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Mapping loss of autonomy among the elderly

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Amélie Carrère

Understanding the differences in loss of autonomy between French departments is essential since they are the leading providers of social services to the elderly. For the first time, thanks to the combination of several data sources, it is possible to obtain a snapshot of the care needs of the elderly in each French department. This study sheds light on the differences in care that can be observed between departments from the perspective of the needs of their citizens, and can help to orient local policies to meet these needs. Unlike previous studies on the subject, it is not restricted to the population receiving benefits related to loss of autonomy (Abassi et al., 2020), it includes both the at-home and institutionalized populations (Brunel and Carrère, 2017), and it compares several measures of disability (Larbi and Roy, 2019). Moreover, it allows us to question the implications of departmental policy via two channels: (1) the way departments mobilize the criteria for assessing loss of autonomy; and (2) the supply of institutional places and the residential mobilities that may induce.

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- The analysis of several measures of loss of autonomy highlights differences between French departments in terms of prevalence, type of disability, and its appearance at an early age.
- Pas-de-Calais is particularly affected by physical disabilities (24% of people aged 60 or more), Guadeloupe by cognitive disorders (17%), and Lozère by difficulties in washing (13%). Northern France and Seine-Saint-Denis stand out for early onset of difficulties (before 75 years of age).
- These differences in needs are not entirely consistent with the loss of autonomy assessed by the departmental councils.
- Departmental differences in needs change little when considering the department of residence before entering a nursing home, with the exception of a few departments. Paris is the department for which the prevalence of loss of autonomy decreases the most due to an "institutional" exodus.

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What are the differences depending on who assesses disability?

In France, to measure loss of autonomy among the elderly, it is possible to:

- use survey data that question the elderly about their difficulties;
- or mobilize administrative data.[1]

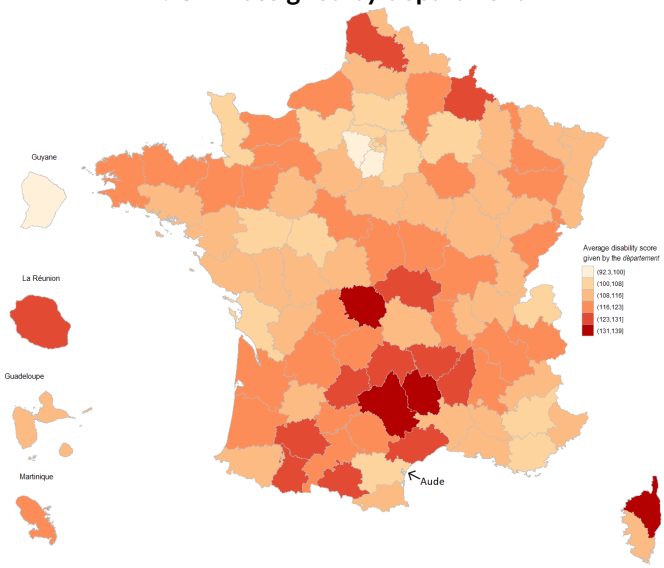
Administrative sources regarding the Allocation personnalisée d'autonomie (APA) are derived from an evaluation by departmental councils, whose criteria can be reconstructed using survey data. To open the discussion on equity of access to the financing of disability, this study first presents the differences between the evaluations made by departments and the declarations of elderly people in the surveys.

Assessment of disability by departmental councils

Departmental councils are responsible for assessing the needs of elderly people applying for APA. They assign them an iso-resource group (GIR) which classifies people according to their degree of loss of autonomy.[2] This administrative measure of loss of autonomy can be converted into a weighted average GIR (*GIR moyen pondéré*, or GMP), Box 1. A GMP of 100 is equivalent to an average need for 10 full-time jobs for 100 elderly people living in that department.[3] The GMP "assigned" by department provides information on the care needs of the elderly from the point of view of the allocation of social assistance. The assigned GMP is 113 points in the French population aged 60 or more. It varies from 92 points in Guyana to 139 points in Haute-Corse (Figure 1–A).

"The loss of autonomy assessed by departments is highest in Haute-Corse, lowest in Guyana."

A. GMP assigned by department



B. Relative gap between GMP assigned by the department and GMP estimated with surveys

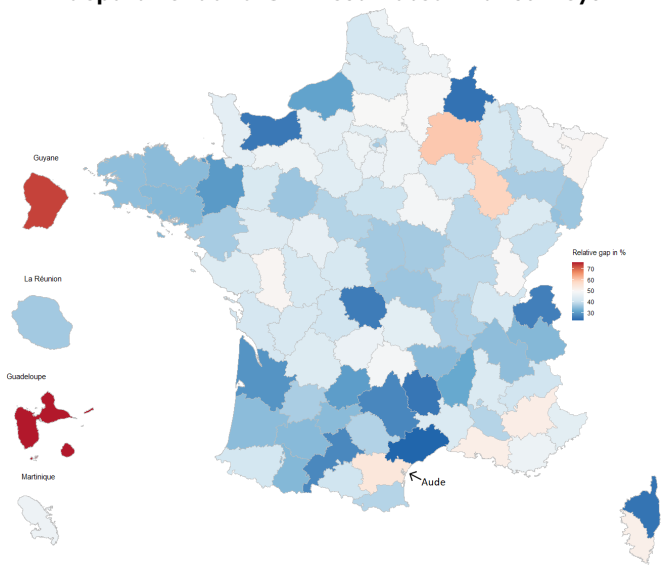


Figure 1: Comparison of an administrative measure of disability by source (administrative or surveys)

GMP: weighted average GIR. GIR: iso-resource group (disability score). A score of 70 is applied equally to all GIRs (estimated or assigned) 5-6.
Note: The relative gap corresponds to the difference between the GMP estimated with surveys (in the department before entering nursing home) and the GMP assigned by the department divided by the GIR assigned by the department.
Interpretation: Aude department has an assigned GMP of 109 points (average need of 10.9 employees per 100 elderly people) and an estimated GMP of 189 points (average need of 18.9 employees per 100 elderly people).
Sources : DREES, 2014 VQS, 2015 EHPA and 2015 Aide Sociale surveys.
Coverage: French departments (excluding Mayotte).

Assessment of disability using survey data

We use the same methodology as Larbi and Roy (2019) to estimate a GMP from the 2014 Vie Quotidienne et Santé (VQS) and 2015 Établissement d'hébergement pour personnes âgées (EHPA) data. It is 176 points in the French population aged 60 or older and ranges from 136 points in Haute-Savoie to 194 points in Guadeloupe. For all departments, the GMP estimated by survey is higher than the GMP assigned by the departments. The relative dif-

[1] Evaluation of loss of autonomy requested by elderly people is carried out by departmental councils. This assessment then allows them to be allocated an amount of aid to cover all or part of their disability expenses.

[2] The GIR has a value from 1 to 6. People in GIR 1 are the most dependent; those in GIR 5 or 6 are autonomous.

[3] The 2007-2012 Solidarité Grand Âge plan recommends a ratio of one employee per 1,000 GIR points in institutions.

ference is greatest in Guadeloupe (Figure 1–B).

The differences between the needs attributed by the departmental councils and the needs estimated by surveys may be due to individual effects such as non-use of APA,[4] but also to differences in the implementation of departments' gerontological policy. The latter has an impact on:

- APA applications: Applications are made by elderly individuals or their entourage but the degree to which they are facilitated by the departments may vary (complexity of the files, access to information about APA, etc.);
- Eligibility for APA: People whose GIR is between 1 and 4 can benefit from the department's coverage of part of their dependency expenses. Departments may therefore be encouraged to assess people at the limit of their eligibility for APA as GIR 5 rather than 4;
- GIR evaluation: The amounts proposed for APA depend on the GIR assigned.

The department's dual role as assessor and funder of loss of autonomy, allocating APA under a constrained budget, may encourage it to minimize the needs measured in an attempt to limit expenditure.

"Differences between the loss of autonomy measured by surveys and by departments calls into question the ability of departments to identify the real needs of the elderly."

Type of loss of autonomy and age: Differences within differences

The GMP is a synthetic measure of loss of autonomy. It shows both the prevalence and the severity of loss of autonomy, but masks its multidimensional nature (Box 1). Depending on the measure of loss of autonomy considered or the source used, there are between 1.3 and 3.9 million people aged 60 or over with loss of autonomy in France (Abassi et al., 2020). Our analysis also questions the capacity of the AGGIR assessment grid to capture several dimensions of loss of autonomy.

[4]For example, lack of knowledge of APA, underestimation of their need, and low rates of coverage were cited as possible reasons for non-use of APA.

Progress in the management of loss of autonomy varies from one department to another

The different types of functional limitations, as well as difficulties in washing oneself, are not identically distributed across the country. A principal component analysis (PCA) of the different measures of loss of autonomy (Box 2) takes into account territorial specificities. Figure 4–A corresponds to the projection in a plane of the different indicators of loss of autonomy based on the population aged 60 or more by department of residence at the time of the survey. They are represented by the arrows and indicated by the name of the measure. The x-axis identifies the prevalence of loss of autonomy in the department, in the sense of the proportion of people affected by loss of autonomy. Departments with the highest prevalence rates are located on the right. This dimension contributes 75% of the total variance. The y-axis identifies the severity of the loss of autonomy. Departments with complex disabilities (cognitive disorders or situations of cumulative functional limitations or activity restrictions) are at the bottom of the graph. Axis 2 contributes to 14% of the total variance. Departments in central France and Occitanie (in pink) are more affected by complex disabilities. The high prevalences seen in northern France (purple) are mainly related to physical difficulties or simpler disabilities. Conversely, Île-de-France, Haute-Savoie, Normandy and Morbihan (in apple green) are less affected by loss of autonomy. Between these categories, there is a gradient in the need for care, with a slight advantage for the departments of Brittany, the mountainous regions (Alps, Pyrenees, Vosges) and the coastal regions (in mint green) and a slight disadvantage for the eastern and rural regions (in yellow).

"Departments in central France and Occitanie are more affected by cognitive problems; northern France is more impacted by physical difficulties. Île-de-France, Haute-Savoie, Normandy and Morbihan are less affected by loss of autonomy."

Differences in age at onset of disability

The differences identified above partly hide differences in the age of exposure to the risk of loss of autonomy according to departments. We have therefore carried out the same type of analysis by splitting the loss of autonomy indicators: prevalences among people aged 60 to 74 and among people aged 75 or more are introduced separately (part "B. 60-74 years and 75 or more" of Figure 4). The x-axis still identifies the prevalence of loss of autonomy regardless of age, and

Box 1 : Loss of autonomy: Definitions, measures and data

Loss of autonomy is measured, on the one hand, using administrative data from the 2014 DREES Aide Sociale survey. Three measures are calculated at the departmental level: the weighted average iso-resource group (*GIR moyen pondéré*, or GMP) assigned by the departmental councils (assigned GMP: *GMP_reel*);[a] the proportion of people assigned to GIR 1 to 4 (*GIR14_reel*); the proportion of people assigned to GIR 1 or 2 (*GIR12_reel*).
On the other hand, it is also estimated by combining data from the 2014 Vie Quotidienne et Santé (VQS) survey, which questioned 166,800 people aged 60 or over, and the 2015 Établissement d'Hébergement pour Personnes Agées (EHPA) survey (299,264 nursing-home residents). Estimates are given for the proportion of people with at least one functional limitation (LF) related to physical mobility (*LFphys*);[b] the proportion of people with at least one cognitive LF (*LFcog*);[c] the proportion of individuals with both physical and cognitive LFs (*deuxLF*); the proportion of individuals with LFs but no restriction of activity (RA) (*LFseul*);[d] the proportion of people with (physical or cognitive) LFs combined with RAs (*LFRA*); the estimated GMP[e] (*GMP_est*); the proportion of people in estimated GIR 1 to 4 (*GIR14*); and the proportion of people in estimated GIR 1 or 2 (*GIR12*).
The analyses are carried out on the population aged 60 years or more residing in France, in "ordinary" accommodation or in a care home for dependent elderly (Etablissement d'Hébergement pour Personnes Agées dépendantes, or EHPAD), a non-EHPAD EHPA, or a long-term care unit (*unité de soins longue durée*, or USLD).

[a]The (assigned or estimated) GMP corresponds to the average level of dependency in a given population. A person in GIR 1 has a weight of 1000, respectively 840 for a person in GIR 2, 660 for a person in GIR 3, 420 for a person in GIR 4, 250 for a person in GIR 5, and 70 for a person in GIR 6. The (assigned or estimated) GMP of a department is the sum of the weights of each person aged 60 or more compared to the total population aged 60 or more of the department.
[b]They are measured in VQS using the question "Does the person have difficulty climbing a flight of stairs or walking 500 meters?" (grouping the options "No and "Yes, a little" vs. "Yes, a lot" and "Can't at all") and the "Moving around the home" axis of the AGGIR grid (No=A vs. yes=B, C) in EHPA.
[c]Cognitive LFs are measured using the questions "Does the person have difficulty with... Understanding others or being understood by others; Concentrating for more than 10 minutes; Remembering important things; Solving everyday problems (such as finding their way around or counting money)" in VQS (grouping the options "No" and "Yes, a little" vs. "Yes, a lot" and "Can't at all") and using the "Orientation in time", "Orientation in space", " Behavioral coherence", and "Orientation in communication" dimensions of the AGGIR grid used in EHPA (No=A vs. yes=B, C).
[d]The RA are measured using the question "Does the person have difficulty washing themselves?" in VQS ("No"; "Yes, a little" vs. "Yes, a lot"; "Can't at all") and using the "Washing" section of the AGGIR grid in EHPA (No=A vs. yes=B, C).
[e]In the VQS survey, the GIR is imputed via a model using the common variables between the VQS and CAREMénages surveys (DREES, 2015). For EHPA, it is the assigned GIR.

Box 2 : Methodology: Principal component analysis

We use principal component analyses (PCA). These allow us to classify statistical individuals, in this case **departments**, into dimensions, which we call "principal components", constructed from variables, in this case **measures of loss of autonomy**, at several ages (60 years or more; 60-74 years; and 75 years or more). The advantage of this method is that each dimension removes redundancy from correlated variables. For each component, a variable is created: the "coordinate" of the component. It summarizes the variables that are most important for this component and allows the department to be positioned on a plane (when considering the first two dimensions, for example). Groups of departments with similar characteristics (or clusters) are constructed using the *kmeans* method. We choose to construct five distinct clusters.[a] The *kmeans* method is based on minimizing the sum of the squared Euclidean distances between each department and the centroid (center point) of its cluster.

[a]"Elbow", "silhouette" and "gap statistic" methods are used to determine the optimal number of clusters to build.

contributes 45% of the total variance. Departments to the right have higher prevalences. The y-axis identifies the earliness of the loss of autonomy. This dimension contributes 21% of the total variance. The departments at the top have high prevalences before age 75. Those at the bottom have high prevalences after age 75.

"The departments most affected by cognitive disorders have high prevalences, especially after age 75. The departments most affected by physical disabilities have high prevalences, especially before age 75."

Northern and eastern France have high prevalences of loss of autonomy at all ages (departments in purple in Figure 2). Central France, Brittany, and the Rhone Valley have high prevalences, especially after age 75 (departments in pink). Departments on the Le Havre-Troyes line (to the north and east of Ile-de-France) and the Loire Valley departments (to the south of Ile-de-France) have high prevalences, especially before the age of 75 (departments in yellow). Loss of autonomy remains low in the coastal departments. The Paris region (except for Seine-Saint-Denis) still has the lowest prevalence, especially among people over 75.

Do we really measure departmental differences in loss of autonomy?

The differences in prevalence identified can be questioned from the perspective of residential mobility to-

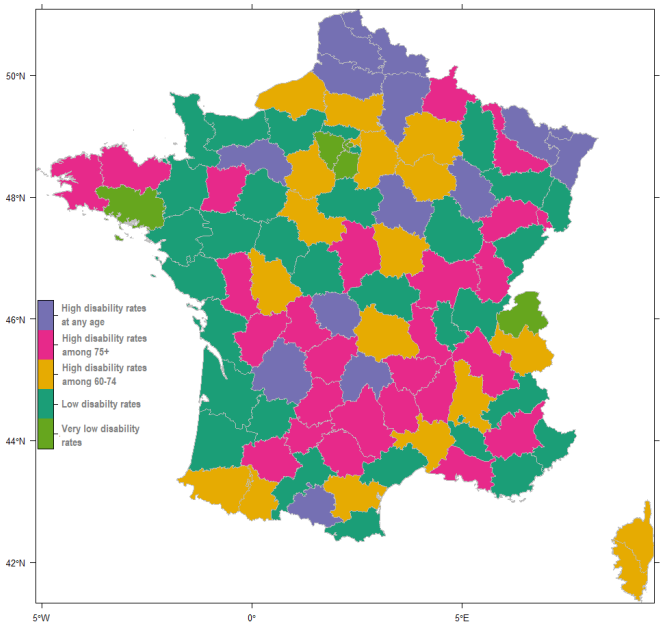


Figure 2: Map of departmental differences in loss of autonomy according to age of individuals

Department: Department of residence at the time of the survey.
Note: This is the cartographic representation of the principal component analysis of Figure 4–B.
Interpretation: Corsica, in yellow, is characterized by a rather high disability level, especially before age 75.
Coverage: Departments in metropolitan France.
Sources: DREES, 2014 VQS and 2015 EHPA surveys.

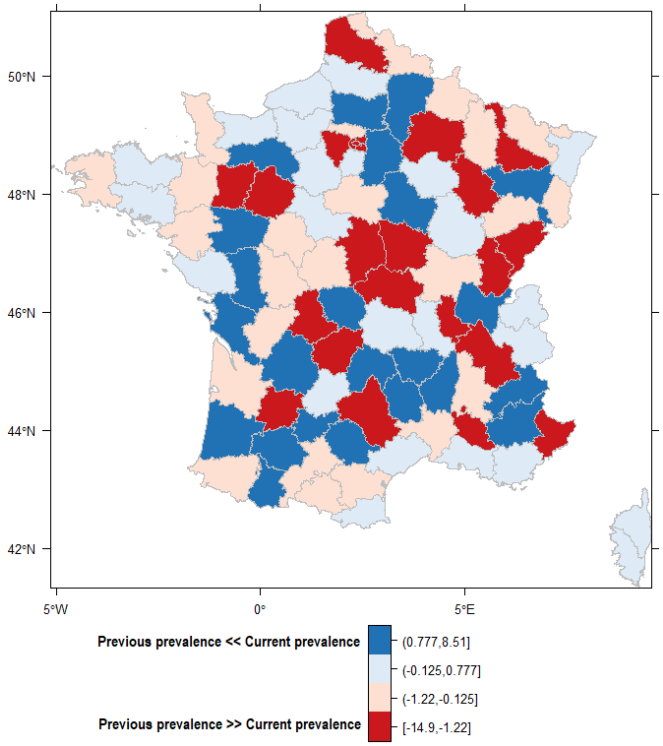


Figure 3: Map of the indicator of rise/fall in prevalence before and after institutional mobility

Note: The thresholds used correspond to the quartiles of the indicator of rise/fall in prevalence. The latter is constructed using a PCA on all the indicators of relative difference in prevalence before and after mobility to a nursing home (coordinate of the first dimension of the PCA).
Interpretation: The prevalence of disability in the department before entering a nursing home is lower than the one in the department after admission to a nursing home for Territoire-de-Belfort (in dark blue).
Sources: DREES, 2014 VQS and 2015 EHPA surveys.
Coverage: Departments of metropolitan France.

wards old people's homes (Ramos-Gorand, 2013). The estimates presented above do not make it possible to know whether there are departments in which it would be good to grow old, or whether the apparently "advantaged" departments are so because dependent elderly people have left their territory due to the lack of care.

The surveys used provide information on the department of residence before entering an institution. We therefore estimate the prevalence of loss of autonomy in the department of residence before moving to an institution, in order to compare it with the prevalence estimated previously, which used the department of residence at the time of the survey. In the majority of departments, the prevalence changes little. For some, however, the gain or loss due to institutional mobility is significant (Figure 3). Prevalence decreases the most due to migration to another department for the departments in dark red.[5] These areas are close to areas that appear to receive dependent elderly people (dark blue). Paris and the Rhone Valley "benefit" the most from the exodus of elderly people (in the sense that they see their rate of prevalence of loss of autonomy improve). Conversely, Lozère, Yonne, Ain and Territoire-de-Belfort "suffer" the most from the migration of elderly people to their territory.

"The prevalence of loss of autonomy is increasing in Lozère, Yonne, Ain and Territoire-de-Belfort due to a strong migration of dependent elderly people to the care facilities of these departments."

[5]These are the 25% with the highest value (strong improvement).

Figure 4: Principal component analysis of loss of autonomy among people aged 60 or over by department in France

Note: The solid arrows represent the different measures of disability (prev6074: prevalence rate among 60-74 year olds; prev75: prevalence rate among 75 year olds or older). The dotted lines are illustrative. They play no role in the construction of the axes. Departments that are close to the arrowhead of a measure have a high value for that measure. Department: Department of residence at the time of the survey.
Interpretation: Northern France is characterized by high disability rates (on the right on the x-axis of graphs A and B), by simple disorders (at the top on the y-axis of graph A), and by disability before 75 years old (at the top on the y-axis of graph B).
Coverage: French departments (excluding Mayotte).
Sources: DREES, 2014 VQS, 2015 EHPA and 2015 Aide Sociale surveys.

Conclusion

The loss of autonomy estimated by the surveys does not match the loss of autonomy evaluated by the departmental councils in the context of the allocation of APA, which raises the question of access to aid to help the elderly pay for part of the cost of their loss of autonomy.

The results, in terms of type of loss of autonomy and age of onset, support the hypothesis that the type of underlying pathologies may explain the mismatch between life expectancy and disability-free life expectancy (Crouzet et al., 2020). We can see here that the departments with the most physical limitations witness these disabilities before the age of 75. These are the same departments that have a double disadvantage in terms of life expectancy and disability-free life expectancy. These departments are characterized by a historically high level of industrial activity, which may explain the appearance of early disabilities and lower longevity. On the other hand, the departments in which the elderly suffer mainly from complex disorders are those which combine high longevity with a high proportion of years of life with disability. These are rather rural departments where agricultural activity is important.

The departmental differences observed should also be seen in the light of the mobility induced by a lack of facilities in certain territories. Laborde et al., 2020 identify that a high density of institutions reduces both life expectancy and disability-free life expectancy. Our analyses suggest that the lack of supply, or its high cost, effectively induces residential mobility that modifies territorial inequalities in loss of autonomy. Thanks to the principle of "*domicile de secours*", the financial burden of this mobility is not passed on to the departments where the elderly are placed in nursing homes. However, these interdepartmental mobilities, which are not always chosen, call into question the adequacy of the supply to the needs (Carrère, Couvert, and Missegue, 2021).

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