15
corpulence_b	Insuffisance pondérale	1086	1616424.49	0.04	0.09	0.13
corpulence_b	Normale	2754	4571709.11	0.03	0.05	0.07
corpulence_b	Obésité	2138	2666037.65	0.01	0.03	0.06
corpulence_b	Surpoids	3220	5209836.30	0.03	0.05	0.07

Table 16 – Death rate after N years: descriptive statistics / environment variables - care-M

variables	modalités	n_PA	marge	txdc1a_p	txdc2a_p	txdc3a_p
voitfam_j	0	7900	12262852.92	0.02	0.05	0.07
voitfam_j	1	1771	2181412.34	0.04	0.08	0.11
voitfam_s	0	6184	9206775.28	0.03	0.06	0.08
voitfam_s	1	3487	5237489.99	0.02	0.05	0.07
voitfam_a	0	8311	12368518.54	0.03	0.05	0.08
voitfam_a	1	1360	2075746.72	0.03	0.05	0.08
voitfam_jms	0	9326	14084128.61	0.03	0.05	0.08
voitfam_jms	1	345	360136.66	0.06	0.11	0.17
voitfam_zero	0	9585	14357567.98	0.03	0.05	0.08
voitfam_zero	1	86	86697.28	0.02	0.09	0.11
voitfam_m	0	7064	9954495.96	0.03	0.06	0.09
voitfam_m	1	2607	4489769.30	0.02	0.04	0.06
voitami_j	0	8343	12369502.52	0.03	0.06	0.08
voitami_j	1	1328	2074762.74	0.02	0.05	0.07
voitami_s	0	6364	8807867.51	0.03	0.06	0.09
voitami_s	1	3307	5636397.75	0.02	0.04	0.06
voitami_a	0	8791	13350254.14	0.03	0.05	0.08
voitami_a	1	880	1094011.12	0.03	0.07	0.10
voitami_jms	0	8870	13789878.60	0.02	0.05	0.07
voitami_jms	1	801	654386.67	0.07	0.16	0.21
voitami_zero	0	8985	13804859.19	0.02	0.05	0.07
voitami_zero	1	686	639406.07	0.06	0.14	0.18
voitami_m	0	7038	10141304.03	0.03	0.06	0.08
voitami_m	1	2633	4302961.23	0.02	0.04	0.07
voitami_nr		9671	14444265.26	0.03	0.05	0.08
farensvt_1	0	6304	10053720.17	0.02	0.05	0.07
farensvt_1	1	3367	4390545.09	0.03	0.06	0.09
farensvt_2	0	3734	4713223.69	0.03	0.07	0.10
farensvt_2	1	5937	9731041.57	0.02	0.05	0.07
farensvt_3	0	9529	14295679.69	0.03	0.05	0.08
farensvt_3	1	142	148585.58	0.03	0.16	0.20
farensvt_nr	0	9446	14270172.24	0.02	0.05	0.08
farensvt_nr	1	225	174093.02	0.11	0.18	0.23
aidentvq_mi	0	5572	12020099.10	0.01	0.03	0.05
aidentvq_mi	1	4099	2424166.16	0.09	0.16	0.23
aidentsou_mi	0	7365	12966416.85	0.02	0.04	0.06
aidentsou_mi	1	2306	1477848.41	0.09	0.17	0.25

Appendix 2: LPM regressions before matching

The salient results, for survival at one and three years, are as follows (tables 17 and 18) :

Table 17 – Regression of one-year probability of death by place of residence

	Tous lieux de vie	Domicile	Etablissement
(Intercept)	-0.027 **	-0,018	-0.084 *
	(0.010)	(0.009)	(0.034)
qinsee_saplaf	0.815 ***	0.807 ***	0.854 ***
	(0.064)	(0.079)	(0.105)
typmen_moi_B_cjslt	0,008	0,007	
	(0.005)	(0.005)	
typmen_moi_C_enfpascj	0,003	0,010	
	(0.016)	(0.016)	
typmen_moi_D_cjenf	0,010	0,008	
	(0.013)	(0.013)	
typmen_moi_E_autre	0.065 *	0.066 *	
	(0.026)	(0.026)	
typmen_moi_F_Insti	0.065 ***		
	(0.010)		
dpd_katzac	0.081 ***	0.060 ***	0.092 ***
	(0.011)	(0.013)	(0.018)
lfsens	0,001	-0,008	0,026
	(0.005)	(0.005)	(0.017)
lfphys	-0.015 **	-0,010	0.050 *
	(0.006)	(0.005)	(0.025)
lfcog	0.016 *	0,011	0,035
	(0.007)	(0.008)	(0.019)
sdlimi_1	0,006	0.017 *	-0,013
	(0.008)	(0.008)	(0.023)
sdlimi_2	-0,006	-0,001	-0,016
	(0.007)	(0.006)	(0.022)
sds_tb	-0,003	-0,001	-0,017
	(0.009)	(0.007)	(0.040)
sds_bb	-0,010	-0,007	-0,015
	(0.007)	(0.006)	(0.019)
sds_mm	0.043 ***	0.024 **	0.083 ***
	(0.008)	(0.008)	(0.020)
sds_tm	0.110 ***	0.078 ***	0.196 ***
	(0.017)	(0.018)	(0.040)
aldoui	0.031 ***	0.029 ***	0.045 **
	(0.006)	(0.005)	(0.016)
trmh_m55	-0,012	-0.014 *	0,007
	(0.007)	(0.007)	(0.021)
trmh_p80	0,007	0,000	0,031
	(0.006)	(0.006)	(0.025)
trmh_NA	0.034 *	0,036	0,021
	(0.014)	(0.020)	(0.022)
corpulshort_insuff	0.045 ***	0.032 **	0.061 **
	(0.010)	(0.010)	(0.020)
hospioui	0.019 **	0.020 **	0,022
	(0.007)	(0.007)	(0.017)
dipli_0	0,005	0,006	0,014
	(0.008)	(0.008)	(0.018)
dipli_becap	-0,002	0,002	-0,021
	(0.007)	(0.007)	(0.023)
dipli_bac	0,002	0,001	0,009
	(0.010)	(0.009)	(0.031)
dipli_bp2p	-0,010	-0,003	-0,054
	(0.009)	(0.008)	(0.034)
N	11591	8565	3026
R2	0,146	0,093	0,098

Standard errors are heteroskedasticity robust. *** p <0.001; ** p <0.01; * p <0.05.

Then with interactions : The results are as follows:

- being on ALD, dependent as defined by Katz, having a cognitive limitation, being underweight or having been hospitalized in the year has the same effect at home or in an institution (coefficient of interaction not significant) ;
- on the other hand, for reporting an Alzheimer's diagnosis, the effect is canceled in institutions: the coefficient is significant and positive for people at home (reference modality), and negative and significant for the inter- action with being in an institution. For cognitive limitation, the coefficient of the interaction is not significant, indicating that the effect is the same at home and in an institution. We return to the fact that, in the separate models, the coefficient in front of Alzheimer's disease was zero in the facility and very significantly positive at home.

- a sensory limitation would be linked to a greater probability of death, in institutions only (coefficient of interaction only significant).

- We also find that being in psychological distress in the sense of having an MH5 score¡55 (variable trmhm55) is associated with better survival at home (but not in an institution), compared with people with an average score (between 55 and 80). One of the limitations of the MH5 score is that it suffers from a high proportion of non-response, giving this highly counter-intuitive result on the probability of death. This paradoxical result merits further investigation in a forthcoming study, which will focus specifically on the psycho- trope consumption of the elderly, using Care and its matching Système national des données de santé (SNDS). The MH5 score (and non-responses to this score) will be cross-referenced with the consumption of psychotropic drugs and the two diagnoses of depression present in the SNSD (top pathology and ALD n° 23 - Recurrent or persistent depressive disorders in adults).

Table 18 – Regression of three-year probability of death by place of residence

	Tous lieux de vie	Domicile	Etablissement
(Intercept)	-0,019	-0,030	0,062
	(0.015)	(0.016)	(0.057)
qinsee_saplaf	1.579 ***	1.819 ***	1.213 ***
	(0.074)	(0.100)	(0.112)
nenf_0	0,009	0.032 *	-0,012
	(0.012)	(0.013)	(0.025)
nenf_1	0,012	0,009	0,018
	(0.010)	(0.010)	(0.025)
nenf_3	0,001	-0,004	0,026
	(0.010)	(0.010)	(0.029)
nenf_4p	0.030 *	0,010	0.093 **
	(0.012)	(0.013)	(0.030)
typmen_moi_B_cjslt	-0,005	0,003	
	(0.009)	(0.009)	
typmen_moi_C_enfpascj	0,038	0,041	
	(0.022)	(0.022)	
typmen_moi_D_cjenf	0,002	0,011	
	(0.020)	(0.020)	
typmen_moi_E_autre	0,045	0,038	
	(0.031)	(0.031)	
typmen_moi_F_Insti	0.118 ***		
	(0.013)		
proxyoui	0.026 **	0.023 *	0,023
	(0.009)	(0.009)	(0.026)
dpd_katzac	0.131 ***	0.116 ***	0.132 ***
	(0.014)	(0.018)	(0.024)
lfsens	-0,006	-0.020 *	0,043
	(0.008)	(0.008)	(0.022)
lfphys	0,014	0,009	0,092
	(0.009)	(0.009)	(0.047)
lfcog	0.038 ***	0.038 ***	0,034
	(0.010)	(0.011)	(0.025)
sdlimi_1	0.037 **	0.057 ***	-0,006
	(0.012)	(0.013)	(0.029)
sdlimi_2	0,006	0,011	-0,004
	(0.010)	(0.010)	(0.029)
sds_tb	-0,010	-0,006	-0,029
	(0.013)	(0.012)	(0.059)
sds_bb	-0,014	-0,013	-0,013
	(0.010)	(0.010)	(0.024)
sds_mm	0.044 ***	0,013	0.113 ***
	(0.011)	(0.012)	(0.022)
sds_tm	0.103 ***	0.084 ***	0.128 ***
	(0.020)	(0.023)	(0.038)
aldoui	0.064 ***	0.069 ***	0.054 **
	(0.008)	(0.008)	(0.020)
trmh_m55	-0.034 ***	-0.039 ***	-0,001
	(0.010)	(0.010)	(0.026)
trmh_p80	0,007	0,000	0,035
	(0.009)	(0.009)	(0.032)
trmh_NA	0.036 *	0.081 **	0,017
	(0.017)	(0.025)	(0.027)
corpulshort_insuff	0.065 ***	0.071 ***	0.053 *
	(0.012)	(0.014)	(0.021)
hospioui	0.056 ***	0.065 ***	0,035
	(0.009)	(0.010)	(0.019)
dipli_0	-0,008	-0,005	-0,012
	(0.010)	(0.011)	(0.021)
dipli_becap	-0,012	-0,004	-0,030
	(0.010)	(0.010)	(0.029)
dipli_bac	-0,013	0,000	-0,069
	(0.014)	(0.014)	(0.041)
dipli_bp2p	-0,027	-0,016	-0,082
	(0.015)	(0.015)	(0.050)
cs_1	0,008	0,001	0,006
	(0.015)	(0.016)	(0.031)
cs_2	0,013	-0,004	0,062
	(0.014)	(0.015)	(0.034)
cs_3	0,003	0,004	-0,012
	(0.015)	(0.015)	(0.044)
cs_4	-0.029 *	-0.028 *	-0,037
	(0.011)	(0.012)	(0.037)
cs_6	0,009	0,018	-0,028
	(0.010)	(0.011)	(0.025)
cs_8	-0,016	-0,002	-0,046
	(0.016)	(0.019)	(0.028)
N	11591	8565	3026
R2	0,271	0,206	0,138

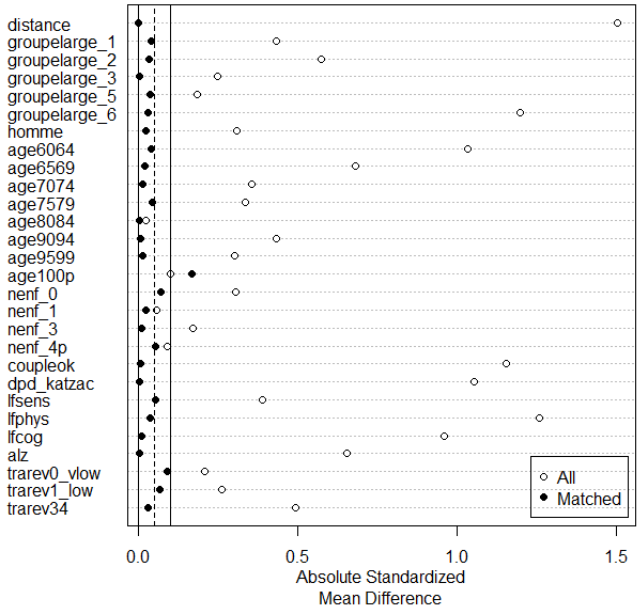
Table 19 – Régression de la probabilité de décès à trois ans : modèle avec interactions du fait de vivre en institution

	Spécif avec lfcog	Spécif avec Alz
(Intercept)	0,001	0,002
	(0.012)	(0.012)
qinsee_saplaf	1.581 ***	1.591 ***
	(0.073)	(0.073)
instit	0,005	0,012
	(0.046)	(0.046)
dpd_katzac	0.135 ***	0.133 ***
	(0.017)	(0.017)
lfsens	-0,014	-0,010
	(0.008)	(0.008)
lfphys	0,013	0,015
	(0.009)	(0.009)
lfcog	0.049 ***	
	(0.011)	
alz		0.117 ***
		(0.027)
aldoui	0.068 ***	0.066 ***
	(0.008)	(0.008)
trmh_m55	-0.050 ***	-0.044 ***
	(0.010)	(0.010)
trmh_p80	0,001	-0,001
	(0.009)	(0.009)
trmh_NA	0.063 ***	0.061 ***
	(0.018)	(0.018)
corpulshort_insuff	0.078 ***	0.076 ***
	(0.013)	(0.013)
hospioui	0.064 ***	0.065 ***
	(0.010)	(0.010)
dipli_0	-0,004	-0,003
	(0.010)	(0.010)
dipli_becap	-0.019 *	-0.019 *
	(0.010)	(0.010)
dipli_bac	-0.032 *	-0.033 *
	(0.013)	(0.013)
dipli_bp2p	-0.042 ***	-0.040 ***
	(0.012)	(0.012)
sdlimi_1	0.041 ***	0.043 ***
	(0.012)	(0.012)
sdlimi_2	0,007	0,007
	(0.010)	(0.010)
sds_tb	-0,011	-0,011
	(0.013)	(0.013)
sds_bb	-0,014	-0,014
	(0.010)	(0.010)
sds_mm	0.043 ***	0.045 ***
	(0.011)	(0.011)
sds_tm	0.100 ***	0.102 ***
	(0.020)	(0.020)
instit:dpd_katzac	-0,009	-0,001
	(0.027)	(0.026)
instit:lfsens	0.047 *	0.046 *
	(0.023)	(0.023)
instit:lfphys	0,085	0,083
	(0.046)	(0.046)
instit:lfcog	-0,020	
	(0.025)	
instit:aldoui	-0,006	-0,005
	(0.020)	(0.021)
instit:trmh_m55	0.076 **	0.068 **
	(0.025)	(0.025)
instit:trmh_p80	0,042	0,038
	(0.032)	(0.032)
instit:corpulshort_insuff	-0,038	-0,035
	(0.025)	(0.025)
instit:hospioui	-0,027	-0,027
	(0.021)	(0.021)
instit:alz		-0.104 **
		(0.033)
N	11591	11591
R2	0,271	0,271

Standard errors are heteroskedasticity robust. *** p <0.001; ** p <0.01; * p <0.05.

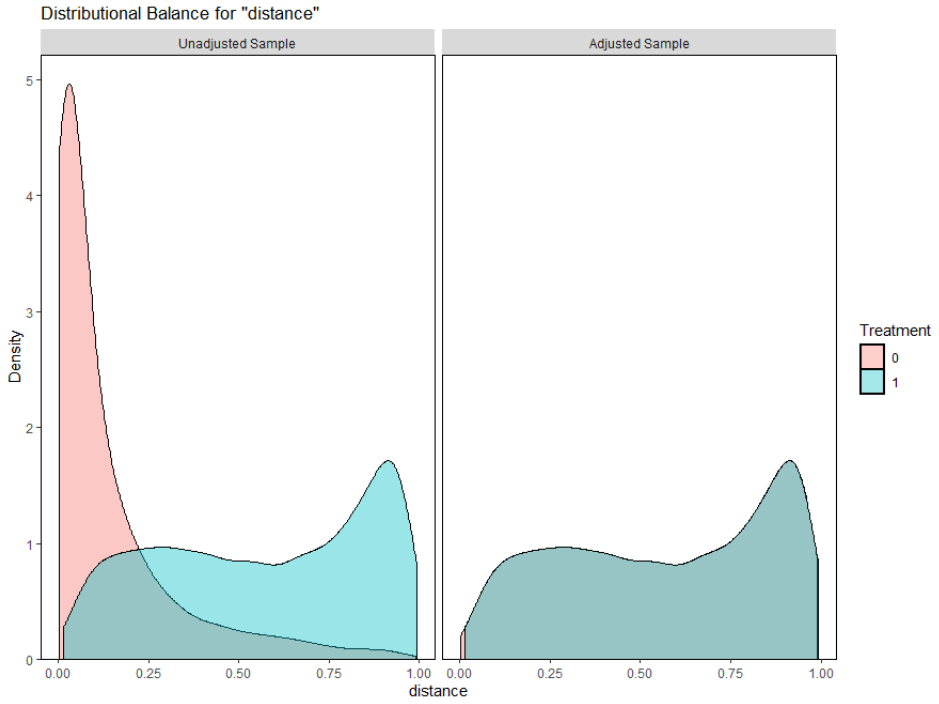
Appendix 3 : Elements on the matching procedure

Figure 6 – Average mean difference in covariates in matched and unmatched samples



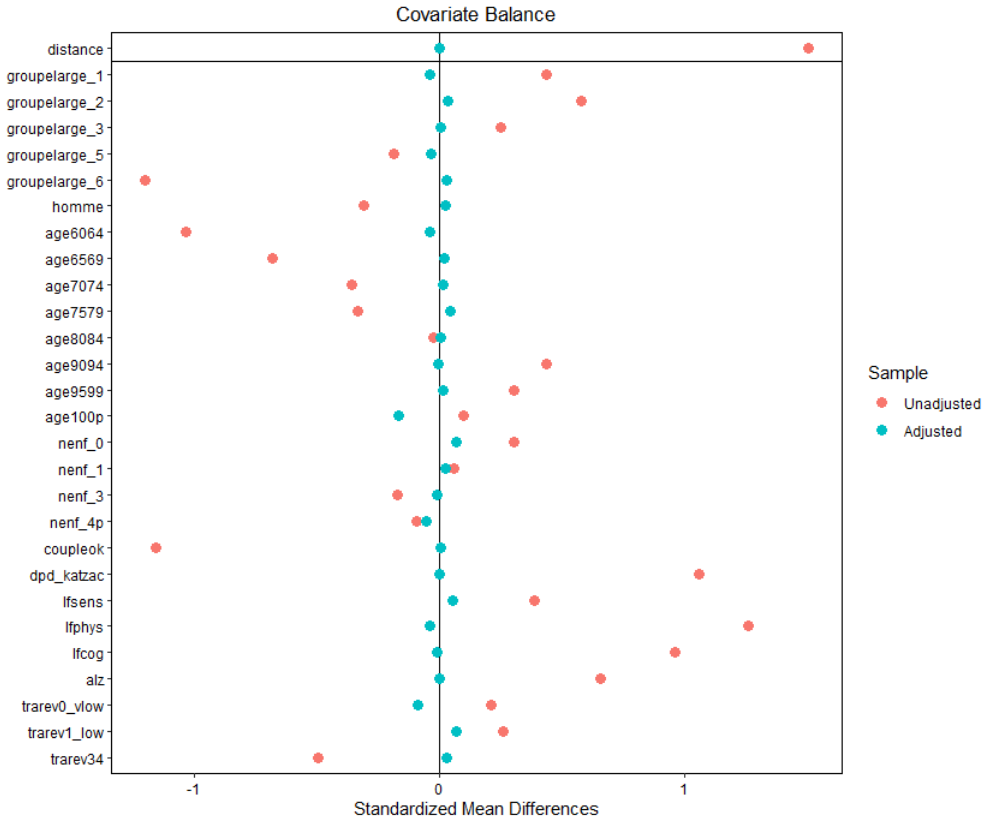
Source : CARE-Ménages and CARE-Institutions surveys, DREES

Figure 7 – Propensity score distribution before and after matching



Source : CARE-Ménages and CARE-Institutions surveys, DREES

Figure 8 – Average mean difference between treated and control individuals, before and after matching



Source : CARE-Ménages and CARE-Institutions surveys, DREES

Appendix 4 : Additional regression tables

Separate regression by institutional setting

Table 20 – Regression of the probability of death at three years: addition of the Alzheimer's indicator to the model, by place of residence

	Tous lieux de vie	Domicile	Établissement
(Intercept)	-0,019	-0,030	0,062
	(0.015)	(0.016)	(0.057)
qinsee_saplaf	1.589 ***	1.822 ***	1.213 ***
	(0.074)	(0.100)	(0.112)
nenf_0	0,009	0.033 *	-0,012
	(0.012)	(0.013)	(0.025)
nenf_1	0,012	0,009	0,018
	(0.010)	(0.010)	(0.025)
nenf_3	0,001	-0,004	0,026
	(0.010)	(0.010)	(0.029)
nenf_4p	0.031 **	0,011	0.093 **
	(0.012)	(0.013)	(0.030)
typmen_moi_B_cjslt	-0,004	0,004	
	(0.009)	(0.009)	
typmen_moi_C_enfpascj	0,039	0,042	
	(0.022)	(0.022)	
typmen_moi_D_cjenf	0,003	0,012	
	(0.020)	(0.020)	
typmen_moi_E_autre	0,047	0,042	
	(0.031)	(0.030)	
typmen_moi_F_Insti	0.114 ***		
	(0.013)		
proxyoui	0.024 **	0.019 *	0,022
	(0.009)	(0.009)	(0.026)
dpd_katzac	0.129 ***	0.110 ***	0.132 ***
	(0.014)	(0.018)	(0.024)
lfsens	-0,005	-0.019 *	0,043
	(0.008)	(0.008)	(0.022)
lfphys	0,015	0,011	0,092
	(0.009)	(0.009)	(0.047)
lfcog	0.034 **	0.029 **	0,034
	(0.010)	(0.011)	(0.025)
alzheimer	0.035 *	0.091 **	0,002
	(0.017)	(0.028)	(0.022)
sdlimi_1	0.037 **	0.055 ***	-0,006
	(0.012)	(0.013)	(0.029)
sdlimi_2	0,005	0,010	-0,004
	(0.010)	(0.010)	(0.029)
sds_tb	-0,010	-0,007	-0,029
	(0.013)	(0.012)	(0.059)
sds_bb	-0,015	-0,014	-0,013
	(0.010)	(0.010)	(0.024)
sds_mm	0.044 ***	0,014	0.113 ***
	(0.011)	(0.012)	(0.022)
sds_tm	0.103 ***	0.084 ***	0.128 ***
	(0.020)	(0.023)	(0.038)
aldoui	0.062 ***	0.067 ***	0.053 **
	(0.008)	(0.008)	(0.020)
trmh_m55	-0.033 ***	-0.038 ***	-0,001
	(0.010)	(0.010)	(0.026)
trmh_p80	0,006	-0,001	0,035
	(0.009)	(0.009)	(0.032)
trmh_NA	0,026	0.062 *	0,016
	(0.017)	(0.025)	(0.028)
corpulshort_insuff	0.064 ***	0.069 ***	0.053 *

Table 21 – Regression of the probability of death at three years: addition of the Alzheimer's indicator to the model, by place of residence (continued)

	Tous lieux de vie	Domicile	Etablissement
	(0.012)	(0.014)	(0.022)
hospioui	0.057 ***	0.066 ***	0,035
	(0.009)	(0.010)	(0.019)
dipli_0	-0,007	-0,004	-0,012
	(0.010)	(0.011)	(0.021)
dipli_becap	-0,011	-0,004	-0,030
	(0.010)	(0.010)	(0.029)
dipli_bac	-0,013	0,000	-0,069
	(0.014)	(0.014)	(0.041)
dipli_bp2p	-0,026	-0,015	-0,082
	(0.015)	(0.015)	(0.050)
cs_1	0,009	0,003	0,006
	(0.015)	(0.016)	(0.031)
cs_2	0,014	-0,001	0,063
	(0.014)	(0.015)	(0.034)
cs_3	0,003	0,005	-0,012
	(0.015)	(0.015)	(0.044)
cs_4	-0.029 *	-0.027 *	-0,037
	(0.011)	(0.012)	(0.037)
cs_6	0,010	0,020	-0,028
	(0.010)	(0.011)	(0.025)
cs_8	-0,014	-0,001	-0,046
	(0.016)	(0.019)	(0.028)
N	11591	8565	3026
R2	0,271	0,208	0,138

Standard errors are heteroskedasticity robust. *** p <0.001; ** p <0.01; * p <0.05.

Duration models are more sensitive, but confirm the main results

The results are those of a Cox proportional hazards model, with two specifications: one with the mortality quotient, to obtain the same specification as the linear models, and the other with gender and age, as the mortality quotient is less directly interpretable here than in an analysis of the probability of death. We also present the results of weighted and unweighted regressions. Indeed, for an analysis of links between variables, weighting is not relevant, and gives a very high importance in the analysis to individuals with a high weight (young and autonomous [6]) and little concerned by the event studied (death): those who die therefore influence the analysis a lot, and above all increase the variability of the estimate. But for the duration analysis, we also present the weighted version, so that it can be compared with the descriptive statistics above.

We find the same determinants of death at one year, but here, the analysis is sensitive to differences in the time span before death, rather than simply comparing the fact of being alive or not at the end of N years. There are therefore more significant variables than with linear probability regressions.

But beyond these new results, which are debatable because the results of Cox models depend on fairly strong hypotheses (proportional hazards in particular), we find the same factors than with our first analyses of mortality at 1 and 3 years: living in an institution, proxy response, loss of autonomy as defined by Katz, being very limited in the acts of daily living, a health status declared "poor" or "very poor", being on ALD, being underweight and having been hospitalized in the year prior to the survey reduce the expected life span after the survey. These factors seem robust to the model specification.

[6] As the Care-ménages survey oversamples disabled individuals, young and autonomous people represent more people in the general population and therefore have a higher weight on average

As regards the lack of effect of proxy response in nursing homes, the fact that proxies tend to assess the patients' disability level more severely than patients themselves has been documented for people living at home (Davin et al. (2019), Li et al. (2015)). Here, it seems to be a quite strong indicator of bad health.

Table 22 – Cox model: same specification as the linear regression of the probability of death at 3 years

	Avec qmort sans poids	Avec qmort pondéré	Avec sexe et age sans poids	Avec sexe et age pondéré
qinsee_saplaf	5.407 ***	7.758 ***		
	(0.239)	(0.427)		
age			0.059 ***	0.075 ***
			(0.003)	(0.004)
homme			0.629 ***	0.852 ***
			(0.044)	(0.073)
nenf_0	0,048	0,185	0,018	0,132
	(0.055)	(0.094)	(0.055)	(0.094)
nenf_1	0,094	0,094	0,081	0,072
	(0.050)	(0.082)	(0.050)	(0.082)
nenf_3	0,039	-0,012	0,003	-0,062
	(0.055)	(0.087)	(0.055)	(0.087)
nenf_4p	0.124 *	0,166	0,063	0,090
	(0.056)	(0.091)	(0.056)	(0.091)
typmen_moi_B_cjslt	-0.136 *	-0,171	-0.180 **	-0.275 **
	(0.057)	(0.078)	(0.059)	(0.082)
typmen_moi_C_enfpascj	0.189 *	0,262	0.224 *	0.347 *
	(0.095)	(0.137)	(0.096)	(0.137)
typmen_moi_D_cjenf	-0,142	-0,159	-0,031	-0,137
	(0.153)	(0.183)	(0.154)	(0.185)
typmen_moi_E_autre	0,197	-0,045	0,268	0,062
	(0.175)	(0.226)	(0.175)	(0.228)
Instit	0.496 ***	0.415 ***	0.455 ***	0.423 ***
	(0.052)	(0.101)	(0.051)	(0.100)
proxyoui	0.219 ***	0.364 ***	0.160 ***	0.259 **
	(0.047)	(0.073)	(0.048)	(0.074)
dpd_katzac	0.395 ***	0.347 ***	0.401 ***	0.376 ***
	(0.048)	(0.093)	(0.048)	(0.092)
lfsens	0,016	0,008	-0,058	-0,101
	(0.046)	(0.070)	(0.046)	(0.070)
lfphys	0.666 ***	0.502 **	0.567 ***	0.437 **
	(0.102)	(0.104)	(0.102)	(0.104)
lfcog	0.193 ***	0.172 *	0.189 ***	0.184 *
	(0.047)	(0.080)	(0.047)	(0.080)
alzheimer	0,043	0,034	0,016	-0,030
	(0.052)	(0.109)	(0.052)	(0.108)
sdlimi_1	0.269 ***	0.515 ***	0.255 ***	0.431 **
	(0.068)	(0.102)	(0.068)	(0.103)
sdlimi_2	0,107	0.300 *	0,082	0,218
	(0.069)	(0.094)	(0.069)	(0.094)
sds_tb	-0.319 *	-0,397	-0,251	-0,249
	(0.158)	(0.185)	(0.157)	(0.184)
sds_bb	-0.113 *	-0.310 *	-0,097	-0.300 *
	(0.057)	(0.088)	(0.057)	(0.088)
sds_mm	0.211 ***	0.290 ***	0.194 ***	0.254 ***
	(0.043)	(0.076)	(0.043)	(0.076)
sds_tm	0.491 ***	0.683 ***	0.491 ***	0.644 ***
	(0.067)	(0.118)	(0.067)	(0.118)
aldoui	0.333 ***	0.536 ***	0.305 ***	0.470 ***
	(0.043)	(0.070)	(0.043)	(0.070)

Table 23 – Cox model: same specification as linear regression of probability of death at 3 years (continued)

	Avec qmort sans poids	Avec qmort pondéré	Avec sexe et age sans poids	Avec sexe et age pondéré
trmh_m55	-0.128 **	-0.242 **	-0,074	-0,151
	(0.049)	(0.083)	(0.049)	(0.083)
trmh_p80	0,029	0,104	0,010	0,074
	(0.060)	(0.079)	(0.060)	(0.080)
trmh_NA	-0,041	-0,031	0,033	0,103
	(0.057)	(0.111)	(0.057)	(0.111)
corpulshort_insuff	0.268 ***	0.340 ***	0.335 ***	0.468 ***
	(0.045)	(0.076)	(0.045)	(0.077)
hospioui	0.242 ***	0.344 ***	0.234 ***	0.316 ***
	(0.037)	(0.063)	(0.037)	(0.063)
dipli_0	0,023	0.188 *	0,021	0.170 *
	(0.043)	(0.074)	(0.043)	(0.074)
dipli_becap	-0,100	-0.200 *	-0,061	-0,145
	(0.054)	(0.086)	(0.054)	(0.086)
dipli_bac	-0,048	-0,023	0,025	0,074
	(0.083)	(0.123)	(0.082)	(0.122)
dipli_bp2p	-0.252 *	-0.401 *	-0,140	-0,246
	(0.099)	(0.142)	(0.099)	(0.142)
cs_1	0,063	0,158	-0,093	-0,096
	(0.062)	(0.106)	(0.062)	(0.108)
cs_2	0,087	0,107	-0,084	-0,152
	(0.067)	(0.107)	(0.068)	(0.110)
cs_3	0,104	0.354 *	-0,169	-0,032
	(0.083)	(0.121)	(0.086)	(0.127)
cs_4	-0,114	-0,017	-0.282 ***	-0.289 *
	(0.072)	(0.107)	(0.073)	(0.109)
cs_6	0,020	-0,023	-0.125 *	-0.264 **
	(0.050)	(0.086)	(0.052)	(0.091)
cs_8	-0,036	0,077	-0,040	0,027
	(0.062)	(0.116)	(0.063)	(0.116)
nobs	3297,000	3297,000	3297,000	3297,000
n	11591,000		11591,000	
nevent	3297,000		3297,000	
statistic.log	3508,140		3777,525	
p.value.log	0,000		0,000	
statistic.sc	4259,368		4070,680	
p.value.sc	0,000		0,000	
statistic.wald	3270,610		3152,720	
p.value.wald	0,000		0,000	
statistic.robust				
p.value.robust				
r.squared	0,261		0,278	
r.squared.max	0,995		0,995	
concordance	0,786		0,793	
std.error.concordance	0,004		0,004	
logLik	-28508,942		-28374,250	
AIC	57093,884		56826,499	
BIC	57325,713		57064,429	
nobs.1	11591,000		11591,000	

*** p <0.001; ** p <0.01; * p <0.05.

Table 24 – Cox model: specifications with "Alzheimer's * place of residence" interactions

	Avec lfcog sans poids	Avec lfcog pondéré	Avec alz sans poids	Avec alz pondéré
age	0.057 ***	0.073 ***	0.057 ***	0.073 ***
	(0.003)	(0.004)	(0.003)	(0.004)
homme	0.625 ***	0.851 ***	0.629 ***	0.849 ***
	(0.044)	(0.073)	(0.044)	(0.073)
nenf_0	0,013	0,128	0,014	0,129
	(0.055)	(0.094)	(0.055)	(0.095)
nenf_1	0,079	0,073	0,081	0,073
	(0.050)	(0.082)	(0.050)	(0.082)
nenf_3	0,014	-0,045	0,012	-0,049
	(0.055)	(0.088)	(0.055)	(0.088)
nenf_4p	0,062	0,090	0,058	0,088
	(0.056)	(0.091)	(0.056)	(0.091)
typmen_moi_B_cjslt	-0.212 ***	-0.286 **	-0.215 ***	-0.286 **
	(0.060)	(0.082)	(0.059)	(0.083)
typmen_moi_C_enfpascj	0,164	0,312	0,152	0,307
	(0.096)	(0.138)	(0.096)	(0.138)
typmen_moi_D_cjenf	-0,078	-0,158	-0,079	-0,149
	(0.154)	(0.185)	(0.154)	(0.185)
typmen_moi_E_autre	0,239	0,049	0,276	0,069
	(0.176)	(0.228)	(0.176)	(0.228)
typmen_moi_F_Insti	0.821 **	0.890 **	0.834 **	0.890 **
	(0.273)	(0.664)	(0.272)	(0.659)
proxyoui	0.190 ***	0.273 **	0.212 ***	0.287 **
	(0.047)	(0.074)	(0.047)	(0.073)
dpd_katzac	0.415 ***	0.419 ***	0.436 ***	0.452 ***
	(0.063)	(0.105)	(0.063)	(0.104)
lfsens	-0.149 *	-0,103	-0.118 *	-0,087
	(0.060)	(0.076)	(0.060)	(0.075)
lfphys	0.525 ***	0.406 *	0.538 ***	0.410 *
	(0.111)	(0.106)	(0.111)	(0.106)
lfcog	l0.247 ***	l 0.199 *		
	(0.057)	(0.085)		
alz			l0.290 ***	l0,167
			(0.085)	(0.141)
sdlimi_1	0.252 ***	0.430 **	0.266 ***	0.447 **
	(0.069)	(0.102)	(0.068)	(0.102)
sdlimi_2	0,081	0,211	0,080	0,211
	(0.069)	(0.094)	(0.069)	(0.094)
sds_tb	-0,258	-0,233	-0,249	-0,226
	(0.157)	(0.184)	(0.157)	(0.184)
sds_bb	-0,092	-0.289 *	-0,090	-0.287 *
	(0.056)	(0.088)	(0.056)	(0.088)
sds_mm	0.187 ***	0.247 ***	0.190 ***	0.257 ***
	(0.043)	(0.077)	(0.043)	(0.076)
sds_tm	0.460 ***	0.620 ***	0.466 ***	0.636 ***
	(0.067)	(0.119)	(0.067)	(0.119)
aldoui	0.530 ***	0.583 ***	0.525 ***	0.581 ***
	(0.065)	(0.079)	(0.066)	(0.080)
trmh_m55	-0.185 **	-0.207 *	-0.154 *	-0.190 *
	(0.061)	(0.090)	(0.061)	(0.090)
trmh_p80	-0,066	0,064	-0,090	0,049
	(0.073)	(0.084)	(0.072)	(0.083)
trmh_NA	0.117 *	0,195	0.128 *	0,215
	(0.057)	(0.110)	(0.058)	(0.111)
corpulshort_insuff	0.489 ***	0.574 ***	0.479 ***	0.569 ***
	(0.067)	(0.088)	(0.067)	(0.088)
hospioui	0.346 ***	0.348 ***	0.344 ***	0.341 ***
	(0.052)	(0.071)	(0.052)	(0.071)

Table 25 – Cox model: specifications with place of residence interactions (continued)

	Avec qmort sans poids	Avec qmort pondéré	Avec sexe et age sans poids	Avec sexe et age p
dipli_0	0,000	0,151	0,003	
	(0.044)	(0.074)	(0.044)	
dipli_becap	-0,072	-0,154	-0,070	
	(0.055)	(0.086)	(0.055)	
dipli_bac	-0,002	0,039	-0,009	
	(0.083)	(0.122)	(0.083)	
dipli_bp2p	-0,160	-0,255	-0,155	
	(0.099)	(0.142)	(0.099)	
cs_1	-0,095	-0,098	-0,094	
	(0.062)	(0.108)	(0.062)	
cs_2	-0,087	-0,154	-0,083	
	(0.068)	(0.110)	(0.068)	
cs_3	-0.177 *	-0,038	-0.176 *	
	(0.086)	(0.126)	(0.086)	
cs_4	-0.284 ***	-0.293 *	-0.279 ***	-(
	(0.073)	(0.109)	(0.073)	
cs_6	-0.136 **	-0.277 **	-0.134 *	-0.
	(0.052)	(0.091)	(0.052)	
cs_8	-0,042	0,038	-0,036	
	(0.063)	(0.116)	(0.063)	
typmen_moi_F_Insti:dpd_katzac	-0,058	-0,195	-0,067	
	(0.088)	(0.187)	(0.086)	
typmen_moi_F_Insti:lfsens	0.218 *	0,055	0.189 *	
	(0.090)	(0.186)	(0.090)	
typmen_moi_F_Insti:lfphys	-0,093	0,114	-0,105	
	(0.264)	(0.647)	(0.264)	
typmen_moi_F_Insti:lfcog	-0,161	-0,151		
	(0.088)	(0.189)		
typmen_moi_F_Insti:aldoui	-0.391 ***	-0.493 ***	-0.384 ***	-0.4
	(0.085)	(0.159)	(0.086)	
typmen_moi_F_Insti:trmh_m55	0.282 **	0.295 *	0.250 **	0
	(0.088)	(0.190)	(0.089)	
typmen_moi_F_Insti:trmh_p80	0.260 *	0,247	0.267 *	
	(0.122)	(0.260)	(0.120)	
typmen_moi_F_Insti:corpulshort_insuff	-0.248 **	-0.349 *	-0.235 **	-(
	(0.088)	(0.172)	(0.088)	
typmen_moi_F_Insti:hospioui	-0.253 ***	-0.206 *	-0.251 ***	
	(0.074)	(0.151)	(0.074)	
typmen_moi_F_Insti:alz			-0.296 **	
			(0.100)	
nobs	3297,000	3297,000	3297,000	32
n	11591,000		11591,000	
nevent	3297,000		3297,000	
statistic.log	3855,047		3847,272	
p.value.log	0,000		0,000	
statistic.sc	4144,703		4145,915	
p.value.sc	0,000		0,000	
statistic.wald	3054,770		3061,970	
p.value.wald	0,000		0,000	
statistic.robust				
p.value.robust				
r.squared	0,283		0,282	
r.squared.max	0,995		0,995	
concordance	0,795		0,795	
std.error.concordance	0,003		0,003	
logLik	-28335,489		-28339,376	
AIC	56764,978		56772,752	
BIC	57051,714		57059,488	
nobs.1	11591,000		11591,000	

Standard errors are heteroskedasticity robust. *** p <0.001; ** p <0.01; * p <0.05.