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ABSTRACT

Gender Heterogeneity in Self-Reported Hypertension*

We investigate the gender gap in hypertension misreporting using the French Constances cohort. We show that false negative reporting of hypertension is more frequent among men than among women, even after conditioning on a series of individual characteristics. As a second step, we investigate the causes of the gender gap in hypertension misreporting. We show that women go to the doctor more often than men do and that they have better knowledge of their family medical history. Once these differences are taken into account, the gender gap in false negative reporting of hypertension is reversed. This suggests that information acquisition and healthcare utilisation are crucial ingredients in fighting undiagnosed male hypertension.

JEL Classification: I10, I12, J18

Keywords: gender, objective health, subjective health, hypertension, false negative reporting

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Introduction

There is evidence in the literature that self-reported health is subject to errors (Jones and Wildman, 2008). When asked about their own health, individuals make reporting errors either because of their comprehension of the survey questions asked or because of their expectations about what good health means or because of their lack of knowledge of their true health status. These errors systematically vary in a number of dimensions including education (Bago d'Uva et al., 2011; Schneider et al., 2012), income (Etilé and Milcent, 2006) and age (Bago d'Uva et al., 2008; Lindeboom and Van Doorslaer, 2004). Another striking dimension of heterogeneity is gender: men tend to report better self-rated health than women, although their probability of dying is higher than women's throughout their life – see Oksuzyan et al. (2018) and Cambois et al. (2011).

Men's reporting behaviour is an issue for public health if they overstate their health status because they are unaware that they are sick. This issue is particularly relevant in the case of silent diseases which produce no clinically obvious symptoms or signs. Individuals may then suffer from a pathology without being aware of it – at least in the first phases of the disease. This is the case for diabetes but also osteoporosis, skin cancer, fatty liver disease, and hypertension, for example. This unawareness may generate serious health consequences since information on one's health status has been shown to have a critical impact on treatment and healthy behaviours - see Slade (2012) and Zhao et al. (2013).

In this paper, we study reporting errors concerning hypertension, one of the most widespread chronic diseases in the world. According to the World Health Organisation, 20% of women and 25% of men had hypertension in 2015.[1] Elevated blood pressure affected 1.13 billion individuals worldwide at that date. In the USA, the prevalence of hypertension was even higher since 45% of American adults were suffering from elevated blood pressure in 2017 (Lakshmi et al., 2020), while nearly half a million deaths included hypertension as a primary or contributing cause in 2018, according to the Centers for Disease Control and Prevention (CDC, 2018).

Because, in the first stages of the disease, hypertension is essentially asymptomatic, many individuals suffering from elevated blood pressure are unaware of their condition. Hypertension awareness is however of crucial importance since, if diagnosed early enough, elevated blood

[1] See https://www.who.int/news-room/fact-sheets/detail/hypertension

pressure can be treated by changes in lifestyles (increasing exercise, stopping smoking, reducing alcohol consumption) and diets (eating more fruits and vegetables, reducing salt and trans fats intake). In contrast, if diagnosed later in the course of the disease, a medical treatment will be necessary, while untreated hypertension can lead to severe complications including heart attacks, heart failure, stroke, kidney damage as well as neurodegenerative disorders including Alzheimer's disease.

In this paper, we investigate the gender dimension of hypertension misreporting using the French *Constances* Cohort. This cohort contains 186,501 individuals enrolled between 2012 and 2019 whom we observe upon enrolment. It has information on self-reported hypertension as well as blood pressure as measured by a nurse. It also contains a wealth of individual characteristics and extensive information on individuals' personal and family medical history. We first investigate the heterogeneity in hypertension reporting across gender. We find that false negative reporting of hypertension - i.e. reporting not to suffer from hypertension while doing so - is more frequent among men than among women, even after conditioning on a number of individual characteristics such as age, obesity, education, occupation and income. As a second step, we investigate the causes of the gender gap in hypertension misreporting. We first show that the number of visits men made to their doctor in the three years prior to inclusion is significantly smaller than for women. We show that men are also less aware than women of their family medical history. To the extent that hypertension has a genetic component and that doctors are more likely to test patients if they are aware that they are at risk of hypertension, this reduces the probability that men's blood pressure be measured. As a matter of fact, when the number of doctor's visits as well as parental health are controlled for, the gender gap in false negative reporting of hypertension is reversed: men suffering from hypertension turn out to be more likely to report their condition than women. This result is consistent with the idea that, being objectively more at risk of hypertension, men get tested more frequently than women, conditional on going to the doctor and letting her know about their family medical history.

1 Previous Research and Contribution

Our paper relates to two strands of literature. The first one focuses on differences in health-reporting behaviour across gender. The starting point of this literature is the observation that women tend to report poorer health than men in many dimensions: disability, functional limitations, depression - see Palacios-Ceña et al. (2012), Oksuzyan et al. (2010) and Salk et al. (2017).

Several explanations have been put forward to account for this gap. Case and Paxson (2005) provide evidence that the incidence of non-acute disabling health troubles is larger among women while lethal conditions are more frequent among men. Cambois et al. (2017) suggest that the fact that women are more exposed to unskilled first jobs, current and past inactivity and unemployment contributes to their excess depressive symptoms. They also find that over-representation of current inactivity, past interruptions and downward career paths among women contributes positively to their excess physical limitations. Other studies suggest that social roles are crucial in explaining why women are disadvantaged as regards self-reported health. Bambra et al. (2009) indeed suggest that tensions between the traditional roles of women as wife and mother and the new pressures for women to work may account for their lower levels of self-reported health, in particular in countries with traditional cultural norms and hence little childcare support. An alternative explanation is that women would be more willing to admit health problems (Caroli and Weber-Baghdiguian, 2016; Courtenay, 2000). However, recent evidence provided by Oksuzyan et al. (2019) suggests that there is no robust gender gap in health reporting, the main difference being between younger individuals who tend to under-report good health and older ones who tend to over-report it, be they men or women.

In this paper, we consider gender heterogeneity in health-reporting behaviour regarding one specific condition, i.e. hypertension. Our data allow us to compare self-reports with the results of measurements made by a nurse, which is usually not done in the above-mentioned literature. Researchers typically develop methods to assess the effect of gender on under or over-reporting of good/bad health using only self-reported information (on self-rated health, chronic conditions, functional limitations etc.) - see Jürges (2007). In the present research we go one step further and compare those self-reports to the results of more objective blood pressure measures. We show that men consistently under-report their hypertension as compared to what is revealed by blood pressure measurement. This is also the case for women but to a lesser extent.

Our research also relates to the literature on undiagnosed hypertension. Scholars in epidemiology have extensively studied the scope of undiagnosed hypertension in a wide array of countries including the United States (Foti et al., 2019; Johnston et al., 2009), Canada (Leung et al., 2020), France (Fenech et al., 2020), Australia, Finland, Germany, Ireland, Italy, Japan, New Zealand, South Korea, Spain and the United Kingdom (NCD-RisC, 2019) but also South Africa (Thomas et al., 2018), India (Anchala et al., 2014; Prenissl et al., 2019) and China (Lv et al., 2018). They emphasise the importance of age, obesity, but also education and income as factors associated with undiagnosed hypertension. Thomas et al. (2018) underline the importance of healthcare utilisation in hypertension awareness in South-Africa. In the present paper, we show that it is also an important factor of the gender gap in false negative reporting of hypertension in France. We add to this literature by emphasising that knowledge of one's own family medical history is also a key determinant of hypertension misreporting, in particular among men.

2 Empirical Strategy

2.1 Objective and Subjective hypertension

We first estimate separately the probability that an individual reports and objectively suffers from hypertension using a linear probability model. The probability of reporting hypertension is modelled as:

$$y_{i1} = \alpha_{10} + \alpha_{11} M_i + \boldsymbol{X_i} \boldsymbol{\alpha_{12}} + \epsilon_{i1} \tag{1}$$

where y_{i1} is equal to 1 if the individual self-reports hypertension and 0 otherwise. M_i is a dummy variable equal to 1 if the individual is a male and 0 otherwise. $\boldsymbol{X_i}$ is a vector of individual-level controls and ϵ_{i1} the error term.

The probability of objectively suffering from hypertension is modelled as:

$$y_{i0} = \alpha_{00} + \alpha_{01} M_i + \boldsymbol{X_i} \boldsymbol{\alpha_{02}} + \epsilon_{i0} \tag{2}$$

where y_{i0} is equal to 1 if the individual objectively suffers from hypertension and 0 otherwise. We report standard errors robust to heteroskedasticity given that the latter is inherent to linear probability models.

To assess whether the difference in the point estimates on M_i is significant or not across self-reported and objective hypertension, we proceed in the following way. We define a new variable y_{is} capturing either self-reported or objective hypertension:

$$y_{is} = S_i.y_{i1} + (1 - S_i).y_{i0} \tag{3}$$

where S_i is a dummy variable which we set equal to 1 when the dependent variable is self-reported hypertension (subscript $s = 1$) and to 0 when it is objective hypertension (subscript $s = 0$). Thus doing, we generate two observations for each individual in our sample.

Plugging (1) and (2) into equation (3) yields:[2]

$$y_{is} = \alpha_{00} + (\alpha_{10} - \alpha_{00})S_i + \alpha_{01}M_{is} + (\alpha_{11} - \alpha_{01})S_i \times M_{is} + \boldsymbol{X_{is}\alpha_{02}} + \boldsymbol{X_{is}} \times S_i(\boldsymbol{\alpha_{12}} - \boldsymbol{\alpha_{02}}) + u_{is} \tag{4}$$

We can then rewrite equation (4) as the following linear probability model:

$$y_{is} = \beta_0 + \beta_1 S_i + \beta_2 M_{is} + \beta_3 S_i \times M_{is} + \boldsymbol{X_{is}\beta_4} + \boldsymbol{X_{is}} \times S_i\boldsymbol{\beta_5} + u_{is} \tag{5}$$

Given that we have duplicated individual observations, we report robust standard errors that allow for clustering at the individual level.

In this setting, β_1 captures the difference between the intercepts of equations (1) and (2). β_2 captures the difference in objective hypertension (i.e. for $S_i = 0$) between men and women. β_3 is our coefficient of interest. It measures the difference in misreporting across women and men: $\beta_3 < 0$ hence implies that males under-report hypertension more than women do. It is identical to the difference between α_{11} and α_{01} in equations (1) and (2), but the advantage of estimating this new model is that it allows us to test whether this difference is statistically significant.[3]

[2] Where $u_{is} = \epsilon_{i0} + (\epsilon_{i1} - \epsilon_{i0})S_i$

[3] Alternatively, we can also estimate equations (1) and (2) using a Seemingly Unrelated Regression model. Given that both equations include identical explanatory variables, the corresponding generalised least squares is identical to equation-by-equation ordinary least squares but it allows to obtain the estimated covariance between α_{11} and α_{01} that is necessary to draw inference about the difference between the two coefficients. The test statistics provides similar results - see Greene (2018).

2.2 False Negative Reporting of Hypertension

The previous section investigates the difference in the prevalence of self-reported hypertension versus objectively measured hypertension across gender. Since we are interested in the gender difference in false negative reporting, we then estimate the following equation:

$$F_i = a_0 + a_1 M_i + \boldsymbol{X_i a_2} + \nu_i \tag{6}$$

where F_i is a dummy variable equal to 1 if individual i does not report hypertension while the measurement realised by a nurse indicates that she/he is hypertensive. It is equal to 0 if the individual who objectively suffers from hypertension reports to do so.

However, estimates obtained with this specification are likely to suffer from selection bias since reporting errors are observed only for individuals who are sick. In particular, we cannot discard the hypothesis that the error term of equation (6), ν_i, is correlated with the error term of the selection equation - i.e. equation (2) -, μ_i. In other words, conditional on the regressors, the probability to suffer from hypertension could be correlated with the probability to report (or not) hypertension. It is possible for example that individuals who are more at risk of developing hypertension are also more likely to be checked often and thus less likely to be unaware that they have hypertension once they have it, which means that the correlation of the error terms would be negative. Alternatively, individuals who are more risk tolerant or have a greater preference for the present might be more at risk of developing hypertension and less likely to undertake preventive checks, which would imply a positive correlation between the error terms.

To deal with selectivity issues, researchers sometimes jointly model the propensity for an individual to be objectively ill and the propensity to misreport illness - see Van de Ven and Van Praag (1981). While bivariate sample selection models with normal errors are theoretically identified without any restriction on the regressors, they are close to unidentified, however, if the same regressors are used in the outcome and the selection equation. Moreover, such identification relies strongly on the distributional assumptions of the error terms. Therefore, plausible estimation of a bivariate sample selection model of false negative reporting requires that some variables affecting the probability of being objectively ill be excluded from the false negatives equation. This exclusion restriction assumes that these variables only affect the probability to suffer from hypertension while they would not have any direct effect on the probability to misreport hypertension, conditional on having it. Johnston et al. (2009) suggest using information on whether the individuals' father and mother died from cardiovascular diseases before or after 60 years old. In our data, we know whether parents suffer/suffered from hypertension. However, including this variable in our analysis is likely to violate the exclusion restriction assumption. Parental hypertension may indeed affect the probability that individuals objectively suffer from hypertension but also the probability that they are aware of it, if individuals with hypertensive medical history go more often to the doctor and/or doctors are more likely to measure their blood pressure. In the absence of any good candidate for the exclusion variable, we choose not to correct for selection bias in our estimates, keeping in mind that this will have to be taken into account when interpreting our results.

3 Data

3.1 The *Constances* Cohort

Our data source is *Constances*, a large cohort recently set up by the French Institute for Medical Research (*INSERM*), meant to be representative of the French population aged 18–64 affiliated with the National Health Insurance (*Sécurité Sociale*) - see Zins et al. (2015) and Ruiz et al. (2016). Data collection started in 2012 and expanded over 8 years. The *Constances* cohort covers 85% of the population, excluding farmers, self-employed individuals and undocumented migrants. Participants are randomly selected and invited to undergo a health examination at one of the 22 health-screening centres run by the National Health Insurance throughout the country. Upon inclusion, a day-long baseline visit takes place during which rich medical data are collected, based on blood, respiratory, physical, and cognitive tests. Respondents are also asked to complete questionnaires regarding their health status, health behaviours, socioeconomic characteristics, and occupational trajectories.[4] Finally, the *Constances* cohort is matched to Social Security files so that, for each individual in the dataset, we have information

[4]Participants to the *Constances* cohort are invited every 5 years for a health examination during which their blood pressure is measured. So, longitudinal information on objective hypertension is available in the data. However, the survey question on self-reported hypertension being asked only upon inclusion, we cannot use the longitudinal dimension of the data and hence focus on the information collected at the time of inclusion.

on her healthcare expenditure, including the number and type of doctor's visits as well as all medical treatments.

By 2019, *Constances* covered 186,794 individuals. Their geographical distribution matches the national distribution of the health-screening centres where they have been recruited. Compared with non-participants, participants were more likely to be females, aged 40 or more, be out of the labor force, be in highly-skilled occupations when employed, earn above-average income, have regular medical check-ups, and not to suffer from any chronic health problem. The *Constances* study was approved by bodies regulating ethical data collection in France[5], and all participants signed a written consent.

3.2 Variables and Descriptive Statistics

The cohort has information on self-assessed health and unusually rich information on more objective health measures, including blood pressure, BMI, waist and hip size, vision and audition. Information on self-reported hypertension was obtained from answers to the following question asked by a medical doctor: "Have you ever been diagnosed with high blood pressure?". Objective blood pressure was measured by a nurse. Three measurements were made: one on each arm, one minute apart, and a third one on the "reference arm", i.e. the arm with the highest blood pressure. In the original dataset provided by the *Constances* team, both measures made on the reference arm are averaged and individuals are classified as objectively suffering from hypertension if their systolic blood pressure is higher than 140 mmHg or their diastolic blood pressure is higher than 90 mmHg or if they have been dispensed at least one antihypertensive medication in the 6 months preceding the survey. Consistent with the notations defined in Section 2, people were then coded as having $y_{i0} = 1$ if they had objective hypertension and $y_{i0} = 0$ otherwise. Individuals reporting that they had been diagnosed with hypertension were considered as self-reporting hypertension. They were coded as having $y_{i1} = 1$, while individuals not reporting hypertension were coded as having $y_{i1} = 0$. As standard in the literature in epidemiology - see, for example Menke et al. (2015) and Geiss et al. (2018) -, in the original *Constances* data, individuals reporting that they had hypertension ($y_{i1} = 1$) but whose blood pressure was found to be normal and who were not under treatment at the time of the survey

[5] Comité Consultatif pour le Traitement des Informations Relatives à la Santé (CCTIRS) and Commission Nationale Informatique et Liberté (CNIL).

were recoded as having objective hypertension ($y_{i0} = 1$). This is motivated by the fact that, in the early stages of the disease, hypertension can be treated by changing health behaviours only, without taking any medication.

The *Constances* cohort also provides information on a number of individual characteristics such as age, marital status, education (5 classes), income (7 classes), employment status as well as the health-screening centre in which the individual has been invited. We use these as controls in our main regressions, along with a dummy variable indicating whether the individual is obese (i.e. has BMI equal to or greater than 30).

We exclude pregnant women from our analysis since we do not want our results to be driven by temporary gestational hypertension. We also exclude individuals who are below age 25 and those for whom information on either subjective or objective hypertension, or individual characteristics is missing. Our final sample contains 120,712 individuals.

Table 1 provides descriptive statistics for hypertension in France from the *Constances* data. The prevalence of objective hypertension is 31.7% in the entire population. This proportion is higher for men (40.2%) than for women (23.9%). Interestingly, the difference between objective and subjective hypertension is higher for men. This finding is consistent with the fact that the proportion of false negatives turns out to be higher for men (64.2%) than for women (55.9%) - see Table 1. Overall, the proportion of individuals who do not report high blood pressure while having it is large (61%).[6]

Appendix Table A1 provides information on the differences across men and women with regard to the number of doctor's visits over the 3 years prior to inclusion, along with individual characteristics such as age, marital status, highest diploma, income, employment status, whether the individual is obese, the year when respondents were surveyed and the health-screening centre they were enrolled in. Interestingly, we see that women go much more to the doctor than men do with, on average, 6.8 visits per year as compared to only 4.7 for men. The same pattern holds when considering only visits to the GP's with a yearly average of 4.2 for women as compared to 3.3 for men.

[6] This is consistent with Fenech et al. (2020) who find that only 37.5% of individuals with elevated blood pressure are aware of it, using an earlier version of the *Constances* cohort.

4 Results

We first estimate separately the probability of suffering from and reporting hypertension - see equations (1) and (2). Results in Table 2 show that men have a higher probability of being hypertensive and of reporting hypertension than women. However, the gender difference in self-reported hypertension is much lower (+2.9 percentage points when estimated with controls) than the difference in objective hypertension (+14.4 percentage points), thus suggesting that men tend to under-report hypertension more than women do.[7]

To check whether this difference across gender is significant at conventional levels, we estimate equation (5). The coefficient of the interaction term (β_3) indeed captures the difference between subjective and objective hypertension across genders. As shown in Table 3, the corresponding point estimate is as large as -0.115 when estimated with controls. As expected, this value is the exactly same as the difference in point estimates between columns (3) and (4) of Table 2. With a standard error of 0.002, this difference turns out to be significant at the 1% level, confirming that men under-report hypertension more than women do.

We then estimate the probability for an individual to report not to be hypertensive, conditional on suffering from hypertension, i.e. false negative reporting. Results in Table 4 show that men have a higher probability to report false negatives than women (+8.3 and +5.2 percentage points respectively, when estimated without and with controls). The detailed regression results are provided in Appendix Table A3. False negative reporting tends to decrease with age and it is higher for individuals in the highest education and income categories. These results may seem counterintuitive, but they are in fact consistent with the idea that individuals who are more at risk of hypertension are more tested and hence more frequently detected than individuals with a lower objective risk. As a matter of fact, Appendix Table A2 shows that the probability of suffering from objective hypertension increases with age (since individuals in our sample all lie on the upward sloping branch of the parabola) and is higher at low levels of education and income. Results in Appendix Table A3 confirm that those individuals are more aware of their condition, probably because doctors tend to test them more.

[7] Detailed regression results are presented in Appendix Table A2.

5 Mechanisms

In this section we investigate the reasons why women have a lower probability than men to report false negatives.

A first reason may be that women are more likely to be diagnosed since they go to the doctor more often than men do, as suggested by our descriptive statistics - see Appendix Table A1. To check that this difference is significant at conventional levels and robust to controlling for individual characteristics, we re-estimate equation (1) with the number of doctor's visits as the dependent variable. As evidenced in Table 5, the difference in the total number of doctor's visits as well as in the number of visits to the GP's across gender is significant at the 1% level, whether or not our standard control variables are included in the regression. To gauge to what extent this gender gap in healthcare utilisation may account for the difference in false reporting of hypertension across men and women, we re-estimate equation (6) including the number of doctor's visits as an additional control. Column (1) of Table 6 reports the baseline result already presented in Table 4 - column (2): the gender gap in false negative reporting is as large as 5.2 percentage points when only individual characteristics are included in the regression. When adding the total number of doctor's visits (resp. the number of visits to the GP's), this gap goes down to 2.3 and 2.1 percentage points respectively, although still significant at the 1% level. This suggests that one important reason why men who suffer from hypertension under-report it more than women do is because they go to the doctor less often and hence have fewer opportunities of being diagnosed.

Given that hypertension has a genetic component, another reason why hypertensive women may have a lower probability of reporting false negatives could be that they have more information than men about their family medical history. This is plausible since women tend to be in charge of elderly parents: as emphasised by Norton (2000), beyond spouses, and in particular wives, "The other most common informal caregiver is a child, usually a daughter". If women have closer contacts with their parents than men, they are more likely to know whether the former suffer (or suffered) from hypertension. They are therefore more likely to discuss the matter with their doctor during a visit and hence have their blood pressure measured and be diagnosed. In the *Constances* questionnaire, respondents are asked to report whether their father and mother suffer/suffered from a number of health conditions including hypertension, diabetes, stroke, asthma and angina pectoris. We use these as dependent variables and regress each of them on respondents' individual characteristics including gender. As evidenced in Table 7, whatever the health condition we consider, women's parents appear to be in poorer health than men's parents. However, once controlled for children's age, women's parents have, a priori, no reason to be so. So, we interpret our findings as suggesting that women have better information than men do about their parents' health so that they are more likely to have accurate information about their own medical history. To assess whether this difference across gender contributes to explaining the gender gap in hypertension false negative reporting, we include parental health conditions as an additional control when estimating equation (6). The results are presented in column (4) of Table 6. When family medical history is controlled for, the gender gap in false negative reports goes down from 5.2 to 1.4 percentage point, still significant at the 1% level though.

Interestingly, if we control both for the number of doctor's visits and for parental health, the gender gap in hypertension false negative reporting is reversed: men suffering from hypertension have a higher probability than hypertensive women to report that they have high blood pressure, with the difference across gender being significant at least at the 5% level - see Table 6 - columns (5) and (6). This result suggests that the fact that men are more likely to report false negatives, as estimated in Table 4, is entirely due to the fact that men go to the doctor less often than women and that they are less aware of their medical history. As a consequence they have fewer opportunities to get their blood pressure measured, all the more that they are less likely to mention their medical history to their doctor. Once controlled for these differences across gender, men turn out to be more accurate than women in their report of hypertension. This is consistent with the idea that, being objectively more at risk than women, men get tested more systematically once they go and see a doctor and this doctor knows that they have a family history of high blood pressure.

6 Discussion

In this paper we have shown that misreporting of hypertension is more widespread among men than among women. The evidence we provide is twofold. When estimating the probabilities of suffering from objective and self-reported hypertension separately on our full sample of individuals, we find that men both suffer more from and report more high blood pressure but that the gender gap is larger for objective than for self-reported hypertension. Moreover, among individuals with high blood pressure, the fraction of those who report not to be hypertensive is larger among men than among women. This suggests that men are more likely to report false negatives than women.

As a second step, we investigate the causes of the gender gap in hypertension misreporting. We first show that men go to the doctor less often than women. We also provide evidence suggestive of the fact that they are less aware of their family medical history than women. As a consequence, they may be less likely to mention this history to their doctor, thus further reducing the probability that their blood pressure be measured. Consistent with this interpretation, we find that once controlling for the number of doctor's visits over the three years prior to inclusion as well as parental health, men suffering from hypertension are less likely to under-report their condition than women. These findings suggest that getting men to pay more attention to their medical history and invest more in healthcare would be crucial to reduce their undiagnosed hypertension.

The fact that, overall, men are more likely to be unaware than women that they are hypertensive is a problem for public policy to the extent that unawareness negatively affects individuals' healthy behaviours. This can be documented with the *Constances* cohort. As a crude test, we consider the population of individuals with high blood pressure (hence suffering from objective hypertension). On this subsample, we investigate whether false negative reporting of hypertension has any effect on the probability that individuals be on diet.[8] We also consider whether false negative reporting affects their salt intake,[9] as well as the probability that they smoke and consume any alcohol since these are not recommended when one has high blood pressure. Finally, we also investigate the correlation between false negative reporting of hypertension and physical activity since practising sport is strongly recommended to keep blood pressure under control.[10] The raw correlations between false negative reporting and our various outcomes suggest that individuals who suffer from elevated blood pressure without being aware of it have less healthy behaviours than individuals who are aware of their condition

[8]Individuals are considered to be on diet when they answer "Yes" to the following question: "Are you currently on diet?".

[9]Salt intake is considered to be high if individuals answer the following question positively: "Do you like to eat very salty food or do you re-salt your food before tasting it?".

[10]Individuals are considered to practice physical activity if they report practising sport regularly for at least 2 hours a week in the past 12 months.

- see the upper panel of Table A4. The former are indeed less likely to be on diet, they consume more salt, are more likely to smoke and consume alcohol and they are less likely to be physically active than hypertensive individuals who know that they have high blood pressure. When controlling for individual characteristics, the point estimates on the false negative report variable remain correctly signed for all outcomes - see the lower Panel of Table A4 -. However, they are significant at conventional levels only for diet and alcohol consumption.

These findings suggest that running awareness campaigns among men to convince them to pay more attention to health and prevention issues would be crucial to reduce the prevalence of undiagnosed hypertension among them as well as the inappropriate health-related behaviours that this generates.

References

Anchala, R., N. Kannuri, H. Pant, H. Khan, O. Franco, E. Angelantonio, and P. Dorairaj (2014): "Hypertension in India: A systematic review and meta-analysis of prevalence, awareness, and control of hypertension," *Journal of hypertension*, 32, 1170–1177.

Bago d'Uva, T., M. Lindeboom, O. O'Donnell, and E. Van Doorslaer (2011): "Education-related inequity in healthcare with heterogeneous reporting of health," *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 174, 639–664.

Bago d'Uva, T., E. Van Doorslaer, M. Lindeboom, and O. O'donnell (2008): "Does reporting heterogeneity bias the measurement of health disparities?" *Health Economics*, 17, 351–375.

Bambra, C., D. Pope, V. Swami, D. Stanistreet, A. Roskam, A. Kunst, and A. Scott-Samuel (2009): "Gender, health inequalities and welfare state regimes: a cross-national study of 13 European countries," *Journal of Epidemiology & Community Health*, 63, 38–44.

Cambois, E., C. Garrouste, and A. Pailhé (2017): "Gender career divide and women's disadvantage in depressive symptoms and physical limitations in France," *SSM-population health*, 3, 81–88.

Cambois, E., C. Laborde, I. Romieu, and J.-M. Robine (2011): "Occupational inequalities in health expectancies in France in the early 2000s: Unequal chances of reaching and living retirement in good health," *Demographic Research*, 25, 407–436.

Caroli, E. and L. Weber-Baghdiguian (2016): "Self-reported health and gender: The role of social norms," *Social Science & Medicine*, 153, 220–229.

Case, A. and C. Paxson (2005): "Sex differences in morbidity and mortality," *Demography*, 42, 189–214.

CDC (2018): "*Underlying Cause of Death, 1999–2018*," CDC WONDER Online Database. Atlanta, GA.

Courtenay, W. H. (2000): "Constructions of masculinity and their influence on men's well-being: a theory of gender and health," *Social Science & Medicine*, 50, 1385–1401.

Etilé, F. and C. Milcent (2006): "Income-related reporting heterogeneity in self-assessed health: evidence from France," *Health Economics*, 15, 965–981.

Fenech, G., A. Vallée, M. Cherfan, S. Kab, M. Goldberg, M. Zins, and J. Blacher (2020): "Poor Awareness of Hypertension in France: The CONSTANCES Population-Based Study," *American journal of hypertension*, 33, 543–551.

Foti, K., D. Wang, L. Appel, and E. Selvin (2019): "Hypertension Awareness, Treatment, and Control in US Adults: Trends in the Hypertension Control Cascade by Population Subgroup (National Health and Nutrition Examination Survey, 1999–2016)," *American Journal of Epidemiology*, 188, 2165–2174.

Geiss, L. S., K. M. Bullard, R. Brinks, and E. W. Gregg (2018): "Considerations in epidemiologic definitions of undiagnosed diabetes," *Diabetes Care*, 41, 1835–1838.

Greene, W. (2018): *Econometric analysis (Eight ed.)*, New York: Pearson.

Johnston, D. W., C. Propper, and M. A. Shields (2009): "Comparing subjective and objective measures of health: Evidence from hypertension for the income/health gradient," *Journal of Health Economics*, 28, 540–552.

Jones, A. M. and J. Wildman (2008): "Health, income and relative deprivation: Evidence from the BHPS," *Journal of Health Economics*, 27, 308–324.

Jürges, H. (2007): "True health vs response styles: exploring cross-country differences in self-reported health," *Health Economics*, 16, 163–178.

Lakshmi, N., M. LeWinter, P. VanBuren, and H. Dauerman (2020): "Decade-Long Temporal Trends in U.S. Hypertension-Related Cardiovascular Mortality," *Journal of the American College of Cardiology*, 20, 2644–2646.

Leung, A., J. Williams, F. McAlister, N. Campbell, and R. Padwal (2020): "Worsening Hypertension Awareness, Treatment, and Control Rates in Canadian Women Between 2007 and 2017," *Canadian Journal of Cardiology*, 36, 732–739.

Lindeboom, M. and E. Van Doorslaer (2004): "Cut-point shift and index shift in self-reported health," *Journal of Health Economics*, 23, 1083–1099.

Lv, X., H. Niu, Y. Qu, M. Li, L. Li, X. Ma, S. Jiang, C. Gao, R. Wang, P. Zhang, and b. li (2018): "Awareness, treatment and control of hypertension among hypertensive patients aged 18 to 59 years old in the northeast of China," *Scientific Reports*, 8, 1–10.

Menke, A., S. Casagrande, L. Geiss, and C. C. Cowie (2015): "Prevalence of and trends in diabetes among adults in the United States, 1988-2012," *Jama*, 314, 1021–1029.

NCD-RisC (2019): "Long-term and recent trends in hypertension awareness, treatment, and control in 12 high-income countries: an analysis of 123 nationally representative surveys," *The Lancet*, 394, 639–651.

Norton, E. (2000): "Chapter 17 Long-term Care," *Handbook of Health Economics*, 1, 955–994.

Oksuzyan, A., E. Crimmins, Y. Saito, A. O'Rand, J. W. Vaupel, and K. Christensen (2010): "Cross-national comparison of sex differences in health and mortality in Denmark, Japan and the US," *European Journal of Epidemiology*, 25, 471–480.

Oksuzyan, A., M. J. Dańko, J. Caputo, D. Jasilionis, and V. M. Shkolnikov (2019): "Is the story about sensitive women and stoical men true? Gender differences in health after adjustment for reporting behavior," *Social Science & Medicine*, 228, 41–50.

Oksuzyan, A., J. Gumà, and G. Doblhammer (2018): "Sex differences in health and survival," in *A demographic perspective on gender, family and health in Europe*, Springer, Cham, 65–100.

Palacios-Ceña, D., R. Jiménez-García, V. Hernández-Barrera, C. Alonso-Blanco, P. Carrasco-Garrido, and C. Fernández-de-las Peñas (2012): "Has the prevalence of disability increased over the past decade (2000–2007) in elderly people? A Spanish population-based survey," *Journal of the American Medical Directors Association*, 13, 136–142.

Prenissl, J., J. Manne-Goehler, L. Jaacks, P. Dorairaj, A. Awasthi, A. Bischops, R. Atun, T. Bärnighausen, J. Davies, S. Vollmer, and P. Geldsetzer (2019): "Hypertension screening, awareness, treatment, and control in India: A nationally representative cross-sectional study among individuals aged 15 to 49 years," *PLOS Medicine*, 16, 1–18.

Ruiz, F., M. Goldberg, S. Lemonnier, A. Ozguler, E. Boos, A. Brigand, V. Giraud, T. Perez, N. Roche, and M. Zins (2016): "High quality standards for a large-scale prospective population-based observational cohort: Constances," *BMC Public Health*, 16, 877.

Salk, R. H., J. S. Hyde, and L. Y. Abramson (2017): "Gender differences in depression in representative national samples: Meta-analyses of diagnoses and symptoms." *Psychological bulletin*, 143, 783.

Schneider, U., C. Pfarr, B. S. Schneider, and V. Ulrich (2012): "I feel good! Gender differences and reporting heterogeneity in self-assessed health," *The European Journal of Health Economics*, 13, 251–265.

Slade, A. N. (2012): "Health investment decisions in response to diabetes information in older Americans," *Journal of Health Economics*, 31, 502–520.

Thomas, R., R. Burger, and K. Hauck (2018): "Richer, wiser and in better health? The socioeconomic gradient in hypertension prevalence, unawareness and control in South Africa," *Social Science & Medicine*, 217, 18–30.

Van de Ven, W. P. and B. M. Van Praag (1981): "The demand for deductibles in private health insurance: A probit model with sample selection," *Journal of Econometrics*, 17, 229–252.

Zhao, M., Y. Konishi, and P. Glewwe (2013): "Does information on health status lead to a healthier lifestyle? Evidence from China on the effect of hypertension diagnosis on food consumption," *Journal of Health Economics*, 32, 367–385.

Zins, M., M. Goldberg, et al. (2015): "The French CONSTANCES population-based cohort: design, inclusion and follow-up," *European Journal of Epidemiology*, 30, 1317–1328.

Table 1: Prevalence of Self-reported and Objective Hypertension by Gender

	All (1)	Males (2)	Females (3)	T–test (4)
Objective hypertension	0.317	0.402	0.239	0.16***
Subjective hypertension	0.124	0.144	0.105	0.04***
False Negative Reporting	0.610	0.642	0.559	0.08***
N	120,712	58,011	62,701	120,712

Note: ***Statistically significant at the 1% level; ** at the 5% level; * at the 10% level. Columns (2) and (3) report the mean prevalence for males and females, respectively. Column (4) reports the test for equal means. False negative reporting corresponds to a situation in which individuals objectively suffer from hypertension while not reporting to do so.

Table 2: Self-reported and Objective Hypertension

	Self-reported hypertension (1)	Objective hypertension (2)	Self-reported hypertension (3)	Objective hypertension (4)
Man	0.038***	0.163***	0.029***	0.144***
	(0.002)	(0.003)	(0.002)	(0.002)
Controls	No	No	Yes	Yes
R^2	0.003	0.031	0.155	0.245
N	120,712	120,712	120,712	120,712

Note: Columns (1) and (3) provide estimates of equation (1). Columns (2) and (4) provide estimates of equation (2). Control variables include age, age squared, a dummy variable for obesity, marital status, full-time and part-time employment, highest diploma (5 classes), income (7 classes), a dummy variable for the health-screening centre individuals were enrolled in and year dummies. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Double Sample Model – Hypertension

	Probability of hypertension (1)	Probability of hypertension (2)
Subjective hypertension	-0.134***	-0.030
	(0.001)	(0.027)
Man	0.163***	0.144***
	(0.003)	(0.002)
Subjective hypertension × Man	-0.124***	-0.115***
	(0.002)	(0.002)
Controls	No	Yes
R^2	0.075	0.258
N	241,424	241,424

Note: This table provides estimates of equation (5). Control variables include age, age squared, a dummy variable for obesity, marital status, full-time and part-time employment, highest diploma (5 classes), income (7 classes), a dummy variable for the health-screening centre individuals were enrolled in and year dummies. In col (2), interaction terms between the previous controls and *Subjective hypertension* are included. Standard errors are clustered at the individual level. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: False Negative Reporting

	False Negative Reporting (1)	False Negative Reporting (2)
Conditional on suffering from hypertension		
Man	0.083***	0.052***
	(0.005)	(0.005)
Controls	No	Yes
R^2	0.007	0.093
N	38,287	38,287

Note: This table provides estimates of equation (6). Control variables include age, age squared, a dummy variable for obesity, marital status, full-time and part-time employment, highest diploma (5 classes), income (7 classes), a dummy variable for the health-screening centre individuals were enrolled in and year dummies. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Number of Doctor's Visits

	Total number of doctor's visits		Number of visits to the GP	
	(1)	(2)	(3)	(4)
Man	-6.548***	-6.431***	-2.851***	-2.936***
	(0.093)	(0.094)	(0.055)	(0.054)
Controls	No	Yes	No	Yes
R^2	0.039	0.098	0.021	0.138
N	120,712	120,712	120,712	120,712

Note: This table provides estimates of equation (1) with the number of doctor's visits as the dependent variable. Control variables include age, age squared, a dummy variable for obesity, marital status, full-time and part-time employment, highest diploma (5 classes), income (7 classes), a dummy variable for the health-screening centre and year dummies. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: False Negative Reporting - Mechanisms

	False Negative Reporting					
	(1)	(2)	(3)	(4)	(5)	(6)
Man	0.052***	0.023***	0.021***	0.014***	-0.012**	-0.013***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Total number of doctor's visits		-0.005***			-0.005***	
		(0.000)			(0.000)	
Number of GP visits			-0.010***			-0.010***
			(0.000)			(0.000)
Father's Diabetes				0.020**	0.021***	0.022***
				(0.008)	(0.008)	(0.008)
Father's Stroke				-0.009	-0.008	-0.006
				(0.009)	(0.009)	(0.009)
Father's Hypertension				-0.189***	-0.184***	-0.181***
				(0.006)	(0.006)	(0.006)
Father's Asthma				0.002	0.007	0.010
				(0.019)	(0.019)	(0.019)
Father's Angina				-0.012	-0.011	-0.011
				(0.012)	(0.012)	(0.012)
Mother's Diabetes				-0.009	-0.007	-0.005
				(0.008)	(0.008)	(0.008)
Mother's Stroke				0.009	0.011	0.012
				(0.010)	(0.009)	(0.009)
Mother's Hypertension				-0.184***	-0.181***	-0.178***
				(0.005)	(0.005)	(0.005)
Mother's Asthma				0.008	0.012	0.012
				(0.018)	(0.018)	(0.017)
Mother's Angina				0.030*	0.029*	0.031**
				(0.015)	(0.015)	(0.015)
R^2	0.093	0.118	0.134	0.149	0.171	0.186
N	38,287	38,287	38,287	38,287	38,287	38,287

Note: This table provides estimates of equation (6). Control variables include age, age squared, a dummy variable for obesity, marital status, full-time and part-time employment, highest diploma (5 classes), income (7 classes), a dummy variable for the health-screening centre individuals were enrolled in and year dummies. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Parents' Health Conditions

	Hypertension	Diabetes	Stroke	Asthma	Angina pectoris
	(1)	(2)	(3)	(4)	(5)
Mother's Health Condition					
Man	-0.075***	-0.006***	-0.011***	-0.005***	-0.008***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Controls	No	No	No	No	No
R^2	0.008	0.000	0.001	0.000	0.001
N	120,712	120,712	120,712	120,712	120,712
Man	-0.076***	-0.010***	-0.012***	-0.005***	-0.009***
	(0.025)	(0.021)	(0.022)	(0.008)	(0.012)
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.025	0.021	0.022	0.008	0.012
N	120,712	120,712	120,712	120,712	120,712
Father's Health Condition					
Man	-0.039***	-0.010***	-0.005***	-0.004***	-0.003***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Controls	No	No	No	No	No
R^2	0.003	0.000	0.000	0.000	0.000
N	120,712	120,712	120,712	120,712	120,712
Man	-0.038***	-0.011***	-0.006***	-0.004***	-0.004***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.008	0.008	0.014	0.007	0.007
N	120,712	120,712	120,712	120,712	120,712

Note: This table provides estimates of equation (1) with hypertension, diabetes, stroke, asthma and angina pectoris respectively, as the dependent variable. Control variables include age, age squared, a dummy variable for obesity, marital status, full-time and part-time employment, highest diploma (5 classes), income (7 classes), a dummy variable for the health-screening centre individuals were enrolled in and year dummies. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix

Table A1: Descriptive Statistics

	All (1)	Males (2)	Females (3)	T–test (4)
Total number of doctor's visits	17.355	13.954	20.502	-6.55***
Number of visits to the GP's	11.311	9.830	12.682	-2.85***
Living with a partner	0.751	0.784	0.720	0.06***
Age	48.416	48.846	48.018	0.83***
Obesity	0.128	0.131	0.124	0.01***
Highest diploma:				
No diploma	0.029	0.033	0.026	0.01***
Lower-secondary general education	0.059	0.053	0.063	-0.01***
Lower-secondary professional education	0.173	0.210	0.139	0.07***
High-school diploma	0.154	0.148	0.160	-0.01***
Tertiary education	0.584	0.555	0.612	-0.06***
Income category:				
Less than 450 Euros	0.004	0.005	0.003	0.00***
Between 450 and 1,000 Euros	0.029	0.028	0.031	-0.00**
Between 1,000 and 1,500 Euros	0.065	0.056	0.073	-0.02***
Between 1,500 and 2,100 Euros	0.110	0.099	0.121	-0.02***
Between 2,100 and 2,800 Euros	0.154	0.148	0.160	-0.01***
Between 2,800 and 4,200 Euros	0.310	0.314	0.305	0.01***
More than 4,200 Euros	0.280	0.307	0.255	0.05***
Don't know	0.005	0.004	0.006	-0.00***
Refuse to answer	0.042	0.038	0.045	-0.01***
Employment status:				
Not in employment	0.293	0.296	0.290	0.01*
Full time	0.597	0.662	0.537	0.12***
Part time	0.110	0.042	0.173	-0.13***
Year of the survey:				
2012	0.052	0.050	0.055	-0.00***
2013	0.123	0.118	0.127	-0.01***
2014	0.155	0.158	0.152	0.01**
2015	0.178	0.180	0.176	0.00
2016	0.206	0.212	0.200	0.01***
2017	0.214	0.209	0.218	-0.01***
2018	0.072	0.073	0.071	0.00
2019	0.001	0.001	0.000	0.00

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	All	Males	Females	T–test
	(1)	(2)	(3)	(4)
Health-screening centre				
Angoulême	0.037	0.034	0.039	-0.00***
Auxerre	0.014	0.013	0.015	-0.00*
Bordeaux	0.062	0.062	0.062	-0.00
Le Mans	0.020	0.019	0.021	-0.00*
Lille	0.020	0.021	0.020	0.00
Lyon	0.022	0.022	0.022	-0.00
Marseille	0.071	0.072	0.071	0.00
Nancy	0.067	0.068	0.066	0.00
Nîmes	0.047	0.047	0.047	0.00
Orléans	0.067	0.071	0.064	0.01***
Paris-CPAM	0.031	0.030	0.031	-0.00
Paris-IPC	0.037	0.036	0.037	-0.00
Pau	0.102	0.105	0.101	0.00*
Poitiers	0.064	0.064	0.064	-0.00
Rennes	0.046	0.047	0.045	0.00
Saint-Brieuc	0.032	0.032	0.032	-0.00
Saint-Nazaire	0.047	0.045	0.048	-0.00
Toulouse	0.060	0.057	0.063	-0.01***
Tours - La Riche	0.032	0.033	0.031	0.00
N	120,712	58,011	62,701	120,712

Table A2: Objective versus self-reported hypertension - Detailed Regression Results

	Self-reported hypertension (1)	Objective hypertension (2)	Self-reported hypertension (3)	Objective hypertension (4)
Man	0.038***	0.163***	0.029***	0.144***
	(0.002)	(0.003)	(0.002)	(0.002)
Living with a partner			0.018***	0.022***
			(0.003)	(0.003)
Age			-0.015***	-0.016***
			(0.001)	(0.001)
$Age^2/100$			0.023***	0.031***
			(0.001)	(0.001)
Obesity			0.171***	0.219***
			(0.004)	(0.004)
Highest diploma (ref: no diploma):				
Lower-secondary general education			-0.014*	-0.021**
			(0.008)	(0.009)
Lower-secondary professional education			-0.018**	-0.027***
			(0.007)	(0.008)
High-school diploma			-0.032***	-0.051***
			(0.007)	(0.008)
Tertiary education			-0.041***	-0.080***
			(0.007)	(0.008)
Income category (ref: Less than 450 Euros):				
Between 450 and 1,000 Euros			-0.016	-0.062***
			(0.017)	(0.022)
Between 1,000 and 1,500 Euros			-0.025	-0.063***
			(0.016)	(0.021)
Between 1,500 and 2,100 Euros			-0.020	-0.063***
			(0.016)	(0.021)
Between 2,100 and 2,800 Euros			-0.031*	-0.071***
			(0.016)	(0.021)
Between 2,800 and 4,200 Euros			-0.033**	-0.078***
			(0.016)	(0.021)
More than 4,200 Euros			-0.047***	-0.098***
			(0.016)	(0.021)
Don't know			-0.048***	-0.076***
			(0.018)	(0.025)
Refuse to answer			-0.036**	-0.071***
			(0.017)	(0.021)
Employment status (ref: not in employment):				
Full time			-0.008***	-0.006
			(0.003)	(0.004)
Part time			-0.004	-0.012**
			(0.004)	(0.005)
Year dummies	No	No	Yes	Yes
Health-screening centre dummies	No	No	Yes	Yes
R^2	0.003	0.031	0.155	0.245
N	120,712	120,712	120,712	120,712

Note: Columns (1) and (3) provide estimates of equation (1). Columns (2) and (4) provide estimates of equation (2).Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A3: False Negative Reporting - Detailed Regression Results

	False Negative Reporting (1)	False Negative Reporting (2)
Man	0.083***	0.052***
	(0.005)	(0.005)
Living with a partner		-0.017**
		(0.007)
Age		-0.007***
		(0.002)
$Age^2/100$		-0.002
		(0.002)
Obesity		-0.176***
		(0.006)
Highest diploma (ref: no diploma):		
Lower-secondary general education		0.015
		(0.014)
Lower-secondary professional education		0.010
		(0.013)
High-school diploma		0.013
		(0.013)
Tertiary education		0.024*
		(0.013)
Income category (ref: Less than 450 Euros):		
Between 450 and 1,000 Euros		-0.001
		(0.036)
Between 1,000 and 1,500 Euros		0.039
		(0.035)
Between 1,500 and 2,100 Euros		0.022
		(0.034)
Between 2,100 and 2,800 Euros		0.042
		(0.034)
Between 2,800 and 4,200 Euros		0.041
		(0.034)
More than 4,200 Euros		0.061*
		(0.035)
Don't know		0.088*
		(0.048)
Refuse to answer		0.056
		(0.036)
Employment status (ref: not in employment):		
Full time		0.012*
		(0.007)
Part time		-0.012
		(0.010)
R^2	0.007	0.093
N	38,287	38,287

Note: This table provides estimates of equation (6). Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A4: False Negative Reporting of Hypertension and Healthy Behaviours

	Diet	Salt	Smoking	Alcohol consumption	Physical activity
	(1)	(2)	(3)	(4)	(5)
False Negative Reporting	-0.066***	0.011**	0.034***	0.020***	-0.015*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.008)
Controls	No	No	No	No	No
R^2	0.010	0.000	0.002	0.001	0.000
N	34,391	26,436	36,797	33,717	18,173
False Negative Reporting	-0.051***	0.003	0.005	0.011***	0.007
	(0.004)	(0.005)	(0.004)	(0.004)	(0.008)
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.029	0.019	0.056	0.045	0.031
N	34,391	26,436	36,797	33,717	18,173

Note: Control variables include age, age squared, a dummy variable for obesity, marital status, full-time and part-time employment, highest diploma (5 classes), income (7 classes), a dummy variable for the health-screening centre individuals were enrolled in and year dummies. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.