ÉTUDES et RÉSULTATS

Chronic diseases more often affect those on low incomes and more significantly reduce their life expectancy

Between 2016 and 2017, the poorest 10% in France more often developed a chronic disease than the wealthiest 10%, with comparable age and sex: 2.8 times more cases of diabetes, 2.2 times more liver or pancreatic diseases, 2.0 times more psychiatric conditions, 1.6 times more chronic respiratory diseases, 1.5 times more neurological or degenerative diseases and 1.4 times more cardiovascular diseases. In contrast, they develop relatively fewer cancers. However, this report does not take into account potential social inequalities in view of the use of screening and differences depending on the type of cancer.

The risk of reporting a chronic disease also varies greatly between socio-professional groups. Therefore, executives and higher intellectual professions develop these less often than manual workers and employees.

As they develop chronic diseases more often, there are also greater numbers of those with the lowest incomes living with one of these diseases, although their mortality is relatively higher when they are ill.

Chronic diseases exacerbate social inequalities with regard to life expectancy: without these, the gap in life expectancy at birth between the wealthiest and poorest would fall by more than a third.

Samuel Allain, in collaboration with **Vianney Costemalle** (DREES)

From 2012 to 2016, the gap in life expectancy at birth[1] between the wealthiest 5% of the French population and the poorest 5% was 13 years for men and 8 years for women (Blanpain, 2018). Chronic diseases could, in large part, be responsible for these inequalities as they are the most frequent causes of mortality (DREES and Santé publique France (French National Agency for Public Health), 2017).

According to the chart of diseases developed by the Caisse nationale d'Assurance maladie (French National Health Insurance Fund, CNAM), chronic diseases can be grouped into broad categories *(box 1)*, the most common of which are cardiovascular diseases (5.1 million people treated in 2019[2]), diabetes (4.0 million), chronic respiratory diseases (3.7 million), cancers (3.3 million), psychiatric diseases (2.5 million),

1. Life expectancy is the average lifetime for a population if they were exposed for their entire lives to the mortality conditions that are observed over a given period.
2. Although this study is based on the 2016-2017 period, the figures presented in the CNAM report concern 2019 because this is the first year in which these statistics are available for all mandatory health insurance schemes.

●●● neurological or degenerative diseases (1.7 million), inflammatory or rare diseases or HIV/AIDS[3] (1.3 million) and liver or pancreatic diseases (0.6 million) [CNAM, 2021].

Although age significantly increases the risk of developing a chronic disease, the social situation is another risk factor[4]. By matching healthcare data to socio-fiscal data, the EDP-Santé database makes it possible to estimate this risk factor between 2016 and 2017 *(box 2)*.

Those with the lowest incomes are 2.8 times more at risk of developing diabetes than those with the highest incomes

With the notable exception of cancers, the risk of developing one of the chronic diseases mentioned in this publication is higher among the poorest 10% of the population than among the wealthiest 10% *(graphic 1)*. With comparable age and sex, the risk ratio between these two population groups therefore varies from 0.90 to 2.79 depending on the disease studied. The chronic disease with the largest gap is diabetes: the risk of developing it is 2.79 times higher for the poorest than the wealthiest. This is followed by chronic liver and pancreatic diseases and psychiatric diseases, with respective risk ratios of 2.20 and 1.95, then neurological or degenerative diseases and cardiovascular diseases, with respective risk ratios of 1.49 and 1.36.

Furthermore, the risk of developing a chronic disease falls gradually and regularly as the standard of living[5] increases, with each tenth of the population having a lower risk than the previous tenth. However, the poorest tenth of the population does not have a higher risk of developing a cardiovascular disease or a chronic respiratory disease than the second-poorest tenth. This may be linked to the limitations of identifying diseases through using treatment *(box 2)*.

Box 1 Description of the disease categories

Diseases were categorised in compliance with the methodology of the Caisse nationale d'Assurance maladie (CNAM) [CNAM, 2018]. The following categories were kept:

> **Cardiovascular diseases:** this group includes coronary diseases (such as heart attacks), strokes, heart failure, peripheral artery disease (PAD), heart rate or block problems, valve diseases, pulmonary embolism and other cardiovascular issues.

> **Diabetes:** regardless of type.

> **Cancers**.

> **Psychiatric diseases:** this group includes psychotic disorders (such as schizophrenia), neurotic and mood disorders (such as bipolar disorder and depression), learning disabilities, addictions, psychiatric disorders starting in childhood and all other psychiatric disorders (relating to personality or behaviour).

> **Neurological or degenerative diseases:** this group includes dementia (especially Alzheimer's disease), Parkinson's disease, multiple sclerosis, paraplegia, myopathy and myasthenia, epilepsy and other neurological illnesses.

> **Chronic respiratory diseases:** this group includes asthma, chronic obstructive pulmonary disease (COPD), chronic respiratory failure, etc. Cystic fibrosis is not included in this group.

> **Liver or pancreatic diseases:** this group includes all liver and pancreas issues, excluding cystic fibrosis and diabetes.

These categories are not exclusive. For example, an individual can live with diabetes in addition to cancer. Therefore, the number of people living with a chronic disease is not equal to the total number of those living with each category of chronic disease.

Graphic 1 Standardised risk of developing a chronic disease, depending on the standard of living and the category of the disease
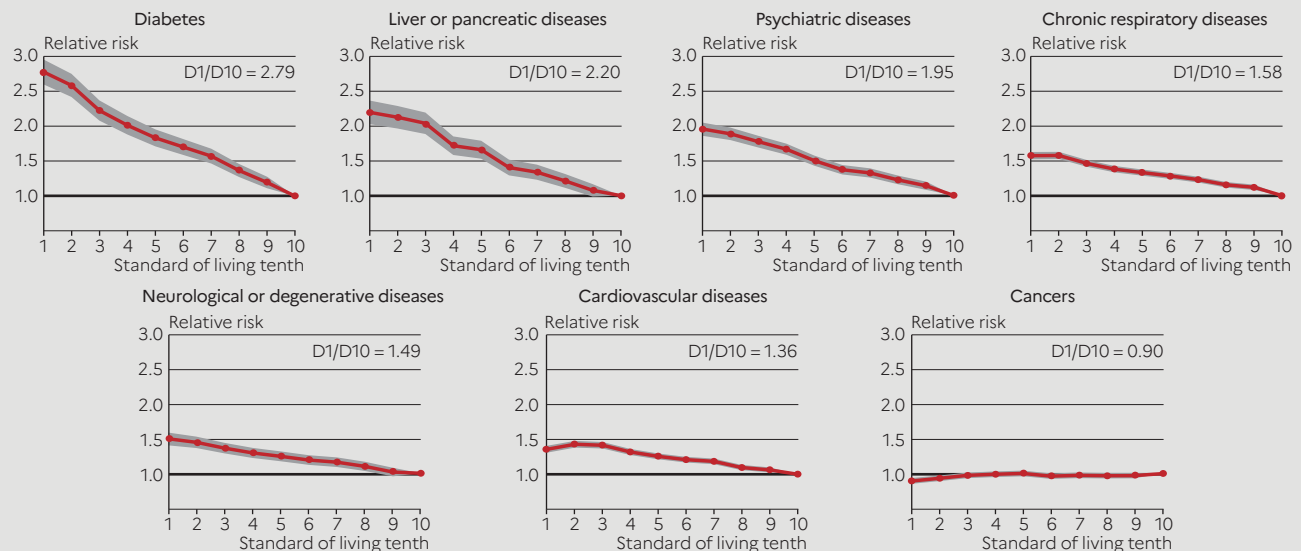
Note > The 95% confidence interval is indicated by the strip that surrounds the values.
The value given at the top right of each image corresponds to the relative risk for lower-income individuals (lowest tenth) compared to wealthier individuals (top tenth).
Interpretation > The poorest 10% have a risk of developing a chronic respiratory disease that is 1.58 times higher than for the wealthiest 10%.
Scope > 2016-2017, France (excluding Mayotte).
Source > EDP-Santé 2017.

> *Studies and results* no. 1243 © DREES

3. This category was not presented in this publication due to its heterogeneity.
4. A risk factor increases the probability of a disease appearing, without this necessarily indicating a causal effect.
5. The standard of living, also known as "equivalised disposable income", is equal to the disposable income of the household divided by the number of consumer units.

Social inequalities with regard to cancer can be distinguished as they are inverted[6]. With comparable age and sex, those who are wealthier have a risk of cancer occurring that is 1.12 times higher than for those who are poorer. Furthermore, these inequalities are not graduated, as the risk for wealthier people is equal to that for those with an average standard of living (fifth tenth). Some social disparities in the incidence *(box 3)* and mortality of cancers are well confirmed in Europe and in France (Bryere *et al.*, 2017; Chauvin *et al.*, 2017; Dalton *et al.*, 2008). Lung and oesophageal cancers most often affect disadvantaged social categories and their prognoses are also less optimistic than for those who are more privileged. In contrast, treatment for breast, prostate and melanoma cancers more often concern the more privileged social categories, which may be explained by differences in the use of screening. These social categories also have more favourable prognoses for these cancers (Bryere *et al.*, 2017; Chauvin *et al.*, 2017; Menvielle *et al.*, 2008).

There are many causes at the root of the reported social disparities, such as living and working conditions, access to care, literacy in healthcare[7] and individual behaviours, for example (Wilkinson and Marmot, 2004).

Box 2 Source, scope and method

Source

EDP-Santé data was used in this study. EDP-Santé combines data from the Permanent Demographic Sample (EDP), produced by INSEE, and that from the national system of healthcare data (SNDS), produced by CNAM (Dubost and Leduc, 2020).

Scope

The population studied includes those living in metropolitan France or in the overseas territories, except for Mayotte, for which there is not sufficient data.

Method

Typology of illnesses

The illnesses have been identified using algorithms developed by the Caisse nationale d'Assurance maladie (CNAM) [CNAM, 2018]. This was recreated based on their descriptions.
Unlike the methodology adopted by CNAM, they were applied to all individuals in EDP-Santé and not only to those whose treatment is reimbursed by Assurance maladie in the year. Despite this, the prevalence of different categories of diseases studied are at very similar levels to those published by CNAM over the same period (CNAM, 2022). The algorithms use the following events:

– diagnoses included in the French hospital discharge database (PMSI) following a hospital stay;

– diagnoses leading to treatment for a long-term condition (LTC);

– specific actions or drugs for diseases (and reimbursed by Assurance maladie).

Depending on the diseases, these events were observed over a period of one to five years. The administrative data used to identify ill individuals has an important limitation: it does not include those who did not receive treatment that is reimbursed by Assurance maladie or those who receive the treatment without having presented their health insurance card or without sending a medical form.

Standardising the rates of incidence and prevalence

Standardisation makes it possible to compare the subgroups by cancelling out confounding factors (age, for example) that influence the phenomenon studied. For example, young people are relatively poorer than others. However, they are less often diabetic, so it could therefore be believed that poverty reduces the risk of diabetes. Here, the rates of incidence and prevalence have been standardised by age (10-year categories) and by sex, with a direct standardisation method.

Choices regarding standard of living and socio-professional group

For analyses performed on socio-professional groups, taken from the population census, the weighting used is that suggested by INSEE. For retirees and the unemployed, the socio-professional group is determined by the last professional activity.

In analyses performed on the standard on living, the weighting was calculated by calibration on the margins of the census (age, sex, department). An average of the standard of living was established for the 2011-2013 period in current euros. This makes it possible to obtain an indicator before developing the disease, which is useful for incidence analyses: in this way, it is possible to partially rule out the influence that the disease has on standard of living. However, it is not possible to fully cancel out this effect, as an individual's health can begin to deteriorate before they access treatment.

The advantage of averaging the standard of living over three years is to smooth out variations in income. When the standard of living was missing for this period (10% of cases), the oldest information on this was used (from 2014, 2015, 2016 or 2017). Among this 10% of cases, 57% of individuals were minors. As their standard of living is that of their parents, it is less of an issue to include a standard of living closest to the onset of the disease.

Analyses concerning life expectancy

Several methodological choices related to measuring gaps in life expectancy according to the standard of living are different to those used by INSEE (Blainpain, 2018) because they were guided specifically by the objective of analysing chronic diseases. Therefore, for matters of statistical power, individuals were categorised by decile and not by twentieth percentile of there standard of living. Similarly, the standard of living tenths were calculated for the entire population and not according to age group. This change in norm had little impact on the results obtained. Those born abroad were included in the analysis. Lastly, INSEE studied mortality between 2012 and 2016 in those mentioned in a 2011 tax declaration, while this study focused on mortality between 2016 and 2017 in those mentioned in a tax declaration for the same period (2016-2017).

Life expectancy was calculated using the INSEE methodology (INSEE, 2018), namely by estimating mortality quotients up to 105 years and by extending these up to 120 years. With regard to differences in life expectancy due to chronic diseases, the calculations were carried out separately for the entire population (both ill and healthy individuals) and for the population that does not have the disease studied. It was not possible to calculate life expectancy for the population suffering from the disease only, as the calculation requires mortality quotients for each age. However, some diseases see very few cases at certain ages.

---

6. Adding the details for each type of cancer was not possible in this publication.

7. Healthcare literacy is the ability to access information, understand and evaluate it and to communicate it so as to promote, maintain and improve your health.

The risk of developing a chronic respiratory disease is 1.4 times higher for manual workers than for executives

Due to the correlation between socio-professional category and standard of living, socio-professional inequalities related to the risk of developing a chronic disease cover, in part, those linked to the standard of living. For example, manual workers are more likely than executives and higher intellectual professions to develop a psychiatric disease (risk multiplied by 2.02), diabetes (1.92), a neurological or degenerative disease (1.52), a liver or pancreatic disease (1.50), a chronic respiratory disease (1.43) or a cardiovascular disease (1.29) *[graphic 2]*. No significant difference in risk was highlighted in the cancer category. Employees are also more likely to develop chronic diseases than executives and higher intellectual professions, with the exception of cancers and liver and pancreatic diseases *(complementary table A)*.

However, the scale of socio-professional inequalities in view of the risk of discovering a chronic disease is not strictly identical to that related to inequalities in standard of living.

The poorest have a risk of living with a psychiatric disease that is 2.8 times higher than for those who are better off

The risk of developing a chronic disease is determined by its incidence, while the risk of living with this disease is determined by its prevalence *(box 3)*. Those who have developed a chronic disease have to live with it before either healing or dying. The progress and prognosis of the disease may differ depending on socio-professional category and the standard of living of the person being treated. The affected person's standard of living may also change, notably due to the appearance of the disease. For these reasons, social inequalities revealed by the prevalence of a chronic disease differ from those highlighted by its incidence.

Social inequalities are particularly marked with regard to the risk of living with a psychiatric disease as this is 2.81 times higher for the poorest groups than for the wealthiest *(graphic 3)*. This gap in prevalence is greater than the gap in incidence (1.95). In fact, some psychiatric diseases – if they developed early in life – may reduce opportunities for studying or having a job, which can negatively impact standard of living. A person with an average standard of living before developing this type of disease may therefore transition to a lower standard of living after it appears. This then reinforces the gaps in prevalence between the poorest and wealthiest groups when compared to the gaps in incidence.

Women face higher inequalities regarding diabetes, men face higher inequalities regarding psychiatric diseases

The analysis of the prevalence of chronic diseases categorised by standard of living and by sex[8] indicates that social inequalities are greater among women than men with regard to diabetes (risk ratio of 3.46 between the poorest and wealthiest, versus 1.90 for men) and cardiovascular diseases (risk ratio of 1.50 versus 1.23 for men) *[Table 1]*. In contrast, they are greater for men than for women with regard to psychiatric diseases (3.45 versus 2.42 for women), liver or pancreatic diseases (2.82 versus 2.43 for women) and neurological or degenerative diseases (1.63 versus 1.42 for women).

Box 3 Incidence and prevalence

Definitions

Incidence is calculated by comparing the number of new cases of a disease over a reference period (here, one year) with the population that was not ill at the start of the period. It focuses on the rate of new diseases and thus measures the risk of falling ill.

Prevalence is calculated by comparing the number of ill individuals, whether old or new cases, with the total population. It focuses on the numbers of ill individuals and thus measures the risk of living with the disease.

The incidence and prevalence of chronic diseases generally follow the same trend, i.e., a higher rate of incidence will often lead to a higher rate of prevalence. This is not the case if mortality is significant: the prevalence will remain low because individuals who become ill pass away shortly after having developed the disease.

Use

Incidence is a better indicator to evaluate social inequalities with regard to health, as it is a response to the question: "Who is at risk of falling ill?" Furthermore, it can be studied according to the social situation that preceded diagnosis of the disease, which makes it possible, in part, to differentiate the effect of social situation on health from the effect of health on social situation. In contrast, it is less precise statistically as it is calculated using the much smaller numbers of those who transition from not being ill to being ill. In addition, it is not always easy to know whether an individual who is listed as being ill for the first time in a given year corresponds to a truly new case of the disease or if the disease was not listed in the previous year. For example, an individual who went abroad may be declared healthy in a given year because they have not taken a certain drug. Once back in the home country, they would be incorrectly counted as a new case of the disease.

In contrast, the prevalence analyses may be more relevant from a care perspective as they answer the question: "Who are the ill individuals?"

Graphic 2 Standardised incidence ratio between manual workers and executives, according to the category of the disease
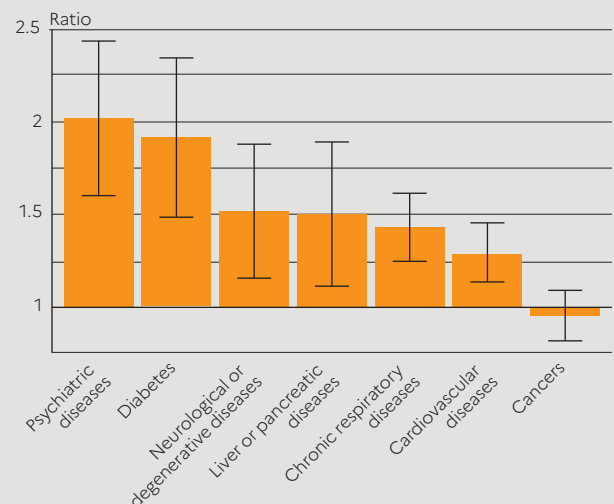
Note > The 95% confidence interval is indicated by the segments that surround the values.
Interpretation > Manual workers have a risk of developing a liver or pancreatic disease that is 1.50 times higher than that for executives and higher intellectual occupations.
Scope > 2016-2017, France (excluding Mayotte).
Source > EDP-Santé 2017.

> *Studies and results* no. 1243 © DREES

---

8. Prevalence enables a more precise analysis of subgroups than incidence because of higher statistical power *(box 3)*.

4

DREES • Études et Résultats • October 2022 • no. 1243 • Chronic diseases more often affect those on low incomes and more significantly reduce their life expectancy

Manual workers have a risk of living with a psychiatric disease that is 2.1 times higher than for executives

The risk of living with a chronic disease also varies according to the socio-professional group *(table 2)*. When ages and sex are comparable, the risk is greater for manual workers and employees than executives, except for cancers.

As in the analyses related to the standard of living, the gap in prevalence of psychiatric diseases according to socio-professional category is greater among men. With regard to diabetes, this gap is greater among women *(complementary table B)*.

In addition, it was the case only for women that executives more often live with cancer than artisans, traders and company heads, employees and manual workers. One of the possible explanations is that breast cancer is the most common cancer among women and that it is more often detected in privileged women (Bryere *et al.*, 2017; Chauvin *et al.*, 2017; Dalton *et al.*, 2008). This difference may be due to the fact that screening is more frequent among executives than other professions.

Lastly, among farmers, the prevalence of cancers and liver and pancreatic diseases is lower than for executives, which is not justified by significant gaps in incidence *(complementary table A)*. One of the potential explanations is that ill farmers have a shorter life expectancy than ill executives.

Table 1 Relative risk of living with a chronic disease for the poorest compared to the wealthiest, according to sex and category of the disease

Category	Women	Men
Cancers	**0.74** [0.72; 0.76]	**0.82** [0.80; 0.84]
Diabetes	**3.46** [3.37; 3.56]	**1.90** [1.86; 1.93]
Cardiovascular diseases	**1.50** [1.47; 1.54]	**1.23** [1.21; 1.25]
Liver or pancreatic diseases	**2.43** [2.27; 2.60]	**2.82** [2.67; 2.98]
Neurological or degenerative diseases	**1.42** [1.37; 1.47]	**1.63** [1.57; 1.69]
Psychiatric diseases	**2.42** [2.36; 2.49]	**3.45** [3.34; 3.56]
Chronic respiratory diseases	**1.73** [1.69; 1.78]	**1.64** [1.60; 1.68]

Note > The 95% confidence interval is indicated between square brackets under the value.
Interpretation > The poorest women (lowest tenth) have a risk of living with diabetes that is 3.46 times higher than for the wealthiest women (highest tenth). The real value is between 3.37 and 3.56, with a probability of 95%.
Scope > 2016-2017, France (excluding Mayotte).
Source > EDP-Santé 2017.

> *Studies and results* no. 1243 © DREES

Graphic 3 Standardised risk of developing a chronic disease, according to the standard of living and the category of the disease
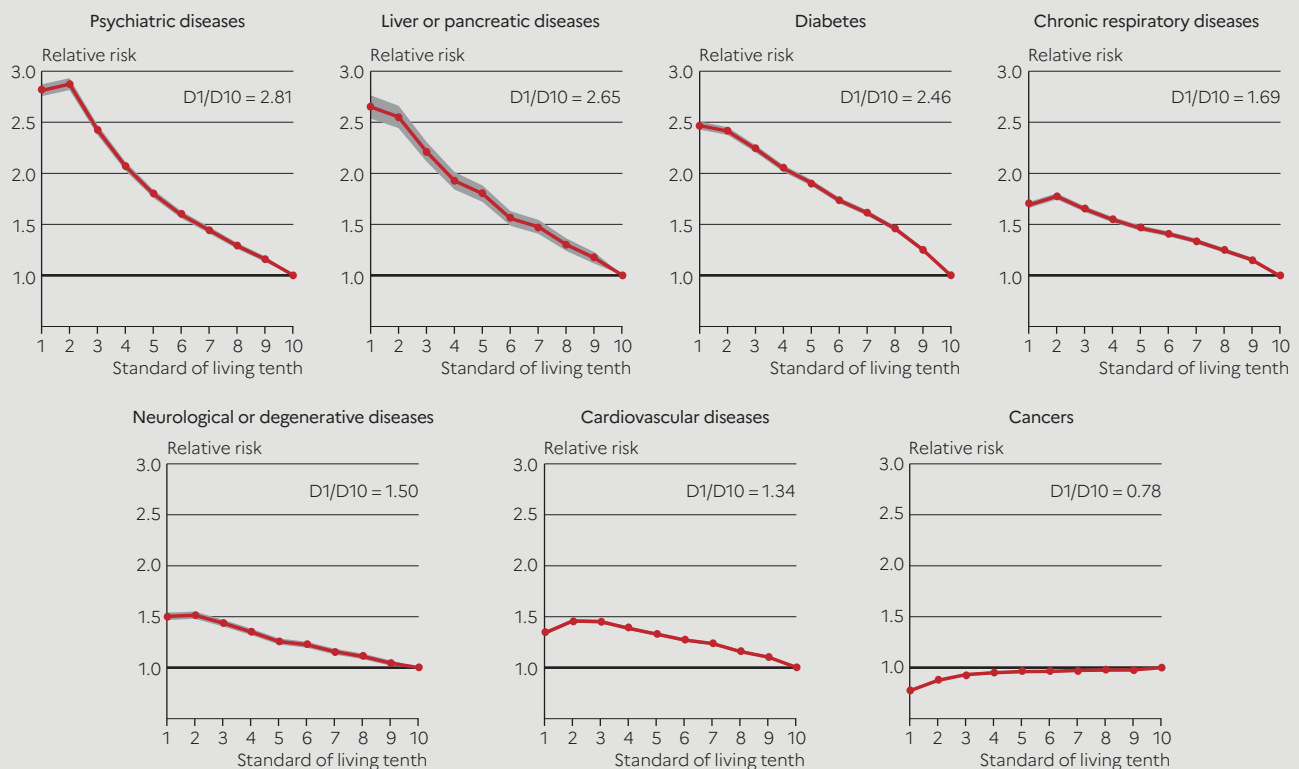
Note > The 95% confidence interval is indicated by the strip that surrounds the values.
The value given at the top right of each image corresponds to the relative risk for lower-income individuals (lowest tenth) compared to wealthier individuals (top tenth).
Interpretation > The poorest 10% have a risk of living with a chronic respiratory disease that is 1.69 times higher than for the wealthiest 10%.
Scope > 2016-2017, France (excluding Mayotte).
Source > EDP-Santé 2017.

> *Studies and results* no. 1243 © DREES

5

DREES • Études et Résultats • October 2022 • no. 1243 • Chronic diseases more often affect those on low incomes and more significantly reduce their life expectancy

Chronic diseases increase inequalities in life expectancy

At all ages, people suffering from a chronic disease have a higher risk of death than those who are unaffected. This is the same for those on a lower income compared to those who are wealthier (*complementary graphic A*). These two effects combine in such a way that a lower-income individual suffering from a chronic disease has a relatively higher risk of dying.

Table 2 Prevalence of categories of disease by socio-professional group, with regard to executives

Category	Farm workers	Artisans, traders, company heads	Executives and higher intellectual professions	Intermediate professions	Employees	Workers
Cancers	0.85 [0.70; 0.99]	0.89 [0.83; 0.95]	1.00	0.99 [0.94; 1.05]	0.93 [0.88; 0.98]	0.86 [0.82; 0.91]
Diabetes	1.27 [1.17; 1.37]	1.36 [1.27; 1.46]	1.00	1.21 [1.14; 1.28]	1.59 [1.50; 1.68]	1.88 [1.78; 1.98]
Cardiovascular diseases	1.19 [1.13; 1.25]	1.21 [1.15; 1.27]	1.00	1.11 [1.06; 1.16]	1.20 [1.15; 1.26]	1.32 [1.26; 1.37]
Liver or pancreatic diseases	0.73 [0.56; 0.90]	1.26 [0.98; 1.54]	1.00	1.17 [0.99; 1.34]	1.40 [1.19; 1.61]	1.57 [1.33; 1.80]
Neurological or degenerative diseases	1.44 [1.12; 1.77]	1.10 [0.97; 1.22]	1.00	1.15 [1.03; 1.26]	1.30 [1.18; 1.43]	1.38 [1.25; 1.52]
Psychiatric diseases	1.12 [0.97; 1.26]	1.35 [1.17; 1.52]	1.00	1.40 [1.28; 1.52]	1.87 [1.71; 2.03]	2.08 [1.90; 2.26]
Chronic respiratory diseases	1.18 [1.00; 1.35]	1.22 [1.10; 1.35]	1.00	1.14 [1.06; 1.22]	1.33 [1.24; 1.41]	1.46 [1.36; 1.56]

**Note >** The 95% confidence interval is indicated between square brackets under the value.
Interpretation > Employees have a risk of living with diabetes that is 1.59 times higher than for executives and higher intellectual professions. The real value is between 1.50 and 1.68, with a probability of 95%.
Scope > 2016-2017, France (excluding Mayotte).
Source > EDP-Santé 2017.

> *Studies and results* no. 1243 © DREES

Graphic 4 Inequalities in life expectancy due to chronic diseases
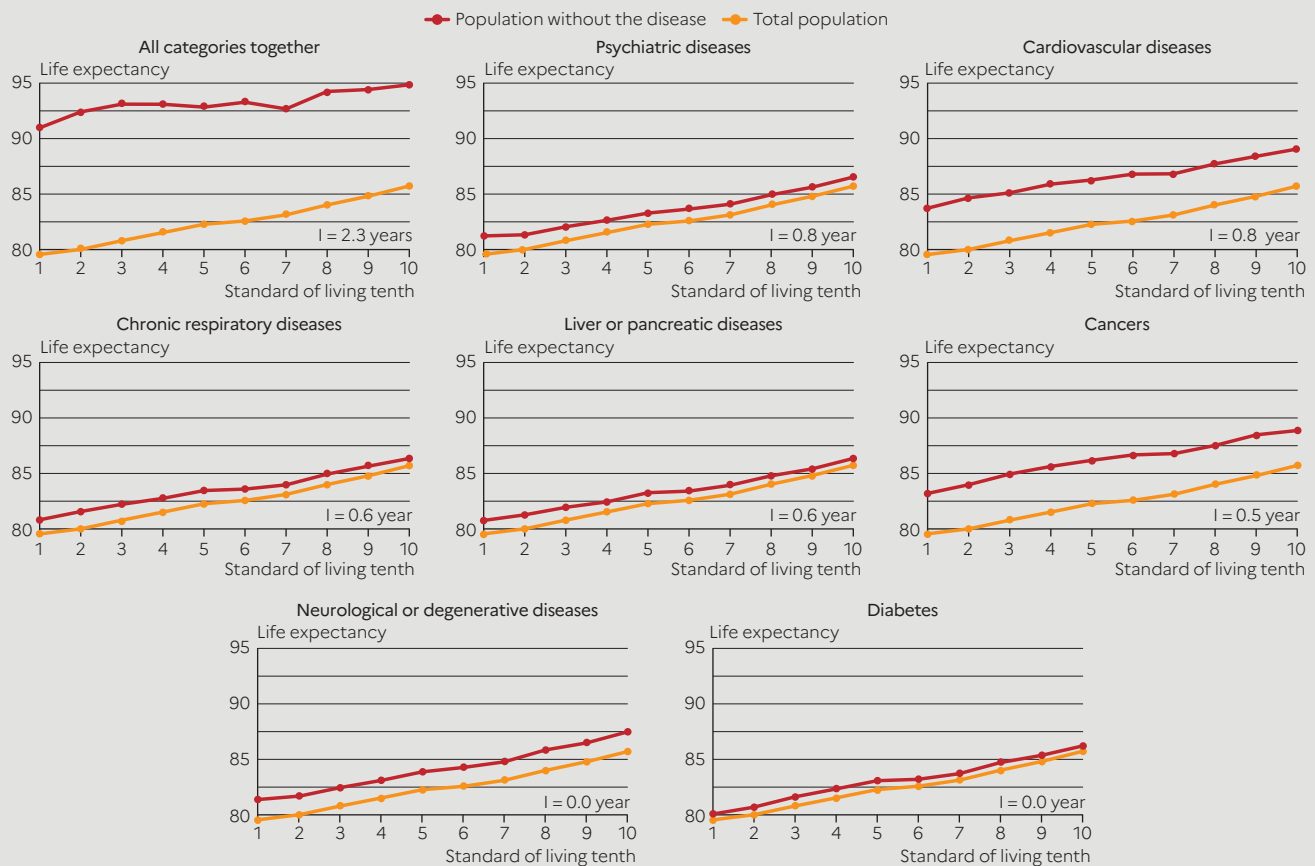
Note > Value I represents inequalities in life expectancy due to the disease, defined as the gap between inequalities in life expectancy in the total population (life expectancy in the poorest tenth – life expectancy in the wealthiest tenth) and inequalities in life expectancy of the population without the disease (life expectancy of the poorest tenth of the population without the disease – life expectancy of the wealthiest tenth of the population without the disease).
Interpretation > The wealthiest individuals who do not have a chronic respiratory disease have a life expectancy of 86.4 years.
Scope > 2016-2017, France (excluding Mayotte).
Source > EDP-Santé 2017.

> *Studies and results* no. 1243 © DREES

6

DREES • Études et Résultats • October 2022 • no. 1243 • Chronic diseases more often affect those on low incomes and more significantly reduce their life expectancy

Life expectancy summarises mortality conditions over a period and for a given subgroup. Between 2016 and 2017, the estimated life expectancy based on the sample used in this study was 85.2 years for women and 79.8 for men *(box 2)*.

The chronic diseases used in this publication have a significant impact on life expectancy. Given the observed mortality conditions, those who never develop a chronic disease are likely to live much longer on average: 94.6 years for women (equal to +9.3 years) and 91.8 years for men (equal to +12.0 years). However, few people avoid these diseases as they get older: 78% of those aged 50 to 54 years have none of these diseases, versus 49% for those aged 70 to 74 years and 25% of those aged 90 to 94 years *(com-plementary graphic B)*. This strong drop with age is partly due to cardiovascular diseases, which affect 51% of those aged 90 to 94 years.

Chronic diseases exacerbate social inequalities in life expectancy[9]. More specifically, within the population that does not suffer from a chronic disease, the difference in life expectancy is 3.8 years between the wealthiest and poorest individuals. If we include those who are ill, this difference in life expectancy is multiplied by 1.6. This is then 6.2 years, equal to an additional 2.3 years *(graphic 4)*. Psychiatric diseases (+0.8 years) and cardiovascular diseases (+0.8 years) have the greatest impact on widening the gaps in life expectancy. ●

---

9. Chronic diseases increase the inequalities in life expectancy, both *via* the differences in incidence of these diseases (more people affected every year among those with lower incomes) and *via* differences in mortality.

Key words: (Chronic disease) (Social inequality) (Social healthcare inequalities) (Standard of living) (Life expectancy) (Cancer)

Data linked to the study: https://drees.solidarites-sante.gouv.fr/publications-communique-de-presse/etudes-et-resultats/les-maladies-chroniques-touchent-plus-souvent

Source codes: https://gitlab.com/DREES_code/public/etudes/er1243

Learn more

> **Blanpain, N.** (2018). L'espérance de vie par niveau de vie : chez les hommes, 13 ans d'écart entre les plus aisés et les plus modestes. Insee, *Insee Première*, 1687.

> **Bryere, J., Dejardin, O., Launay, L.,** *et al.* (2017). Environnement socioéconomique et incidence des cancers en France. *Bulletin épidémiologique hebdomadaire*, 4, p. 68-77.

> **Chauvin, P., Lesieur, S., Vuillermoz, C.** (2017). *Les inégalités sociales en soins de cancérologie : comprendre pour adapter les pratiques. Rapport pour l'ARS Île-de-France.*

> **Dalton, S. O., Schüz, J., Engholm, G.,** *et al.* (2008). Social inequality in incidence of and survival from cancer in a population-based study in Denmark: 1994-2003: summary of findings. *European Journal of Cancer,* 44(14).

> **Dubost, C.-L., Leduc, A.** (2020, octobre). L'EDP - Santé : un appariement des données socio-économiques de l'échantillon démographique permanent au Système national des données de santé. *Les dossiers de la DREES*, 66.

> **Institut national de la statistique et des études économiques (Insee)** (2018). Les indicateurs démographiques. Insee, *Sources et méthodes*.

> **Direction de la recherche, des études, de l'évaluation et des statistiques (DREES), Santé publique France** (2017) *L'état de santé de la population en France. Rapport 2017.* Paris, France : DREES, Santé publique France.

> **Menvielle, G., Leclerc, A., Chastang, J.-F., Luce, D.** (2008). Inégalités sociales de mortalité par cancer en France : état des lieux et évolution temporelle. *Bulletin épidémiologique hebdomadaire*, 33, p. 289-292.

> **Caisse nationale d'Assurance maladie (CNAM)** (2022). *Data pathologies.* Disponible à partir de l'url : https://data.ameli.fr [page consultée le 16 septembre 2022].

> **Caisse nationale d'Assurance maladie (CNAM)** (2021, juillet). *Rapport Charges et produits. Améliorer la qualité du système de santé et maîtriser les dépenses : propositions de l'Assurance maladie pour 2022.* Paris, France : CNAM.

> **Caisse nationale d'Assurance maladie (CNAM)** (2018). *Méthodologie générale de la cartographie des pathologies, version G5 (années 2012 à 2016).* Paris, France : CNAM.

> **Wilkinson, R., Marmot, M.** (2004). *Les déterminants sociaux de la santé : les faits* (2ᵉ édition). Copenhague, Danemark : Bureau régional de l'Europe, Organisation mondiale de la Santé.