Limiting health care access to undocumented immigrants: A wise option?[1]

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Abstract:

The number of undocumented migrants in high income countries has increased in recent decades, imposing considerable political, fiscal and social pressures on governments. This has fostered discussions on whether and to what extent undocumented migrants should get access to public programs and public benefits. Looking at the 2012 Spanish health reform, this is the first paper to document the impacts of a restriction on access to the health care system for undocumented migrants on health care utilization, health care system perceptions and self-reported health in a high income country.

We show that such restrictions may significantly reduce planned care for undocumented migrants and result in sharp fall in positive opinions about the health care services still left available to them. We also exploit the heterogeneity in implementing the policy across regions and report stronger effects in regions that enforced the national ban more fully. Furthermore, in the first three years since the implementation of the reform, we find suggestive evidence of a worsening in self-assessed health. This study is relevant for policymakers in the developed world, especially in countries which have recently implemented initiatives aimed at reducing the health care coverage for targeted groups, such as the UK and the US.

Keywords: Health Care Access Restrictions; Undocumented Migrants; Health Care Use; Health Outcomes; Health System Satisfaction.

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1. INTRODUCTION

The number of people migrating to high income countries has surged in the last decades, a significant proportion of which does not have a legal status in the receiving country. Data from Eurostat reveals that 618,780 non-EU citizens were found to be illegally residing in the EU in 2017, with Spain ranking in the top list of EU countries reporting the largest number of them (44,625), only after Germany (156,710), France (115,085), Greece (68,110), and the United Kingdom (54,910). [4] Furthermore, the flows of illegal immigrants to Spain are also increasing in recent years; data from Frontex (The European Border and Coast Guard Agency) shows that illegal border crossings on the Western Mediterranean sea (between Morocco and Spain) have increased significantly from 7,004 in 2015 to 9,990 in 2016, 23,063 in 2017 and 57,034 in 2018. For the case of the US, data from the PEW Research Centre states that 10.7 million unauthorized immigrants were living in the US in 2016. Increasing immigration pressures on high income countries have prompted some political parties to call for restrictions in access to public services and public benefits for immigrants as well as a stricter implementation of immigration regulations (Swain, 2019).

In this context, to our knowledge, this paper is the first to present an evaluation of the impact of introducing restrictions in public services, specifically in health care, for undocumented immigrants on three main outcomes: health care utilization, user opinions about the system and self-assessed health. We exploit a reform introduced by the Spanish government in 2012 that prevented undocumented immigrants from accessing the public health care system, with the exception of hospital emergency services, pregnancy and birth and health care for children under 18 years old. Before the 2012 reform, the health care system in Spain was universal, which means that undocumented immigrants were entitled to full health care cover in the same conditions as the native population.

Our study makes use of a unique quarterly dataset to investigate the impact of the implementation of this restriction on several health utilization outcomes, as well as on measures of health system perceptions--a parameter that is increasingly used as a health care system performance tool. We show that the reform resulted in important reductions in planned care for undocumented migrants, together with drops in the use of the emergency services. In addition, the results highlight a sharp fall in levels of overall positive opinions about the health care system, particularly with the emergency services–the only facility still accessible to undocumented immigrants. We also see that these effects are stronger in Spanish regions that implemented the national ban more fully as compared to regions that opted to introduce regional legislation to reduce its effects for the affected population. Furthermore, in the first three years following the implementation of the reform, we find suggestive evidence of a worsening trend in self-assessed health. These results have relevant

[4] In relative terms with respect to the population size, the proportion of undocumented immigrants in those countries is as follows: in Germany 1.88 per 1000 inhabitants; in France 1.71 per 1000 inhabitants; in Greece 6.35 per 1000 inhabitants; in the UK 0.82 per 1000 inhabitants; in Spain 0.94 per 1000 inhabitants.
https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20180709-1?inheritRedirect=true&redirect=%2Feurostat%2Fweb%2Fmain

implications for policymakers in the industrialised world, especially in countries which have recently implemented initiatives aimed at reducing the health care coverage for the undocumented population, such as the UK (Keith & van Ginekken, 2015). Our results could also contribute to ongoing discussions in several high income countries on introducing restrictions in health care access for targeted sub-groups of the native population, the US being a particular example.

We also add to the extensive and growing number of studies which explore the relationship between insurance cover, access to health care and self-assessed health, most importantly in the US (see e.g. Taubman et al., 2014; Currie & Gruber, 1996). For instance, a recent study on the effects of the expansion in health care coverage following the 2014 Affordable Care Act (Courtemanche et al., 2017), finds a significant increase in health care utilization after the reform, especially in regions which simultaneously implemented an expansion in the Medicaid programme. However, effects on self-reported health and risky health behaviour were less clear-cut.

There is substantial evidence of a positive association between adult and infant health outcomes and an expansion of the health care system coverage both in country specific studies (most notably in the US), and in the analysis of large samples of countries over long time periods (for instance, Moreno-Serra, R., & Smith, P., 2015). However, while there is an extensive body of literature on the effects of expanding health insurance cover on utilization and health, and on health behaviours (e.g. Dave, Kaestner, and Wehby, 2019), fewer studies have focused on the impact of reducing coverage. An example of the latter is a recent paper by Tello-Trillo (2018) which provides evidence of a substantial reduction in health care access and a worsening trend in self-reported health after the implementation of the 2005 Medicaid disenrollment reform affecting mainly childless adults in Tennessee in the US. Our study differs from this paper mainly in terms of our nation-wide scope rather than being limited to just one state or region and the policy target group in Spain being undocumented immigrants specifically. In parallel, the paper by Juanmartí et al. (2018) looks at the impact of the same Spanish reform on mortality rates of undocumented migrants and finds a significant increase (about 16%) in the mortality rates of the affected population.

This paper is structured as follows. Section 2 provides a background on the 2012 Spanish health care reform. Section 3 describes the data employed and section 4 discusses the empirical strategy. Section 5 presents the main empirical results and the sensitivity analysis performed. The final section discusses the main policy implications and concludes.

2. THE SPANISH HEALTH CARE REFORM

The Spanish National Health Service provided universal coverage until 2012. It is tax funded and predominantly operates within the public sector. Since 2002, health care administration has been totally devolved to the regions (or Autonomous Communities) (Bernal Delgado et al., 2018). Prior to 2012, one of the major reforms in the health system involving immigrants was Act 4/2000, which granted full access to

health services regardless of nationality and legal status. The only prerequisite for non-Spaniards to receive the same health services as the native population was to register as a resident of a municipality. Evidence suggests that over time there has been a persistent increase in health inequality prejudicial to the immigrant population in Spain[5]. In particular, while immigrants start with a lower income-related inequality in health outcomes than the native population, such inequalities increase over time, converging to the national figures (Hernández-Quevedo & Jiménez-Rubio, 2009a; Gotsens et al., 2015).

In April 2012, after four years of severe economic crisis in Spain, the government introduced a new law that changed the nature of the health care system. Several aspects of the health system were redefined, including the beneficiaries, its universality, the gratuitous nature of the services provided and other cost containment measures (Gallo & Gené-Badia, 2013). The 2012 law specifically linked entitlement with contribution to the system, thus excluding a large group of undocumented immigrants from receiving health care. Emergency, maternity and child care were the only services which undocumented immigrants were still able to use on the same terms as Spanish nationals.[6]

Recent reports have documented the existence of obstacles to health service access for groups of the population that were, theoretically, unaffected by the law, such as children. In some cases, undocumented individuals have also reported on being restricted from accessing emergency care (Nuño-Solinís, 2016). The new reform has also been accompanied by great confusion about the terms of the restrictions not only among the targeted population, but also among doctors and other stakeholders in the system.

Another feature of the 2012 legislative change has been its uneven implementation across Spanish regions. Some regional authorities applied strong versions of the national health care ban (see Table 2). Others introduced alternative programs to still be able to provide access to the health care system to undocumented migrants in their regions, such as in the case of the Canary Islands, Andalusia and the Basque Country (Gallo and Gené-Badia, 2013) and may be less affected by the national ban. The region of Castile-La Mancha applied the nationwide regulations in full force without restrictions, while five regions applied the national ban with some minor exceptions (Bacigalupe et al., 2016). We exploit these regional asymmetries later in our specifications.

[5] Spain has recently witnessed an unprecedented increase in its foreign population. According to the 2007 National Immigrant Survey, 2.6 million Spanish households contain at least one person born abroad (INE, Spanish Institute of Statistics, 2008), although as a result of the recent economic downturn, the figures have remained stable: in 2011, Spain received 457,650 immigrants, a slightly lower number than in 2010 (465,169) (INE, 2016).

[6] At the same time, the government announced alternative health care plans for undocumented immigrants, which have since proven to be unaffordable and even more expensive than existing private insurance plans in Spain (Nuño-Solinís, 2016).

3. DATA

We use very rich data from the *Barómetro Sanitario*, or the Spanish Health Barometer (later, SHB), which is a national survey that collects information on opinions, attitudes, utilization and perceptions of health services among a representative cross-section of the Spanish population, aged 18 and above. The Centre for Sociological Research has been conducting the survey three times a year since 1996, numbering a total sample of over 6,000 respondents per year. Data is collected by personal interview, and since households are selected randomly, respondents may include undocumented immigrants. We use data based on surveys conducted from 2008 to 2015, however we note that information on two of the outcomes of interest (perceptions about emergency care and self-assessed health) were only included from 2010 onwards. In other words, for specifically these two outcomes, the relevant period included in our analysis is only from 2010-2015.

For the purposes of this study, the post-reform period is taken as the time immediately following the implementation of the nationwide law, on 1 September 2012: Phase 3 of the 2012 survey, all the Phases of 2013, 2014 and Phases 1 and 2 of 2015). The first pre-reform period is taken from the Phase 3 of the 2011 survey and Phases 1 and 2 of 2012 (i.e., from 1 September 2011 to 1 September 2012) ; year 1 post-reform is described by Phase 3 in 2012 and Phases 1 and 2 in 2013 (i.e., from 1 September 2012 to 1 September 2013), and so on. The period after September 2015 is excluded from our analysis because legislative changes were made following the regional elections held in May, broadening the scope of the cover provided to the undocumented population in several of the regions which had been applying a stronger version of the nationwide legislation (Nuño-Solinís, 2016).

The SHB provides information on health care utilization, health status and individual opinions about the health system in the last twelve months. In capturing utilization and opinions, questions refer to specific components of the health care system such as general practitioner (GP) visits, specialist visits, general hospital care and emergency care. Opinions about general and specific health care services are rated by both actual and potential users of public health services, on a scale from 1 (very unsatisfied) to 10 (very satisfied). As discussed previously, we focus mainly on opinions about emergency care services since these are the only services which all undocumented immigrants are theoretically entitled to use after the reform.[7] The survey also includes a wide range of socioeconomic information (including age, gender, education, activity status and nationality). We generate an aggregate measure of planned health care use, designated as one if the individual has visited the GP, a specialist or a hospital, and zero if he/she has not visited any of these services.

While the primary focus of the reform is health care utilization, a parameter that can be directly determined, the impact of the law on user perceptions about the health system, or on health status, is less

[7] The exact question in the survey regarding the overall health system is: "In general, would you say that you are satisfied with the way in which the public health care system works in Spain?". Regarding emergency care, the exact survey question is: "From your own experience or the idea that you have, I would like you to evaluate the following public health services"

straightforward. Taking a recent study (Fiorentini et al., 2017) reporting a strong correlation between objective and subjective opinions about health system responsiveness, we offer the conjecture that the 2012 reform may have had a negative effect on the perceived quality of care on the part of undocumented persons. However, it is also plausible that, in times of restricted access to health care, individual expectations may be lower (Gallo and Gené-Badía, 2013) and thus positive opinions about the health system may even increase as a result. With respect to health outcomes, access to health services could translate into healthy behaviour and status improvements via information and advice given by doctors (Courtemanche et al., 2017). On the other hand, access to health insurance could also worsen health outcomes by incentivising unhealthy behaviour, which may arise as a result of ex ante moral hazard or from pure income effects. Thus, from a theoretical point of view, the impact of the reform could be ambiguous, in terms of both health and satisfaction with the system.

Similar to the few previous studies of undocumented immigrants in this context, direct information on the legal status of the individual is not available as this question is not included in the SHB survey. Thus, we adopt the approach from previous research in this field and assign documented or undocumented status to individuals according to their nationality (Amuedo-Dorantes & Lopez, 2005). Following this methodology, we calculate a proxy for each individual's undocumented status using the 2011 Census to obtain information on the number of individuals of each nationality living in Spain one year before the introduction of the reform, and comparing this with the number of residence permits taken from the Ministry of Employment and Social Security in Spain. From this, we assign a status of "undocumented" to all individuals with a nationality that shows a positive number when we subtract the number of residence permits issued for a given nationality from the number of individuals from that same nationality indicated in the 2011 Census of Spain.[8] The list of nationalities categorized as undocumented in our model can be found in Appendix Table 1A. Unlike the case of other surveys, our data enable us to identify individuals with double nationality, that is, the Spanish nationality and that of the individual's country of origin. Thus, in our baseline data, our group of interest, or the treatment group, excludes those with double nationality. The control group includes all other nationalities not included in Annex Table 1A, Spanish citizens, and individuals with double nationality.

We recognize that ours is not a perfect proxy. Of course, not all individuals with nationality from Appendix Table 1A will actually be undocumented. Some will have a residence permit and enjoy full legal status. However, given the extreme difficulty of assessing legal status at the individual level, we rely on a proxy variable. Therefore, individuals from these countries who may have legal status in Spain are also considered as part of the treatment group, i.e. subject to the health care ban. In consequence, our estimates represent a lower band of the true impact of the reform. That said, we also note that several NGOs and other organizations working in Spain have documented several cases of legal residents being denied access to the health care system after the reform (an example is illustrated in Appendix Figure 1A). In this way, our

[8] This is a similar procedure to that of Gonzalez-Enriquez (2009) for the year 2008.

treatment variable may be a reliable proxy of the affected population, to a limited extent. In any case, we also test for robustness and explore the sensitivity of our results to changes in the definition of undocumented immigrant.

4. METHODS

We start our analysis by estimating the effects of the health care ban on health care utilization, health status and perceptions about the health system for the treatment group for all Spanish regions. Although the reform was implemented with varying levels of intensity across regions, we opt to analyze first at the national level to take into account that the affected population may not have been aware of the specificities introduced at the regional level. If this is the case, then we may observe a reduction in the utilization of health care for undocumented migrants in the entire territory. Furthermore, even if the undocumented population were aware of the regional differences in implementation of the policy, they may have regarded the use of the health care system as a risky endeavour, fearing the possibility of prosecution or even deportation, a phenomenon referred to as a "chilling effect" (Watson et al., 2014). Finally, there may also have been internal migration, with affected persons moving from regions that enforced the new law more fully to regions that implemented a softer version.

We begin by estimating a simple Difference in Difference (DD) model in which the treatment group includes undocumented immigrants in Spain (as defined in the previous section). We look at their health outcomes before and after the application of the new law vis-a-vis the control group (also defined previously). This first DD specification can be summarised as follows:

$$Y_{icyp} = \beta_0 + \beta_1 UI_{ic} + \beta_2 Post_{yp} + \beta_3 UI_{ic} * Post_{yp} + \beta_4 X_{icyp} + R_j + \delta_y + \gamma_p + \theta_c + LT_{yp} * R_{ccaa} + \varepsilon_{icyp}$$

where UI is a dummy variable identifying whether individual "i" is an undocumented immigrant, as proxied by the country nationality of the individual "c". Post is a dummy variable that takes the value of 1 for the period of the third Survey Phase ("p") of year 2012 ("y") and for subsequent periods. Thus, β_3 identifies the impact of the reform on undocumented immigrants in the country as a whole. The regression also includes region (at the level of Autonomous Communities) ("R_j") fixed effects, year fixed effects, "δ_y", and Survey Phase dummies "γ_p" (three phases per year) as well as country of nationality fixed effects, "θ_c". We also include region-specific linear trends ($LT_{yp} * R_{ccaa}$, at the level of Autonomous Communities) in order to capture any time-varying linear trend that may affect health care outcomes differently in each region (as there is some degree of decentralization to the regions, it can be the case that there are different trends across regions over time). Additionally, we also include certain individual level controls such as age, level of education,

gender, and the regional unemployment rate[9]. For the health outcome models, self-reported health is collapsed into two categories: very bad and bad (assigned the value of 1); and medium, good and very good (assigned the value of 0). In all cases, estimations are based on linear probability models, standard errors are clustered by province (52) and sampling weights are used to make the sample as representative as possible of the Spanish population. As we are estimating several regressions, we adjust p values for the multiple hypothesis testing problem. Thus, we present our baseline results with p values using the conservative Sidak multiple correction test in parenthesis (Abdi, 2007: Sidak, 1967). Adjusted p values are in general similar to unadjusted ones (see supplementary online Appendix, Tables 4A-6A).

As mentioned above, some regional authorities tried to pass local laws granting access to their regional health care system to undocumented migrants. These regional laws were introduced at different points in time after the national legislation (see Table 2). Therefore, we divide the regions into those that we considered were more "intensively treated" (applied the national health care ban; Madrid, Murcia, Balearic Islands, Rioja, Castilla-Leon, Castilla-La Mancha) and those that were "less intensively treated" (introduced regional laws to still be able to provide access to health care for undocumented migrants; Andalusia, Asturias, Aragón, Canary Islands, Cantabria, Catalonia, Basque Country, Extremadura, Galicia, Valencia, Navarra). We consider the regions as belonging to each group during the entire period. The more intensively treated regions represent 32.6% of the observations in our sample and 29.8% of the population in Spain in 2012 whereas the less intensively treated regions represent 67.3% of the observations in our sample and 69.8% of the population in Spain in 2012. We estimate the same DD model as in the first case but separately, one for the more intensively treated regions and another, for those designated as less intensively treated.

The validity of the DD estimator relies on the existence of "parallel or common trends". In our case, this means that, allowing for initial differences, health status and health care use patterns in the control group should be a valid counterfactual for what would have occurred to health-related outcomes in the treatment group if the reform had not been applied. While on theoretical grounds there is no reason to believe that patterns in the treatment and control groups differed before the 2012 reform, further study is needed to formally test the parallel trends assumption, by means of an event study model. This model includes interactions between pre-reform dummy variables with the treatment group in order to assess the differences in the outcome variables between these two groups in the years before the policy was implemented. Table 2A shows the results of the event study models for the variables that are significant in the baseline models (results for the rest of outcome variables are provided in online supplementary Appendix Tables 1A-3A). We show the results for the models including all regions as well as for the models considering only the more/less intensively treated regions. The results of the pre-reform interaction analysis of these dummy variables show

[9] Group dummies (18-35 years – the reference category – and 35-45, 45-65, 65-75 and >75 years), dummies for the level of education (no qualification – the reference category, including individuals with less than five years' school education – secondary or pre-university studies and higher education), gender as well as regional level controls such as the unemployment rate of the region.

convincing evidence that the parallel trend assumption is met, as most of the coefficients for the pre-reform dummies are insignificant.

5. RESULTS

According to the descriptive statistics shown in Table 1 for the pre-reform period, there are some differences in the health-related variables between undocumented and documented individuals. These differences are very much in line with those reported in the previous literature. In general, undocumented immigrants are healthier and have a more positive opinion about the health system than individuals in the control group in both more and less intensively treated regions. Regarding other socioeconomic factors, undocumented immigrants are generally younger in both types of regions. These features are in line with the 'healthy immigrant' effect literature, according to which there is a positive selection of immigrants, that they are in better health than the native population, although the comparative advantage seems to decrease over time (McDonald and Kennedy, 2004; Farré, 2016).

We believe that these differences between the documented and the undocumented do not pose a threat to our identification as, under the assumption that these differences are constant over time, our DD model will be correctly estimated. Figures 1 and 2 plot the raw data on aggregated planned health care utilization for the treated and the control group in more intensively treated regions from 2008 (five years before the implementation of the policy) to 2015 (three years after its implementation). Figure 1 seems to indicate a strong drop in planned health care utilization for undocumented migrants in more intensively treated regions after the reform. Figure 2 shows that there seems to be no significant change in planned health care use for the control group in these regions. Of course, these figures provide only descriptive evidence and do not imply causal effects of the policy; clearly, other aspects may have affected the outcomes of interest. In the next part of this analysis, we examine the results of the econometric model, which includes region, country of nationality fixed effects, time fixed effects, survey phase fixed effects and region-specific linear trends as well as controls for individual characteristics in order to isolate the causal impact of the policy on health care utilization, self-assessed health and user perceptions about health care services.

We begin by estimating the results for the outcome variables including all Spanish regions in the regression. In Table 3 we show that, after the reform, undocumented migrants have lower probabilities of visiting the GP, are less likely to use the emergency room, of having a visit for planned care (GP, specialist and hospital visits altogether) and have lower satisfaction measures. However, none of these negative effects are significant at any level. In the last column, we see a significant increase in the probability of reporting bad health for the treated group after the reform. As the baseline levels of bad health are quite low in the group of undocumented migrants, the reform increased the probability of having bad health by approximately 160%, a rather large effect.

In order to take into account inter-regional differences in the implementation of the law, which generated another dimension of heterogeneity, we perform separate estimations, depending on the intensity of the implementation, to better identify the size of the policy effects. As mentioned, we classify the regions between two groups, those that were more intensively treated (stronger implantation of the law) and those that were less intensively treated. We compare utilization and satisfaction outcomes for the treated and control groups in more intensively treated regions (Table 4) and in less intensively treated regions (Table 5).

Table 4 shows that most of the coefficients are larger in magnitude and become highly significant. Specifically, undocumented migrants have a lower probability of visiting the GP which dropped by 8.1% while the probability of visiting a specialist declined by 25.7% for undocumented migrants after the reform. Furthermore, hospital visits dropped by 36.4%. The positive opinions about the health care system also fell significantly. Satisfaction with the health services was reduced by 2.9% and positive opinions about the emergency care services dropped by 9.7%. When we estimate the results using a sample restricted to only users of the health care system (which are not reported but are available upon request), the results of the measures of perception of the health care system are similar in terms of signs although, for the more intensively treated regions, the coefficients for positive opinions about the health services and about the emergency services are further reduced so that the negative impacts become larger.

The coefficient for self-assessed health is positive, suggesting a deterioration of the health status of the affected population, but in this specification it is not statistically significant.

Estimating the same model for the less intensively treated regions, we see in Table 5 that most of the coefficients are much smaller in size and insignificant, with the exception of visits to the emergency department (a reduction by 19.2%) as well as worsening in self-assessed health measure (an increase in bad health by 287%). Although those regions tried to introduce some regional legislation to counterbalance the national law, it is important to note that coverage was not immediately restored (as there was a time lag between the national and the regional laws) and coverage was only partially (and not fully restored) restored in many of the less intensively treated regions.

With these results, we find evidence of strong negative impacts on health care utilization as well as on opinions about the health system and self-assessed health for undocumented migrants because of the introduction of the health care ban in 2012. These effects are stronger in the more intensively treated regions. In the next section we test our results for robustness.

6. TESTS OF ROBUSTNESS

In order to test the robustness of our results we perform two placebo exercises in which we assign treatment status to two groups of the population which are arguably untreated by the reform. The first “fake” treatment group consists of persons with a nationality from the European Union (EU). These individuals should not be

substantially affected by the policy change as their European Union nationality would entitle them to access the health care system under the same conditions than any other Spanish citizen. Following the 2012 reform, EU citizens were additionally requested to present a consular certificate to be able to access health care services in the same terms as any Spanish citizen. However, according to the only qualitative document that provides some anecdotic evidence on the exclusion cases across Spain (REDER, 2017), there are some cases of EU citizens being excluded from health care. That is why we believe the results of our second "fake" treatment group, which includes individuals with a double nationality (Spanish nationality and another one), might be more reliable.

In both exercises, the control group is left unchanged so that it is the same as in our baseline regressions. Details of the estimation results for the two fake treatment groups and for all our outcome variables are shown in the Appendix section for the model including all Spanish regions (Table 3A), the model including only the more intensively treated regions (Table 4A) and the less intensively treated regions (Table 5A). Columns labelled as DN refer to the results using as the fake treatment group those individuals with double nationality whereas columns labelled as EU refer to the results using as the fake treatment group those individuals with an EU nationality.

As expected, none of the coefficients are negative and significant, reinforcing the causal interpretation of our baseline estimates. As mentioned before, though, some of the EU individuals might have also been denied access to the public health care system (as reported by some NGO's) and that could explain that the only positive sign that we find in these placebo tests is for emergency visits in more intensively treated regions.

As the questions in the survey about health care utilization and health system perception measures refer to the situation in the previous 12 months, we put proportional weights to the post-reform variable according to the exposure time to the reform in each wave. Thus, the "post" dummy variable takes the value of 0.4 for the period of the third Survey Phase of year 2012, 0.6 for the first period of 2013, 0.8 for the second period of 2013 and 1 from the third period of 2013 to the subsequent periods. The results are in Tables 6A, 7A and 8A. We can see that results are very similar to the baseline ones reported in Tables 3, 4 and 5, though the size of the coefficients are slightly bigger in the regressions with weights on the post reform variable.

Finally, we use as treatment variable the percentage of undocumented in any given nationality shown in Table 1A. Thus, instead of using a binary treatment indicator (which equals 1 for all the nationalities with a positive percentage of undocumented in Spain in 2011), we use the continuous number that represents the percentage of undocumented individuals for each nationality in Spain in 2011. We can see that the results (Tables 9A for all Spanish regions, 10A for more intensively treated regions and 11A for less intensively treated regions) are somewhat similar than our baseline results in terms of signs and significance levels of the coefficients, although a small number of coefficients become insignificant when using the continuous treatment variable (such as bad health for the regression for all Spain and hospital visits and positive opinions about the health care services for the regressions in more intensively treated regions). Of course, the point estimates of the coefficients are different because the treatment variable is no longer a dummy variable but a continuous

variable. We decide to use the binary treatment variable as our baseline results for one main reason: the percentage of undocumented by nationality is probably measured with error and we, therefore, label as treated all individuals potentially affected by the reform (because they have undocumented persons of their nationality in Spain).

In any case, the results of all these robustness tests provide further evidence about the credibility of our identification strategy and about the plausibility of our baseline estimates.

7. CONCLUSIONS

In this study, we examine the effects of a 2012 legal reform that restricted access to the health care system for undocumented immigrants in Spain. We evaluate the effect of this reform on several indicators of health care utilization, on the level of positive opinions about the health system and on self-assessed health status using a difference-in-difference specification that compares the outcomes of undocumented migrants (as proxied by nationals of countries with undocumented migrants in Spain in 2011) to the control group (which includes Spanish citizens as well as citizens from other countries with no undocumented migrants in Spain in 2011).

In the first stage of the analysis, we considered the effects of the reform on all undocumented immigrants in Spain vis-à-vis the unaffected population. Our results show reductions in most of the health care utilization variables (although the coefficients are not significant) as well as a significant deterioration of the undocumented migrants' self-assessed health. Then, we split the sample into those belonging to either the more or the less intensively treated regions on the basis of how strictly they complied with the nationwide ban. According to our results, restricting access to the health care system for undocumented immigrants had a stronger effect on utilization and health system perception variables in highly treated regions; GP visits were reduced by 8.1%, specialist visits dropped by 25.7% and hospital visits plummeted by 36.4%. Positive perceptions about the health services fell by 2.9% and about the emergency services dropped by 9.7%. In less intensively treated regions, we observe a decrease in hospital emergency visits (a result which may support the "chilling effect" hypothesis previously found in earlier studies (see e.g. Watson, 2014), as well as a substantial deterioration of self-assessed health.

In this paper, we have been able to provide evidence of adverse health related effects in the first three years after the implementation of the reform. Our results, combined with previous studies, particularly by Juanmartí et al. (2018) that restricting access to health care leads to higher mortality rates for undocumented migrants, may imply an increased possibility of additional non-negligible negative health impacts in the near future arising from lower health care utilization we have seen in this paper. In addition, our study provides indicative evidence that, as shown in the literature, there is a strong correlation between measures of self-reported health and mortality (Jylhä, 2011). The lack of access to preventive services may impose huge costs on society, given the negative externalities generated by contagious diseases, for instance, but which we are

not able to evaluate with the database used in this study. Finally, restricting access to services according to nationality usually requires complex administrative procedures and is highly opposed by many health professionals who have declared themselves against this initiative (Nuño-Solinís, 2016).

Additionally, our findings of lower levels of positive opinions about the emergency care department post-reform may reinforce those of Fiorentini et al. (2017), who recorded a strong association between subjective and objective measures of health care satisfaction. Therefore, we corroborate previous findings that patients' self-reported measures can be considered valid predictors of more objective measures of responsiveness and could be used as tools to evaluate the performance of health systems.

One of the first measures of the new government that took office in July 2018 in Spain was to restore universal health coverage to immigrants who are able to prove to have resided for more than 90 days in the country. However, no formal procedure has been established to assess the impact of this new policy, and monitoring compliance with the new measure is important in order to avoid long-term health and other social costs. The results of our study may offer a cautionary tale for policymakers not only in Spain, but also in other countries considering the introduction of restrictions on access to health services for the immigrant population. These findings may also be relevant for the United Kingdom, which introduced an up-front surcharge to access NHS hospitals for people from outside the European Economic Area in 2015 –which has recently been doubled claiming this would produce savings on NHS resources and deter health tourism. To the authors' knowledge, the impacts of this policy on health, utilization trends, satisfaction with services or other more general socio economic aspects such as immigration in the UK labour market and immigration status itself have not been explored, and would thus be an interesting case for applying the methodology we used in this paper.

Compliance with Ethical Standards:

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Conflict of Interest: The authors declare that they have no conflict of interest.

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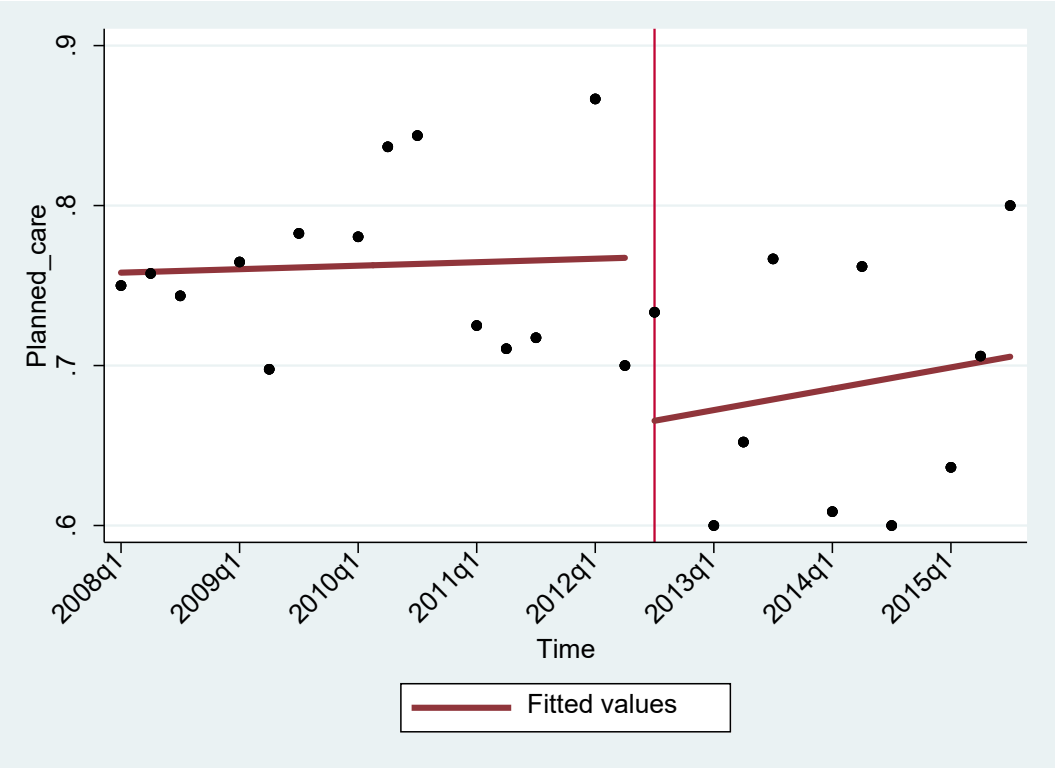
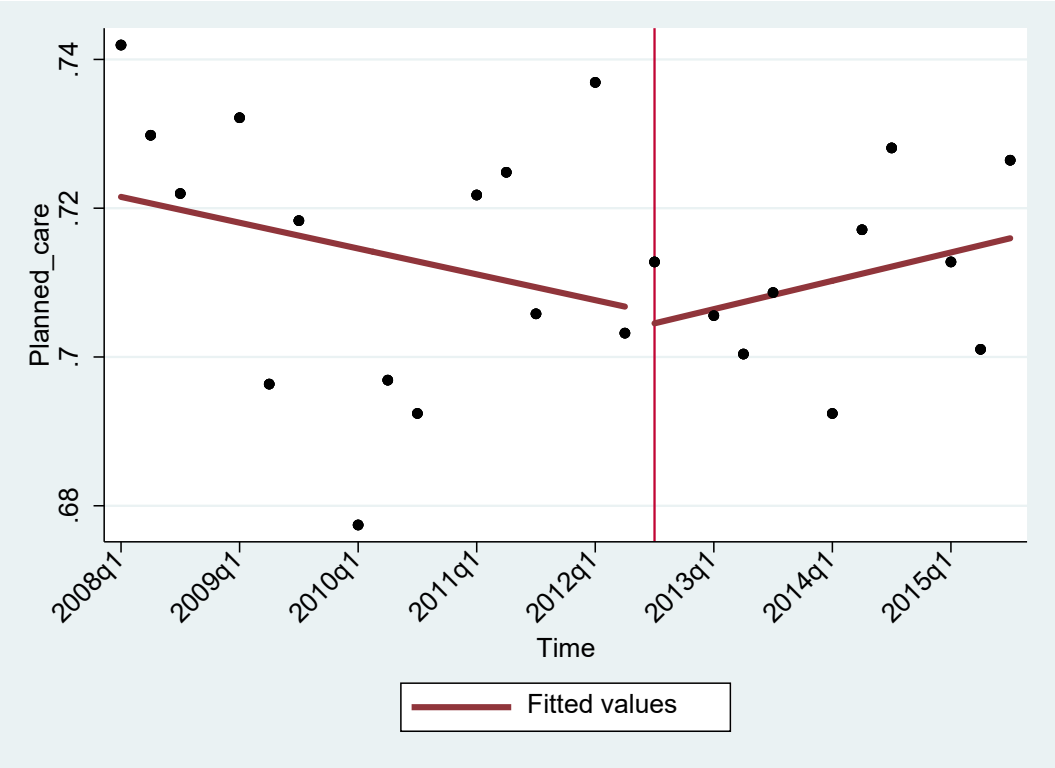
FIGURES

Figure 1. Proportion of planned Health Care Visits for treated (undocumented) individuals. More intensively treated regions.



Planned Health Care visits: Aggregated visits to the GP, Specialist and Hospital services.

Figure 2. Proportion of planned Health Care Visits for control (documented) individuals. More intensively treated Spanish regions.



Planned Health Care visits: Aggregated visits to the GP, Specialist and Hospital services.

TABLES

Table 1. Descriptive statistics (2008-2012, pre reform period).

	Less treated regions			More treated regions		
Use variables	**Documented**	**Undocumented**	**Diff p val**	**Documented**	**Undocumented**	**Diff p val**
Prob. GP visit	0.689	0.706	0.179	0.674	0.738	**0.002**
Prob. Specialist visits	0.374	0.292	**0.000**	0.387	0.350	**0.086**
Prob. Hospital visit	0.086	0.093	0.508	0.085	0.140	**0.000**
Prob. Planned visit	0.728	0.735	0.693	0.714	0.762	**0.017**
Prob. Emergency visits	0.292	0.387	**0.000**	0.260	0.364	**0.000**
Positive Opinion about health services and Health variables						
Positive opinion health system	6.425	7.136	**0.000**	6.617	7.451	**0.000**
Positive opinion emergency services	6.074	6.392	**0.006**	6.074	6.775	**0.000**
Bad Health	0.050	0.008	**0.002**	0.040	0.013	**0.017**
Socioeconomic variables						
No studies	0.027	0.012	**0.0140**	0.025	0.007	**0.0110**
Primary education	0.231	0.134	**0.0000**	0.223	0.136	**0.0000**
Secondary education	0.517	0.713	**0.0000**	0.506	0.683	**0.0000**
University	0.168	0.132	**0.0129**	0.200	0.153	**0.0081**
Female	0.491	0.510	0.3339	0.496	0.458	**0.0866**
Male	0.509	0.490	0.3339	0.504	0.542	**0.0866**
Regional unemployment rate	18.545	17.917	**0.0000**	17.013	16.346	**0.0029**
18-35 years old	0.288	0.558	**0.0000**	0.288	0.570	**0.0000**
35-45 years old	0.199	0.284	**0.0000**	0.202	0.248	**0.0104**
45-65 years old	0.303	0.143	**0.0000**	0.296	0.169	**0.0000**
65-75 years old	0.117	0.012	**0.0000**	0.117	0.011	**0.0000**
> 75 years old	0.093	0.003	**0.0000**	0.097	0.002	**0.0000**
N	23,917	690		10,215	537	

In bold, statistically significant result at 10% significant level or less

Table 2. Reaction of different ACs to the national reform

Regions that applied alternative health programmes for undocumented immigrants	Regions that applied the national law barring access to health care for undocumented immigrants			
	With exceptions			Without exceptions
	Chronic disease	Mental illness	Public health risk	
Andalusia (2013) Asturias (2012) Aragón (2013) Canary Islands (2013) Cantabria (2013) Catalonia (2012) Basque Country (2012) Extremadura (2013) Galicia (2012) Valencia (2013) Navarre (2013)	Madrid (2012) Murcia (2012)	Madrid (2012) Balearic Islands (2012) Rioja	Madrid (2012) Castilla - León Balearic Islands (2012) La Rioja	Castilla - La Mancha

Source: Own elaboration by the authors.

Table 3. Difference-in-Differences: health care utilization variables. Impact on undocumented immigrants in all Spanish regions.

	GP visits	Specialist visits	Hospital visits	All planned care	Hosp. Emergency visits	Positive opinion Health System	Positive opinion Emerg. Care	Bad Health
After	0.027	-0.056	0.002	0.014	0.002	0.056	-0.130	-0.005
	(0.97)	(0.43)	(0.98)	(0.74)	(0.98)	(0.97)	(0.95)	(0.97)
Undocumented*After	-0.025	0.004	-0.006	-0.021	-0.055	-0.084	-0.213	0.016**
	(0.46)	(0.97)	(0.97)	(0.77)	(0.14)	(0.77)	(0.70)	(0.05)
Constant	1.209***	-0.026	0.077*	1.117***	0.355***	9.734***	6.798***	0.069*
	(0.00)	(0.56)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.07)
Nationality Fixed Effects	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X
Individual Covariates	X	X	X	X	X	X	X	X
Pre-reform mean outcome variable	0.721	0.318	0.114	0.748	0.376	7.281	6.577	0.010
% Impact of the policy								160%
Observations	54,351	54,338	54,546	54,591	54,505	54,142	37,928	40,588
R-squared	0.042	0.045	0.012	0.048	0.018	0.072	0.064	0.046

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.
*** p<0.01, ** p<0.05, * p<0.1

Table 4. Difference-in-Differences: health care utilization variables. Impact on undocumented immigrants in more intensively treated Spanish regions.

	GP visits	Specialist visits	Hospital visits	All planned care	Hosp. Emergency visits	Positive opinion Health Serv.	Positive opinion Emerg. Care	Bad Health
After	-0.041	-0.117	0.030	-0.043	-0.108*	-0.064	-0.201	0.025
	(0.91)	(0.67)	(0.67)	(0.67)	(0.31)	(0.91)	(0.80)	(0.22)
Undocumented*After	-0.060*	-0.090***	-0.051***	-0.057**	-0.025	-0.219*	-0.658***	0.007
	(0.08)	(0.00)	(0.01)	(0.05)	(0.62)	(0.06)	(0.00)	(0.62)
Constant	1.155***	0.339***	0.109***	1.149***	0.019	10.467***	5.358***	0.041
	(0.00)	(0.00)	(0.00)	(0.00)	(0.61)	(0.00)	(0.00)	(0.19)
Nationality Fixed Effects	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X
Individual Covariates	X	X	X	X	X	X	X	X
Pre-reform mean outcome variable	0.738	0.350	0.140	0.762	0.364	7.451	6.775	0.013
% Impact of the policy	-8.1%	-25.7%	-36.4%	-7.5%		-2.9%	-9.7%	
Observations	17,711	17,709	17,763	17,775	17,746	17,611	12,300	13,264
R-squared	0.045	0.047	0.016	0.052	0.019	0.059	0.061	0.036

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.
*** p<0.01, ** p<0.05, * p<0.1

Table 5. Difference-in-Differences: health care utilization variables. Impact on undocumented immigrants in less intensively treated Spanish regions.

	GP visits	Specialist visits	Hospital visits	All planned care	Hosp. Emergency visits	Positive opinion Health Serv.	Positive opinion Emerg. Care	Bad Health
After	0.031	-0.053	0.000	0.016	0.028	-0.003	-0.104	-0.010
	(0.96)	(0.67)	(1.00)	(0.89)	(0.96)	(1.00)	(0.96)	(0.88)
Undocumented*After	-0.002	0.072	0.025	0.005	-0.074*	0.016	0.062	0.023**
	(1.00)	(0.52)	(0.94)	(1.00)	(0.09)	(1.00)	(1.00)	(0.02)
Constant	0.138***	0.837***	0.060**	1.111***	0.333***	6.741***	6.973***	0.059
	(0.01)	(0.00)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)	(0.12)
Nationality Fixed Effects	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X
Individual Covariates	X	X	X	X	X	X	X	X
Pre-reform mean outcome variable	0.708	0.293	0.094	0.737	0.385	7.149	6.416	0.008
% Impact of the policy					-19.2%			287%
Observations	36,619	36,607	36,761	36,794	36,737	36,509	25,615	27,310
R-squared	0.044	0.048	0.013	0.048	0.019	0.077	0.068	0.054

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.

*** p<0.01, ** p<0.05, * p<0.1

APPENDIX:

Table 1 A. Nationality of undocumented immigrants (2011).

Nationality of undocumented immigrants	% Undocumented
Dominica	0.7540
Chile	0.6791
Guatemala	0.5785
Saudi Arabia	0.5710
Liberia	0.5683
Ivory Coast	0.5549
Paraguay	0.5340
Nicaragua	0.5208
Honduras	0.5090
Vietnam	0.5081
Ethiopia	0.4990
Costa Rica	0.4880
Nepal	0.4782
El Salvador	0.4773
Panama	0.4735
Congo	0.4573
Kazakhstan	0.4496
Brazil	0.4431
Equatorial Guinea	0.4339
Venezuela	0.3772
Israel	0.3493
Angola	0.3390
Argentina	0.3377
Macedonia	0.3310
Sierra Leone	0.3195
Uruguay	0.3166
Iran	0.3077
Guinea	0.3006
Turkey	0.2936
Cameroon	0.2861
Bolivia	0.2827
Iraq	0.2795
Nigeria	0.2792
Cape Verde	0.2593
Korea, South	0.2585
Senegal	0.2434
Benin	0.2427
Burkina Faso	0.2305

Guinea-Bissau	0.2293
Colombia	0.2248
Togo	0.2230
Bosnia and Herzegovina	0.2188
Bangladesh	0.2147
Jordan	0.2002
Mali	0.1996
Cuba	0.1941
Ecuador	0.1921
Lebanon	0.1693
Syria	0.1686
Serbia	0.1663
Dominican Republic	0.1617
Peru	0.1590
Indonesia	0.1522
Ghana	0.1483
South Africa	0.1362
Mauritania	0.1295
India	0.1277
Gambia	0.1217
Pakistan	0.1151
Tunisia	0.1032
Moldova	0.1030
Japan	0.1028
Egypt	0.0883
Algeria	0.0770
Philippines	0.0545
Thailand	0.0361
Kenya	0.0114

Source: Own calculation following the methodology of González-Enriquez (2009). The categorization of undocumented immigrants is based on the number of individuals from a given nationality living in Spain in 2011 (as reported in the 2011 census) and the number of individuals of that nationality that have a legal residence permit to leave in Spain based on Spanish Ministry of Employment and Social Security.

Table 2A. Estimations with pre-reform dummies.

All Spain	Bad Health	**More intensively treated regions**		Specialist visits	Hospital visits	All planned care	Satisf. Health Serv.	Satisf. Emerg. Care	**Less intensively treated regions**	Hosp. Emergency visits	Bad Health
After	-0.005	After	-0.041	-0.116	0.029	-0.043	-0.056	-0.201	After	-0.102	-0.010
	(0,99)		(0,95)	(0,69)	(0,76)	(0,95)	(0,95)	(0,89)		(0,99)	(0,90)
4yearsbefore*		4yearsbefore*	-0.014	-0.089	0.070	-0.002	-0.187		4yearsbefore*		
Undocumented		Undocumented	(0,96)	(0,18)	(0,37)	(0,97)	(0,77)		Undocumented		
3yearsbefore*		3yearsbefore*	0.098*	-0.019	0.051	0.089	0.100		3yearsbefore*		
Undocumented		Undocumented	(0,08)	(0,89)	(0,31)	(0,12)	(0,89)		Undocumented		
2yearsbefore*	-0.023	2yearsbefore*	-0.029	0.034	0.067	0.008	0.009	0.319	2yearsbefore*	-0.226	-0.019
Undocumented	(0,33)	Undocumented	(0,97)	(0,97)	(0,57)	(0,99)	(0,99)	(0,97)	Undocumented	(0,25)	(0,15)
1yearbefore*	-0.032	1yearbefore*	0.024	0.023	0.003	0.007	-0.196	-0.109	1yearbefore*	0.204	-0.023
Undocumented	(0,26)	Undocumented	(0,98)	(0,96)	(0,99)	(0,99)	(0,96)	(0,99)	Undocumented	(0,34)	(0,11)
Undocumented*	-0.003	Undocumented*	-0.039	-0.103*	-0.008	-0.032	-0.274	?-0.585	Undocumented*	0.050	0.008
After	(0,58)	After	(0,74)	(0,07)	(0,80)	(0,74)	(0,53)	(0,37)	After	(0,77)	(0,84)
Constant	0.088**	Constant	0.622***	0.339***	0.106***	1.125***	6.492***	4.741***	Constant	4.270***	0.056
	(0,02)		(0,00)	(0,00)	(0,00)	(0,00)	(0,00)	(0,00)		(0,00)	(0,25)
Nationality Fixed Effects	X	Nationality Fixed Effects	X	X	X	X	X	X	Nationality Fixed Effects	X	X
Region FE	X	Region FE	X	X	X	X	X	X	Region FE	X	X
Time FE	X	Time FE	X	X	X	X	X	X	Time FE	X	X
Region linear trends	X	Region linear trends	X	X	X	X	X	X	Region linear trends	X	X
Individual Covariates	X	Individual Covariates	X	X	X	X	X	X	Individual Covariates	X	X
Observations	40,588	Observations	17,732	17,731	17,785	17,797	17,633	12,313	Observations	25,615	27,310
R-squared	0.046	R-squared	0.043	0.043	0.014	0.049	0.059	0.061	R-squared	0.068	0.054

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.

*** p<0.01, ** p<0.05, * p<0.1

Table 3A. Estimates for alternative definitions of undocumented individuals (Placebo tests) in all Spanish regions.

	GP visits		Specialist visits		Hospital visits		All planned care		Hosp. Emergency visits		Positive opinion Health Serv.		Positive opinion Emerg. Care		Bad Health	
	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU
After	0.026	0.028	-0.055	-0.056	0.002	0.001	0.014	0.015	0.001	0.001	0.066	0.048	-0.139	-0.131	-0.004	-0.005
	(1.00)	(0.99)	(0.41)	(0.44)	(1.00)	(0.99)	(1.00)	(0.99)	(1.00)	(0.99)	(1.00)	(0.99)	(0.96)	(0.97)	(1.00)	(0.99)
Undocumented* After	-0.056	-0.057	0.069	-0.011	0.046	0.017	-0.052	-0.036	-0.019	0.093	-0.180	0.010	0.435	-0.079	-0.004	-0.016
	(0.89)	(0.71)	(0.78)	(0.98)	(0.89)	(0.96)	(0.87)	(0.90)	(0.90)	(0.29)	(0.89)	(0.98)	(0.75)	(0.98)	(0.90)	(0.96)
Constant	0.658***	1.541***	-0.369***	0.603***	-0.037	0.006	0.547***	1.405***	0.182***	0.946***	12.383***	8.034***	9.351***	8.705***	0.078**	0.041
	(0.00)	(0.00)	(0.00)	(0.00)	(0.44)	(0.75)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.09)	(0.56)
Nationality FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Individual Covariates	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Observations	54,351	54,351	54,338	54,338	54,546	54,546	54,591	54,591	54,505	54,505	54,142	54,142	37,928	37,928	40,588	40,588
R-squared	0.045	0.043	0.048	0.046	0.014	0.013	0.051	0.048	0.021	0.019	0.076	0.073	0.067	0.065	0.050	0.046

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.

*** p<0.01, ** p<0.05, * p<0.1

DN: Double Nationality individuals

EU: European Union citizens

Table 4A. Estimates for alternative definitions of undocumented individuals (Placebo test) in more intensively treated Spanish regions.

	GP visits		Specialist visits		Hospital visits		All planned care		Hosp. Emergency visits		Positive opinion Health Serv.		Positive opinion Emerg. Care		Bad Health	
	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU
After	-0.043	-0.042	-0.109	-0.118	0.022	0.027	-0.040	-0.045	-0.099*	-0.116**	0.000	-0.067	-0.235	-0.210	0.031**	0.023*
	(0.96)	(0.94)	(0.69)	(0.65)	(0.88)	(0.79)	(0.96)	(0.94)	(0.41)	(0.28)	(1.00)	(0.94)	(0.88)	(0.87)	(0.08)	(0.30)
Undocumented*After	-0.031	0.025	0.053	-0.018	0.106	0.016	-0.050	0.017	0.007	0.153**	-0.054	-0.034	0.586	-0.209	-0.048	0.000
	(0.83)	(1.00)	(0.73)	(1.00)	(0.49)	(1.00)	(0.73)	(1.00)	(0.98)	(0.02)	(0.98)	(1.00)	(0.45)	(0.98)	(0.73)	(1.00)
Constant	0.608***	1.642***	0.004	0.917***	-0.119	0.013	0.502***	1.363***	-0.255***	-0.179***	12.923***	9.935***	7.120***	6.634***	0.041	0.041*
	(0.00)	(0.00)	(0.96)	(0.00)	(0.30)	(0.41)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.30)	(0.17)
Nationality Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Individual covariates																
Observations	17,732	17,732	17,732	17,731	17,731	17,785	17,785	17,797	17,797	17,768	17,768	17,633	17,633	12,313	12,313	13,278
R-squared	0.049	0.044	0.048	0.044	0.016	0.014	0.056	0.051	0.023	0.019	0.066	0.060	0.065	0.062	0.039	0.032

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.

*** p<0.01, ** p<0.05, * p<0.1

DN: Double Nationality individuals

EU: European Union citizens

Table 5A. Estimates for alternative definitions of undocumented individuals (Placebo test) in less intensively treated Spanish regions.

	GP visits		Specialist visits		Hospital visits		All planned care		Hosp. Emergency visits		Positive opinion Health Serv.		Positive opinion Emerg. Care		Bad Health	
	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU	DN	EU
After	0.028	0.031	-0.053	-0.050	0.002	0.001	0.013	0.017	0.025	0.025	0.002	-0.004	-0.181*	-0.101	-0.006	-0.009
	(0.99)	(0.99)	(0.62)	(0.69)	(1.00)	(1.00)	(0.99)	(0.99)	(0.99)	(0.99)	(1.00)	(1.00)	(0.99)	(0.99)	(0.91)	(0.91)
Undocumented*After	-0.070	-0.036	0.116	0.020	0.025	0.021	-0.046	-0.005	0.007	0.074	-0.128	-0.053	0.623	-0.059	0.017	-0.002
	(0.094)	(0.054)	(0.087)	(0.033)	(0.041)	(0.027)	(0.078)	(0.049)	(0.063)	(0.044)	(0.380)	(0.185)	(0.510)	(0.413)	(0.026)	(0.026)
Constant	0.518***	0.532***	0.454***	1.648***	-0.042	0.002	0.513***	0.483***	0.128*	0.133***	8.356***	8.507***	5.294***	9.676***	0.025	0.036
	(0.00)	(0.00)	(0.02)	(0.00)	(0.64)	(0.00)	(0.00)	(0.00)	(0.50)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.64)	(0.49)
Nationality Fixed Effects	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Individual covariates																
Observations	36,574	36,574	36,564	36,564	36,715	36,715	36,747	36,747	36,691	36,691	36,463	36,463	25,582	25,582	27,276	27,276
R-squared	0.051	0.048	0.058	0.056	0.019	0.017	0.057	0.055	0.024	0.021	0.082	0.079	0.071	0.069	0.064	0.061

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.

*** p<0.01, ** p<0.05, * p<0.1

DN: Double Nationality individuals

EU: European Union citizens

Table 6A. Weighted year of treatment estimates in all Spanish regions

	GP visits	Specialist visits	Hospital visits	All planned care	Hosp. Emergency visits	Positive opinion Health Serv.	Positive opinion Emerg. Care	Bad Health
After	-0.003	-0.022	-0.014	-0.013	0.015	-0.218***	-0.240	-0.001
	(0.98)	(0.45)	(0.41)	(0.28)	(0.79)	(0.01)	(0.16)	(0.98)
Undocumented*After	-0.029	-0.001	-0.010	-0.024	-0.064	-0.073	-0.069	0.016
	(0.53)	(0.99)	(0.99)	(0.87)	(0.12)	(0.93)	(0.99)	(0.16)
Constant	1.198***	0.007	0.079**	1.106***	0.357***	9.672***	6.860***	0.077***
	(0.00)	(0.91)	(0.09)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Nationality Fixed Effects	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X
Individual Covariates	X	X	X	X	X	X	X	X
Pre-reform mean outcome variable	0.721	0.318	0.114	0.748	0.376	7.281	6.577	0.010
Observations	54,351	54,338	54,546	54,591	54,505	54,142	37,928	40,588
R-squared	0.042	0.045	0.012	0.048	0.018	0.072	0.064	0.046

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment

*** p<0.01, ** p<0.05, * p<0.1

Table 7A. Weighted year of treatment estimates for more intensively treated Spanish regions

	GP visits	Specialist visits	Hospital visits	All planned care	Hosp. Emergency visits	Positive opinion Health Serv.	Positive opinion Emerg. Care	Bad Health
After	-0.070**	0.050	-0.044	-0.031	-0.030	-0.165	0.377	-0.011
	(0.09)	(0.19)	(0.58)	(0.83)	(0.69)	(0.83)	(0.69)	(0.83)
Undocumented*After	-0.065*	-0.119***	-0.071***	-0.059**	-0.051	-0.215*	-0.672***	0.005
	(0.07)	(0.00)	(0.01)	(0.03)	(0.49)	(0.07)	(0.00)	(0.49)
Constant	1.169***	0.385***	0.111***	1.158***	0.074**	10.453***	5.568***	0.012
	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	(0.00)	(0.00)	(0.59)
Nationality Fixed Effects	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X
Individual Covariates	X	X	X	X	X	X	X	X
Pre-reform mean outcome variable	0,738	0,350	0,140	0,762	0,364	7,451	6,775	0,013
Observations	17,732	17,731	17,785	17,797	17,768	17,633	12,313	13,278
R-squared	0.043	0.043	0.014	0.049	0.018	0.059	0.060	0.031

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.
*** p<0.01, ** p<0.05, * p<0.1

Table 8A. Weighted year of treatment estimates for less intensively treated Spanish regions

	GP visits	Specialist visits	Hospital visits	All planned care	Hosp. Emergency visits	Positive opinion Health Serv.	Positive opinion Emerg. Care	Bad Health
After	-0.002	-0.036	-0.009	-0.018	0.026	-0.304***	-0.314**	0.001
	(0.99)	(0.25)	(0.67)	(0.25)	(0.50)	(0.00)	(0.03)	(0.99)
Undocumented*After	-0.004	0.081	0.031	0.004	-0.073	0.036	0.290	0.024*
	(0.99)	(0.58)	(0.84)	(0.99)	(0.14)	(0.99)	(0.58)	(0.08)
Constant	0.118**	0.859***	0.057**	1.096***	0.324***	6.660***	6.879***	0.079**
	(0.02)	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)
Nationality Fixed Effects	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X
Individual Covariates	X	X	X	X	X	X	X	X
Pre-reform mean outcome variable	0.708	0.293	0.094	0.737	0.385	7.149	6.416	0.008
Observations	36,619	36,607	36,761	36,794	36,737	36,509	25,615	27,310
R-squared	0.043	0.048	0.013	0.048	0.019	0.077	0.068	0.054

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.
*** p<0.01, ** p<0.05, * p<0.1

Table 9A. Weighted probability of being an undocumented immigrant. Estimates for all Spanish regions.

	GP visits	Specialist visits	Hospital visits	All planned care	Hosp. Emergency visits	Positive opinion Health Serv.	Positive opinion Emerg. Care	Bad Health
After	0.027	-0.056	0.002	0.014	0.003	0.056	-0.129	-0.005
	(0.97)	(0.43)	(0.98)	(0.74)	(0.98)	(0.97)	(0.95)	(0.97)
Undocumented*	-0.048	0.047	-0.003	-0.033	-0.153	-0.225	-0.727	0.032
After	(0.91)	(0.96)	(0.97)	(0.96)	(0.37)	(0.86)	(0.68)	(0.57)
Constant	1.207***	-0.044	0.073*	1.117***	0.355***	9.758***	6.800***	0.069**
	(0.00)	(0.56)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.07)
Nationality FE	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X
Individual Covariates	X	X	X	X	X	X	X	X
Pre-reform mean outcome variable	0.721	0.318	0.114	0.748	0.376	7.281	6.577	0.010
Observations	54,351	54,338	54,546	54,591	54,505	54,142	37,928	40,588
R-squared	0.042	0.045	0.012	0.048	0.018	0.072	0.064	0.046

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.
*** p<0.01, ** p<0.05, * p<0.1

Table 10A. Weighted probability of being an undocumented immigrant. Estimates for more intensively treated Spanish regions.

	GP visits	Specialist visits	Hospital visits	All planned care	Hosp. Emergency visits	Positive opinion Health Serv.	Positive opinion Emerg. Care	Bad Health
After	-0.070	0.050	-0.044	-0.031	-0.030	-0.165	0.377	-0.011
	(0.91)	(0.66)	(0.66)	(0.66)	(0.30)	(0.91)	(0.78)	(0.21)
Undocumented*	-0.065**	-0.119***	-0.071	-0.059**	-0.051	-0.215	-0.672**	0.005
After	(0.05)	(0.01)	(0.15)	(0.05)	(0.80)	(0.15)	(0.05)	(0.40)
Constant	1.169***	0.385***	0.111***	1.158***	0.074	10.453***	5.568***	0.012
	(0.00)	(0.00)	(0.00)	(0.00)	(0.60)	(0.00)	(0.00)	(0.11)
Nationality FE	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X
Individual Covariates	X	X	X	X	X	X	X	X
Pre-reform mean outcome variable	0.738	0.350	0.140	0.762	0.364	7.451	6.775	0.013
Observations	17,732	17,731	17,785	17,797	17,768	17,633	12,313	13,278
R-squared	0.043	0.043	0.014	0.049	0.018	0.059	0.060	0.031

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.
*** p<0.01, ** p<0.05, * p<0.1

Table 11A. Weighted probability of being an undocumented immigrant. Estimates for less intensively treated Spanish regions.

	GP visits	Specialist visits	Hospital visits	All planned care	Hosp. Emergency visits	Positive opinion Health Serv.	Positive opinion Emerg. Care	Bad Health
After	0.031	-0.053	0.000	0.016	0.028	-0.003	-0.102	-0.010
	(0.96)	(0.67)	(1.00)	(0.89)	(0.96)	(1.00)	(0.96)	(0.88)
Undocumented*	0.056	0.217	0.066	0.062	-0.240*	-0.003	-0.244	0.066**
After	(0.92)	(0.42)	(0.92)	(0.92)	(0.07)	(0.99)	(0.95)	(0.01)
Constant	0.137***	0.837***	0.060**	1.111***	0.333***	6.741***	6.974***	0.058
	(0.01)	(0.00)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)	(0.12)
Nationality FE	X	X	X	X	X	X	X	X
Region FE	X	X	X	X	X	X	X	X
Time FE	X	X	X	X	X	X	X	X
Region linear trends	X	X	X	X	X	X	X	X
Individual Covariates	X	X	X	X	X	X	X	X
Pre-reform mean outcome variable	0.708	0.293	0.094	0.737	0.385	7.149	6.416	0.008
Observations	36,619	36,607	36,761	36,794	36,737	36,509	25,615	27,310
R-squared	0.044	0.048	0.013	0.048	0.019	0.077	0.068	0.054

Note: Standard errors are clustered at the provincial level, Sidak p-values adjusted for multiple testing are shown in parenthesis. The regression also includes survey phase dummies (three per year). Individual covariates include dummies for age groups, dummies for highest level of education, gender and the level of regional unemployment.
*** p<0.01, ** p<0.05, * p<0.1

Figure 1A. CASES WHERE ENTITLED INDIVIDUALS WERE BANNED FROM ACCESS

KCM is a 9-month-old baby born in Spain from Nigerian parents who have a valid residence permit. They have a family record book and a Spanish birth certificate but the baby does not have a healthcare card because you must have a passport to get one. The family lacks the financial means to apply for one. They received a bill for a consultation with a paediatrician. With the support of a social organisation they have issued a plea, the result of which has been put on hold until the new regional legislation is approved (The Autonomous Region of Valencia).

Source: REDER report, "Five myths for five years of health exclusion", 2017