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The Impact of the Large-Scale Migration on the Unmet Health-care Needs of the Nativeborn Population in A Host Country: Evidence from Turkey

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Abstract

As of December 2018, Turkey is home to 3.6 million Syrian refugees under temporary protection status. The negative externalities of Syrian refugees may affect the native-born population's needs, precisely healthcare needs. The possible increase in healthcare demand due to population increase may escalate unmet healthcare needs (UHCN). The study contributes to the literature by analyzing refugees' effect on the native-born population's unmet healthcare needs. Our central hypothesis is that mass refugee influx increases the ratio of the UHCN arising mainly from systemic reasons, especially at the beginning of the migration crisis. Using a difference-in-differences approach, we find that the UHCN of the native-born population has increased due to the mass refugee influx. We estimate the magnitude of this increase by nearly 6.3% at the beginning of the refugee crisis. The impact diminishes as the imbalance of demand and supply of healthcare services diminishes.

Keywords: Event Study, Health Demand, Health Supply, Health Transformation Program, Pseudo Panel, Refugees, Unmet Healthcare Needs.
JEL Classifications: I11, I14, I18, J15, O52.

1. Introduction

International migration rises to the top of the essential problem list of the 21st century. Migration may boost economic growth, reduce inequalities, and connect diverse societies. However, a lack of a mechanism to manage large-scale migration may cause migration to political tension and chaos within the host country.

At the end of 2019, the United Nations High Commissioner for Refugees (UNHCR) reports that about 79.5 million people worldwide involuntarily migrate. The issue of forcibly displaced people surges, especially after 2011. Neighboring countries host 73 percent of these refugees. In the early months of spring 2011, the civil war began in Syria. The war forcibly displaced millions of people, mainly to the neighboring countries, such as Turkey, Iraq, Lebanon, Jordan, and Egypt. According to the UNHCR, 6.6 million Syrians became refugees outside of Syria at the end of 2019. Turkey is the top hosting country around the world. Turkey is home to 3.6 million Syrian refugees under temporary protection status, while there are around 400,000 Afghanis, Iranians, and Iraqis residing in Turkey.[5] As of July 2018, the Disaster and Emergency Management Agency operates refugee camps (temporary shelter centers) in 10 different cities with 213 thousand Syrian refugees. However, around 3.4 million Syrian refugees live in non-camp settlements in various cities in 2018, representing almost 95 percent of Turkey's total Syrian Refugees. These refugees mostly settled in metropolitan areas such as Şanlıurfa, Gaziantep, Hatay, Kilis, Mardin, Adana, Mersin, Adıyaman, Kahramanmaraş, İstanbul, Ankara, and İzmir. The mass refugee influx in certain cities has a strain on health, education, security, and other social service systems at local and national levels (Balcılar, 2016).

During a large-scale migration, international authorities center attention on the refugee's priorities such as employment, health (Blanchet et al., 2016; Ay et al., 2016; Bilecen and Yurtseven, 2018), housing (Lukes et al., 2019; Hanley et al., 2019) and access to education (Zhang, 2016; Tjaden, 2017). Meanwhile, there is little known about the impact of the mass refugee influx on the native-born population. As in Turkey, at the beginning of the migration crisis, most refugees are hosted in refugee camps near a border. Due to the overcapacity of refugee camps, refugees start spreading all over the country. The transition from refugee camp to local areas will increase the externalities between local citizens and refugees. To ease the externalities, governments need to design long-term approaches. A better understanding of the main channels through which the mass refugee influx affects the native-born population will improve such measures' effectiveness.

The negative externalities of mass refugee influx may have consequences on local population needs, precisely healthcare needs. The possible increase in healthcare demand due to population increase may cause an increase in unmet healthcare needs. The "unmet healthcare needs" (UHCN) is defined as an individual's inability to refer to a doctor if s/he needs healthcare during the last twelve months. Unmet healthcare needs are the interest of health policies that reflect healthcare access (Levesque et al., 2008; Sibley and Glazier, 2009). Any increase seen in the

[5] For more information related to the Syrian Refugee Crisis, see Kirişçi (2014).

UHCN can cause the affected population's health to worsen and increase health inequalities (OECD/EU, 2016).

The initial impact of a large-scale migration may differ from the steady-state, especially during the chaos. The civil war in Syria forced wounded Syrians to migrate to neighboring countries. Besides, the low health status of Syrian refugees increases the burden of health care. Adana Numune Training and Research Hospital, located very close to the Syria–Turkey border, treated 234,233 Syrian patients between June 1, 2012, and July 15, 2014 (Ozdogan et al., 2014). Savas et al. (2016) also state that the refugee crisis negatively affects university hospitals in Hatay in higher working hours and higher patient waiting times. Even in Canada, Barry et al. (2020) point an increase in perceived workload as an impact of Syrian refugees.

Existing literature well documents both direct and indirect effects of international migration on various economic and social outcomes of the host country; price levels (Balkan and Tümen, 2016), housing prices (Akgündüz et al., 2015), labor market outcomes (Stave and Hillesund, 2015; Del Carpio and Wagner, 2015; Fakih and Ibrahim, 2016; Ceritoğlu et al., 2017), investment (Akgündüz et al., 2018), the political decision of the native-born population (Fisunoğlu and Sert 2019; Yüksel 2019; Altındağ and Kausal, 2020), national security (Alougili, 2019), public expenditure[6] (Harris, 2019), and health system (Doganay and Demiraslan, 2016; Daynes, 2016; Ammar et al., 2016).

However, there is little knowledge about how the mass refugee influx affects local people's unmet healthcare needs. The research's contribution is to analyze the impact of the mass refugee influx on the UHCN of the native-born population by exploiting the natural experiment.[7] Our central hypothesis is that mass refugee influx increases the ratio of the UHCN arising mainly from systemic reasons, especially at the beginning of the migration crisis. Although our paper is closely related to the migration literature, the results of this research shed light on the health policies that are supposed to manage the realized refugee crisis.

In the literature, studies analyze different types of UHCN related to health service, dental health, eyeglass requirement (Krutilova, 2016), and mental health (Flisher et al., 1997; Alonso et al., 2007; Sherbourne et al., 2001). These studies consider a particular group of individuals who are vulnerable to UHCN. Krutilova (2016) determines the exposed group with age, high morbidity, the presence of chronic illness, and retirement age, Sherbourne et al. (2001) with gender, and Flisher et al. (1997) with age groups. In our estimation strategy, we also control for these variables that are related to the UHCN.

Using a difference-in-differences approach, we find that the UHCN of the native-born population has increased due to the mass refugee influx. We estimate the magnitude of this

[6] The spending by the Turkish government for Syrians under temporary protection status has exceeded 35 billion dollars (estimates for 28th January 2019).
[7] Balkan and Tümen (2016) suggest that the unexpected mass refugee influx resembles a natural experiment.

increase by nearly 6.3% at the beginning of the refugee crisis. The impact diminishes as the imbalance of demand and supply of healthcare services diminishes. Moreover, some of our estimates indicate that the impact of the refugee crisis emerges recently. This result may indicate that barriers[8] (such as language) of access to health care among non-camp refugees disappear. Thus, the increase in the demand for healthcare increases the UHCN of the native-born population. We also support our significant estimates with the event-study approach and estimating the impact of the refugee influx on unmet dental healthcare needs.

The research outline is as follows: We begin by describing the leading development in the Turkish health system, especially after the Health Transformation Program in Section 2. In Section 3, we describe our data sets. In Section 4, we give the figures for the UHCN in Turkey. Section 5 provides the refugees' access to the health system in Turkey. In Sections 6 and 7, we introduce our estimation approach. We present our baseline results and robustness checks in Section 8. We conclude in Section 9.

2. Health Systems in Turkey

In the early 2000s, given the health consequences of Turkey's health system's performance, financial protection, and patient satisfaction, Turkey took place in the bottom row among the OECD countries (WHO, 2012). Cost increases in health services, increasing expectations, limited public payment capacity, and suspicion of traditional methods force countries to make structural reforms in health systems (Roberts et al., 2004). To disentangle, the new Government covered healthcare objectives within the Urgent Action Plan prepared in 2002. Following the Urgent Action Plan, in 2003, the Ministry of Health redesigned the Turkish health system with the Health Reform Program (HTP).

Initially, the HTP announced eight main themes; the Ministry of Health added three more themes due to the dynamic nature of the Program (Akdağ, 2008):

1. Ministry of Health as the planner and supervisor,
2. Universal health insurance gathering everyone under a single umbrella,
3. Widespread, easily accessible, and friendly health service system,
    a. Strengthened primary healthcare services and family medicine,
    b. Effective and staged referral chain,
    c. Health facilities having administrative and financial autonomy,
4. Health human resources equipped with knowledge and skills, and working with high motivation,
5. Education and science institutions to support the system,
6. Quality and accreditation for qualified and effective health services,
7. Institutional structuring in the rational management of medicine and supplies,

[8] See Ay et al. (2016) for a detailed information.

8. Access to sufficient information at the decision-making process: Health information system.
9. Health promotion for a better future and healthy living programs,
10. Multi-dimensional health responsibility for mobilizing the parties and inter-sectoral collaboration,
11. Cross-border health services which will increase the country's power in the international arena

The motto of the Program was, "We have the consciousness that the health service is a right for the citizens, not a grace of the government." HTP develops a social insurance model that people access healthcare services in line with their needs and contribute to financing healthcare services in proportion to their financial strength (Akdağ, 2012). Starting in January of 2007, even though a citizen does not have social security, s/he can utilize primary healthcare services.

2.1 Demand-side of the health system

The demand for healthcare services increases due to the burden of chronic diseases because the population gets old. The percentage of the individuals who are 15 years old and over receiving inpatient health services is 10.8 percent in 2019. This ratio was 9.2 percent in 2008. Seventy-five years old and over placed the first rank with 23.7 percentage and 65-74 age group followed by 18.3 percent in 2019 (Table A1). Awareness of health leads individuals to preventive services. Nearly half of the individuals benefited from the measurement of blood pressure. It is striking that only a quarter of the individuals controlled for blood cholesterol and blood sugar in 2008, but this ratio become about 40 percent in 2019 (Table A2). The number of patients' hospital visits per physician also confirms the increase in healthcare services demand. Between 2009 and 2018, patients' hospital visits per physician increased by 14.9 percentage (Table A4).[9] We also observe that the total health expenditure per capita has risen rapidly since 2010 (Table A3).

Refugees need various kinds of support, including healthcare, education, infrastructure and resettlement resources, and funding. Because of their current situation, refugees may have low health status. Unfortunately, the situation is not different for the Syrian refugees in Turkey. While only 0.3 percent of Syrian refugees in the 18-69 age group are in the low-risk group for non-communicable diseases, the proportion of those in the medium-risk group (1-2 risk factors) is 41.1 percent, and the proportion of those in the high-risk group (3-5 risk factors) is 58.7 percent. 3-5 risk factors are more common among men (61.3 percent) than women (56.1 percent). In the 18-44 age group, 45.7 percent of men and 46.1 percent of women are in the

[9] The analytical framework regarding health statistics published by the Ministry of Health consists of administrative records of all public institutions and organizations on the health area, and also statistical information obtained from field surveys.

high-risk group. A striking finding is that men (81.7 percent) and women (87.1 percent) in the 45-69 age group have high combined risk (more than three risk factors) (WHO STEPS[10], 2015).

Besides, large-scale migration increases infectious disease risks, overcrowding hospitals, and more generally damaging financial and health resources. In addition to these crowding problems in hospitals, the native-born population complains about Syrians consuming health resources and preventing the native-born population from getting access to services when needed (Ekmekçi, 2017). In case Syrian refugees have to live in more extended periods, the consequences of this situation in the long term will be significantly damaging in terms of health.

2.2 The supply side of the health system

The population's healthcare needs and the increasing demand for healthcare services force an increase in healthcare professionals. Before the HTP, the supply of healthcare professionals was inefficient in Turkey. Regarding the number of physicians per hundred thousand, Turkey ranks at the bottom of the WHO European Region. The situation is the same for other healthcare professionals. Although there is an improvement in these indicators with the HTP, Turkey still has a very low ranking. We provide detailed statistics for healthcare professionals in Table A4.

3. Data

3.1 Survey of Income and Living Condition (SILC)

The primary data set that we use for this research is TURKSTAT SILC microdata for the period $2006-2018$. This survey covers all settlements within the Republic of Turkey's borders and all household members living in these borders' dwellings. However, this survey does not include the institutional population, such as university dormitories, guesthouses, kindergartens, nursing homes, private hospitals, prisons, and military barracks. Although the non-representation of the institutional population may cause misleading results[11], we deal with this problem by weighting the data set using TURKSTAT weights calculated for this micro dataset.

The respondents reply, "What is the main reason for the unmet healthcare need during the last 12 months?" The options for this question are:

1. Financial difficulty/Could not afford to (too expensive or not covered by insurance fund),
2. Could not take time because of work, care for children or others,
3. Too far to travel to healthcare organizations/no means of transportation,
4. Fear of doctor/hospitals/examination/treatment,
5. Giving too late time for an appointment,
6. Wanted to wait and see if the problem got better on its own,

[10] WHO STEPS survey, conducted in December 2015, for Syrian refugees living in Turkey, is a cross-sectional study focused on the refugee population in the ten provinces. The STEPS questionnaire for Syrian refugees has examined five important risk factors classified as follows: In the current situation, daily smoking, consuming less than five servings of fruits and / or vegetables per day, not meeting physical activity recommendations, the presence of overweight or obesity, high blood pressure have been questioned.

[11] For example, research related to the labor market (Ilhan, 2012).

7. Did not know any good doctor or specialist and
8. Other reasons.

Literature classifies these reasons into three groups: Availability of healthcare, accessibility, and acceptability of available healthcare (Hou and Chen, 2002; Sibley and Glazier, 2009). *Availability of healthcare* refers to long waiting times; service is not available when required or not existed within the area. Unmet needs due to *accessibility* are related to cost or transportation concerns. The rest of the reasons includes the preferences or circumstances of an individual. Note that planners cannot regulate these personal reasons because they are not related to healthcare services. Besides, we consider the reasons that are related to healthcare services as *systematic reasons*.

3.2 Syrian Refugees

We create the treatment effect variable by calculating the number of Syrian refugees per 100 native-born population at the region level. We follow three different approaches according to the years' data availability to obtain this refugee presence ratio. Firstly, for the years 2016, 2017, and 2018, we use the official Syrian refugee data at the province level that the Ministry of Interior has been announcing since 2016. Secondly, for the years 2014 and 2015, we benefit from Erdoğan's (2018) data and Erdoğan and Ünver's (2015) data. These studies used different data sources to make predictions for refugee presence at the province level. Finally, to calculate refugee presence for the years 2012 and 2013, we exploit the fact that refugee's preferences are quite similar at different times. Altındağ and Kaushal (2020) also used this approach.

We define the refugee preference as a share of the number of refugees in a province to Turkey's total number of refugees. After successfully obtaining the number of refugees for each province for the years between 2012 and 2018, we convert these to regional numbers and reach the refugee presence at the regional level by dividing them into the regional population.

3.3 Health Service Indicators

Health service indicators (HSI) have been enhanced dramatically for the years after the 2000s in Turkey. For that reason, to have robust estimates for refugees' impact on the healthcare needs of the native-born population, we should control the effect of these indicators on health outcomes. We use TURKSTAT Regional Statistics, the Health Yearbooks of the Ministry of Health, and Investment Incentives Database of the Ministry of Trade to get HIS's at the regional level. We calculate all indicators per 100.000 population at the regional level except the health investment and family health center variables. We calculate the health investment ratio as the share of health investment expenditure to regional GDP.

For our study period, different health policy implementations probably have an impact on health outcomes. Our research design could control their impact on health outcomes automatically since all the implementation is either at the national level or initiate at the same time. However, the Family Medicine Program that has a positive causal effect on health outcomes (Resul et al.,

2017) has been implementing in different provinces at different times. For that reason, we construct a variable to control the indirect impact of this policy on health outcomes.

$$Family\ Center\ Ratio_{rt} = \frac{\sum_i (Policy_{it} \times Pop\_province_{it})}{Pop\_region_{rt}} \quad (1)$$

$Policy_{it}$ is a binary indicator that takes value 1 if the Government implements the family medicine program in province i and year t. The summation of the interactions $Policy_{it}$ with the population of each province of the region r shows the prevalence of the region's policy. Since the variable displays both the duration and the policy's prevalence, we can control differences across regions in terms of both years of the policy implementation and the policy's inclusiveness.

4. Unmet need for healthcare in Turkey

Until 2019, there has been no official figure for the UHCN ratios. For the first time, İkizler (2017) drew attention and calculated these figures for Turkey. Following the procedure of İkizler (2017), we calculate the UHCN ratios for the 2006-2018 period using weighted cross-sectional micro data set (Survey of Income and Living Conditions (SILC) TURKSTAT). The figures may be different from those in EUROSTAT because we use the weighted data set. However, both values imply the same development, and we decide to continue with the weighted ratios.

We report the UHCN arising from systematic (availability and accessibility) and personal (acceptability) reasons in Table A5. In 2006, the UHCN was 23.9 percent and declined to 7.1 percent in 2018. In addition to that, Turkey achieved the smallest level (6.8%) in 2017. Most of the development is a result of the decline in the UHCN arising from systematic reasons. The HTP, initiated in 2003, plays a vital role in this development. Initially, the Program had no observable effect, especially after the Family Physician Practice, Centralized Doctor Appointment System, and General Health Insurance, the UHCN ratios have declined. Even though Turkey succeeded significantly, the ratio is far above the EU-28 average of 3.6 percent in 2018.

The UHCN arising from availability reasons that are a small portion of systematic reasons stays about 0.5-0.8 percentage. As we noted in Section 2, health supply has been increasing during the last decade, but the stability of the UHCN arising from availability reasons can be an alarming situation. In addition to this, there exists a downward trending in the UHCN arising from transportation access reasons. Nevertheless, the fact that with the city hospitals the hospitals in the city center are gathered in one place far from city centers indicates that there may be an increase in this ratio in the following period if the Government does not take this issue very seriously.

Unfortunately, the UHCN arising from personal (acceptability) reasons stays almost the same in the period examined. Consequently, the share of personal reasons increases throughout the period. A government can activate health policies to decrease systematic reasons. However, to decrease the UHCN arising from personal reasons, the Government should implement social policies, such as childcare (İkizler, 2017).

Table A6 provides the UHCN from systematic reasons by gender, age group, regions, income group, and education levels. We observe that the UHCN for females is always higher compared to figures for males. One of the main results is the despicable gender-wage gap. The relation between age and the UHCN arising from systematic reasons is left-skewed bell-shaped. This ratio reached its maximum among the individuals between 35-44 years old. In addition to that, the observed ratio for elder appears more compared to adults. The UHCN is about twice as likely among adults 65 or older than those aged 15 to 24. With increased age comes increased responsibility, then this may increase the UHCN.

Regarding regional developments in the UHCN, we notice that each region follows a very different path. While we observe tremendous improvements in some regions, some regions could not maintain their current advantages. For example, in 2006, the İstanbul region and the Aegean region had the UHCN ratio level in the top four regions. There exists a gap in the UHCN between these two regions in 2018. While the Aegean becomes the region with the lowest UHCN ratio, İstanbul becomes the region with the highest UHCN ratio. In this research, we analyze the regional differences in migrant populations' different influx into each region.

There is a strong correlation with income and the UHCN arising from systematic reasons, and considering that most of the systematic reason related to financial access, it appears predictable. Concerning education, the lowest UHCN arising from systematic reasons occurs among university graduates. Since students already have government support in health, there is no problem, and even the ratio has gotten better over time. The persons who had not completed any school are six times more likely than those with a university education to have a UHCN. We can say that there is a strong relationship between increased education and health access. This result is likely to be due to the relationship between education and income.

5. Milestones of Syrian Refugee Crisis and Accession of Refugees to Health in Turkey

Due to the political conflict in Syria, the number of Syrian refugees has considerably increased in the early 2010s. The refugee influx has generally been towards neighboring countries such as Turkey, Lebanon, Jordan, Iraq, and Egypt. However, Turkey becomes prominent among these countries to have a very liberal refugee policy known as the "open border policy." The Government declares the policy as, "Turkey will keep its borders open to those seeking safety; no individuals from Syria will be sent home against their will, and the basic humanitarian needs of persons fleeing the war will be met." Therefore, Turkey has hosted more refugee than other countries have done and have become the largest refugee-hosting country in the world since 2015 (UNHCR, 2018).

There are three dramatically different phases in the density of the refugee influx. In the first phase, a relatively small number of refugees in Turkey in the early years of crisis exist. In the second phase, the refugee number increased significantly for the years between 2014 and 2016. There exist two factors that explain the mass refugee influx. Firstly, regulations towards refugees could encourage influx. Secondly, there was increasing violence of ISIS in those years. The last phase started in 2016. The refugee presence has been high and relatively less volatile. It points out that the refugee influx and outflow were close to each other in that period.

The Turkish Government had not comprehensive projections for the current situation at the beginning of the influx. Erdoğan (2018) mentioned that the anticipated duration of stay for Syrians was a few weeks, with 50-100 thousand in number at the onset of the crisis. Moreover, the dynamic structure of the crisis made policy implementation towards refugees more difficult for some reason. First, there are not enough refugee camps that can host every refugee. Even though refugees started to spread into the country and stray without any governmental monitor, they did not have any legal status until 2014. Since there were too many institutions responsible for managing refugee influx, the communication and the coordination between them were quite limited. These made the refugee recording process, policy implementation, and detection of vulnerable groups of refugees more difficult.

To overcome the problems of this chaotic term, the Government announced Syrians' status as "people under temporary protection." Temporary Protection Regulation offers Syrian refugees access to legal protection and provides for their access to national systems such as education, health, and the possibility of obtaining work permits (UNCHR, 2018).

Among national systems that have the right to access, health benefits have been more crucial than others. Due to war conditions, refugees' needs to access health services have been more prominent than other needs' especially in terms of vaccination or mental healthcare. According to a field survey that AFAD conducted in 2014, 59.5 percent of refugees used health services. While 79.4 percent of them were satisfied with the healthcare they received, 54.2 percent stated that they had difficulty finding medicines. The most common reasons for their inability to benefit from healthcare services are not having medical needs and being no entitlement, with a share of 59.7 percent and a share of 15.9 percent, respectively. In terms of health issues among refugees, while 46.3 percent of adult refugees reported that they need psychological support, 45.4 percent and 41.3 of child refugees were not a vaccine against polio and measles, respectively.

Although refugee numbers have increased dramatically, thanks to the Ministry of Health's tremendous efforts to deliver health services to them, indicators about health access have been better. According to another field survey that AFAD repeated in 2017, 62.9 percent of refugees used health services. While 81.8 percent of them were satisfied with the healthcare they received, 54.2 percent stated that they had difficulty finding medicines. The most common

reasons for their inability to benefit from healthcare services are not having medical needs and being no entitlement, with a 42 percent share and 15 percent, respectively. In terms of health issues among refugees, 43.6 percent of adult refugees reported that they need psychological support. Besides, most children have been vaccinated against polio and measles.

The increasing mental and psycho-social difficulties faced by Syrian refugees constrain Turkey's health system's capacity. The priority matters are expanding mental health services to address growing needs and reducing life-threatening reproductive health risks (UNCHR, 2016). The Ministry of Health and its supporters, WHO, the European Union, health sector partners, and other humanitarian actors have initiated an enhanced program to fulfill refugees' health service needs. The Program's main goal is to provide linguistic and culturally sensitive primary healthcare services for refugees. The Program has created a Migrant Health Centers (MHC) network across the country where Syrian doctors and nurses offer health services to refugees. Within this goal, Syrian doctors and nurses get training to serve in the Turkish healthcare system across the network of MHCs. The training program's purpose is to teach Syrian healthcare workers how to navigate the system. In 2018, over 580,000 primary healthcare consultations were provided in the seven Refugee Health Training Centers, relating to immunization, maternal care, and child healthcare (UNCHR, 2018). In 2019, the number of Migrant Health Centers reached 191 and increased consultation number, and higher patient satisfaction (UNCHR, 2019).

6. Methodology

6.1 Constructing Pseudo Panel

This research aims to determine the development of the UHCN of the native-born population when there is a mass refugee influx. To achieve this aim, we need a panel dimension of microdata to analyze the change in the UHCN of the native-born population. Even though TURKSTAT SILC provides a micro data set with panel dimension, the question "Did you have an unmet need for healthcare or treatment during the last 12 months?" is asked to respondents only in a cross-section micro dataset. In the absence of long enough and regular panel data, Deaton (1985) suggests using pseudo panels.[12]

To construct pseudo panel data, we need to determine the standard time-invariant features of individuals. The studies choose various time-invariant standard features of individuals, for instance, five-year age groups, being household head, employment status (Browning et al., 1985); races, genders, and age groups (Russell and Fraas, 2005); age groups and regions (Propper et al., 2001). In this paper, we form cohorts according to 11 five-year age groups, two genders (male-female), and 12 regions (NUTS-1 level) that results in a total of 264 ($11 \times 2 \times 12$) cohorts for each year. Table 1 shows the number of people in the most extensive and smallest cohort in the non-weighted data set over the years. Note that there are observations in each cohort.

[12] Heshmati and Kumbhakar (1997) explain the advantages of pseudo panels over regular panels.

Table 1: Number of people in unweighted cohorts by years

Number of people/Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Smallest cohort	42	41	36	40	41	43	47	40	53	66	42	51	55
Largest cohort	292	303	307	297	295	411	472	598	662	605	613	640	674

There are three types of variables in our pseudo panel data set. For some variables, we take the mean of the variables for respondents in each cohort; these are *continuous variables,* such as income. Time-invariant standard features of respondents that are five-year age groups, gender, and regions, appear as a *dummy variable* in the pseudo panel. Categorical variables in the cross-section data now represent the presence or absence of each respondent's particular feature in a cohort. These are *proportional variables*, such as educational level.

6.2 Determination of independent predictor variables

"Healthcare utilization" refers to the use of healthcare services. Andersen Healthcare Utilization Model (1968) suggests that healthcare utilization is a function of predisposing factors (such as race, gender, and age), enabling factors to use, and the need for healthcare (Andersen, 1995). This pioneering model combines the "how's" and "why's" of health services' use. We determine variables in our model according to Andersen's model.[13]

Predisposing factors are related to healthcare utilization, and they are assumed to be stable or not changed regularly. These factors are marriage status, gender, household head, household types, education level, and employment status. *Enabling factors* provide a greater likelihood that a person utilize healthcare. As enabling factors, we consider income levels, ownership of car or internet, and the location. There are two groups of *need* for healthcare. The first group contains self-reported general health status (Very good, good, fair, bad, and very bad)[14] and suffer from any a chronic[15] (long-standing) illness or condition. The second group is related to environmental factors that may cause healthcare needs, such as damp walls, heating problems, and lack of daylight and pollution. Table 2 tabulates these independent factors as groups. We present the descriptive statistics of the variables in Table A7.

[13] Sibley and Glazier (2009) also analyze unmet health care needs using Andersen's Model.
[14] In our model, we categorize general health status into three groups: Good (Very good and good), Moderate (Fair), and Poor (Bad and very bad).
[15] Diabetes, hypertension, asthma, renal failure, rheumatic diseases, etc.

Table 2: The independent predictor variables

Andersen's Model	Variable Groups	Independent Variables
Predisposing Factors	***Demographic***	Marriage (reference: single)
		Gender (reference: male)
		Household Head
		Age (reference: 40-44 years old)
	Social Structure	A household with children (reference: other household types)
		Students, those without diplomas, high school graduates, university graduates (reference: primary or secondary school graduates)
		Informal employment, unemployed (reference: formal employed)
Enabling Factors	***Personal/Family***	**Income Group** First quintile, second quintile, fourth quintile, fifth quintile (reference: third quintile)
		Internet ownership
		Car ownership
	Community	NUTS-1 regions (reference: İstanbul)
Need	***Perceived***	General health is good, general health is low (reference: general health is moderate)
		Chronic disease state
	Evaluated	Damp walls
		Heating problem
		Lack of daylight
		Environmental pollution

7. Model

7.1 Related literature

The refugee-related literature of Turkey generally focuses on labor market outcome, price development, and election results. Studies generally use two types of research designs to investigate the refugee effect on Turkey's socio-economic indicator.

The first strand of literature uses an identification strategy, which is quite similar to the seminal study of Card and Krueger (1994) that compares data from New Jersey and Eastern Pennsylvania to analyze the effect of the minimum wage law on employment outcomes. They use regions with government-operated accommodation camps as treatment areas and use regions neighboring the treatment areas that do not have the camps as control areas. Akgündüz et al. (2015) state that housing and food prices increased, but native-born populations' employment rates are mostly unaffected by the refugee influx. Balkan and Tümen (2016) estimate that the general level of consumer prices has declined by approximately 2.5 percent due to the refugee influx. They state that the channel through which the price declines take

place is the informal labor market. Tümen (2016) finds that there are moderate employment losses among native-born informal workers. The prices of the items produced in informal labor-intensive sectors declined due to labor cost advantages. Rents increased due to high demand in refugee hosted regions. Ceritoğlu et al. (2017) show that immigration affected the native-born population's employment outcomes, while its impact on wages was insignificant. Akgündüz et al. (2018) suggest that hosting refugees is favorable for Turkish firms. They state that total firm entry does not seem significantly affected while there is a significant increase in the number of new foreign-owned firms. Besides, there is some indication of growth in gross profits and net sales.

The second strand of literature uses an instrumental variable strategy to have a causal interpretation of the migration crisis's impact. Studies formulate an instrumenting strategy based on two ideas that could explain refugee location preferences. Former is the travel distance between Syrian governorates and Turkish regions, and the latter is the share of Arabic speaking people in each region's population in 1965 as a historical network indicator. Del Carpio and Wagner (2015) find that the mass refugee influx results in the large-scale displacement of informal, low-educated, female Turkish workers, especially in agriculture. Yüksel (2019) finds that the refugee influx positively affects vote share for the main opposition party in local elections. He states that economic developments influence voting behavior, such as political polarization and ideological factors. Besides, the study could not find a causal relationship between the refugee influx and the far-right party's vote share in contrast to European countries. Fisunoğlu and Sert (2019) estimate a negative but insignificant impact on the incumbent party. They state that the findings have policy implications for Turkey and any country that experiences refugees' considerable flux. Altındağ and Kausal (2020) find robust polarization in refugees' attitudes between the ruling party's supporters and opponents. However, their analyses suggest that the mass refugee influx induced only a modest net drop in support for the party.

We choose to implement an instrumental variable strategy for two crucial reasons. The first reason is that our data have a region variable with a broader region definition (Nuts 1). Thus, both the provinces with no refugee camps and refugee camps are in the same region because of this broad definition. In other words, treatment provinces and control provinces become similar in our data. The second reason for choosing the instrumental variable strategy is our study time interval. We choose a broader time frame regarding other studies. After 2014, refugees have initiated to locate all around the country. For that reason, it is impossible to find a control region where it has not been affected by the influx to implement a control-treatment type research design.

7.2 Empirical approach

Our empirical approach to obtaining the refugee influx's causal effect on the UHCN indicators is a difference-in-differences estimation approach. We define our difference-in-differences estimation approach using the following Equation (2):

$$Y_{irt} = \beta_0 + \beta_1 R_{rt} + X'_{irt}\theta + E'_{rt}\varphi + \delta_i + \tau_t + \omega_r + T * \omega_r + \varepsilon_{irt} \quad (2)$$

where Y_{irt} is the average UHCN indicators of cohort i, in region r and year t. Our primary independent variable of interest R_{rt} is the number of Syrian refugees per 100 native-born population. The vectors X_{irt} and E_{rt} represent the time-varying cohort and region level characteristics. Specifically, X_{irt} includes control variables that are related to the general health condition, socio-economic situation, and environmental factors. The vector E_{rt} includes control variables that are related to health service indicators of regions.

We denote δ_i as a cohort fixed-effect variable that captures time-invariant differences among cohorts. Year fixed effects variable, τ_t, controls for the national-level factors that affect the UHCN, such as epidemics. Region fixed effects variable, ω_r, captures differences across regions such as cultural and historical features that are time-invariant during the study time frame. Region-specific linear time trend variable, $T * \omega_r$, refers to any unmeasured region-level trends that could be related to the UHCN or refugee influx. Finally, ε_{irt} is the idiosyncratic error term.

We repeat Equation (2) for the UHCN and its main component. We cluster the standard errors at the cohort level in every specification to abstain from possible heteroscedasticity and serial correlation problems within cohorts over time (Bertrand et al., 2004).

To estimate β_1 in Equation (2), we use within-regions variations of refugee presence over the years as idiosyncratic variations. In our study, endogeneity is the core problem to have unbiased estimates of β_1. Since the Government has implemented almost no restriction about refugees' settlement preferences, their location choices are probably endogenous. For example, refugees could prefer regions where they have enhanced health facilities related to UHCN. In another case, refugees could choose rich regions where citizens have less UHCN due to their wealth and economic opportunities. Therefore, to provide a causal interpretation for β_1, we instrument the independent variable of interest.

We choose to implement Altındağ and Kaushal (2017) instrumenting strategy that uses Turkish citizens whose mother tongue is Arabic as an instrument for refugee presence. We do not prefer to implement other instrumenting strategies that rely on travel distance because studies show that closeness to border regions could affect health outcomes (Salinas et al., 2013). Our instrumental strategy consists of interactions of two variables: the share of Arabic-speaking people in each regional population and the total number of refugees. The identifying assumption

is that our instrument variable is as good as random after controlling all observable indicators through the region and year effects since it captures the refugee's location preference, relying on only historical networks.

$$IV_{rt} = (Share\ of\ Arabic\ Speaking\ People)_r \times (Total\ Number\ of\ Refugees)_t \quad (3)$$

The central identifying assumption of any difference in difference estimation strategy is the parallel trend assumption. Although our research strategy does not have treatment regions discretely and control regions discretely, we implement a prior trend analysis to see whether there is a problem with the parallel trend assumption. For that, we choose two regions where the share of Arabic-speaking people is highest in 1965 as a treatment region. Then, we show both trends of unmet health care indicators and refugees' share in the population before and after the refugee arrivals. According to Figure A4, we provide evidence that trends in unmet health care needs before the refugees' arrivals exhibit the same patterns in both control and treatment regions. Therefore, we conclude that there are no factors that prevent holding the parallel trend assumption. To strengthen this conclusion and as a robustness check for our results, we conduct an event-study analysis. The analysis provides differences in the UHCN across regions in the years before and after the refugee crisis. For this aim, we run the following model and plot the estimated coefficients. This analysis's central importance is to examine whether the UHCN trends were common across regions before the refugee influx.

$$Y_{irt} = \beta_0 + \tau_t + \omega_r + \delta_i + T * \omega_r + X'_{irt}\theta + \sum_t \propto_t (T_t * A_r) + \varepsilon_{irt} \quad (4)$$

As in Equation (2), Y_{irt} is the average UHCN indicators of cohort i, in region r and year t. All variables are the same as in Equation (2) except $T_t * A_r$. Let T_t be a binary indicator for each year and A_r be the population share of Arabic speaking people in region r in 1965.

8. Results

8.1 Baseline Results

We present our main findings in Tables A8 to A11, including estimates of the refugee effect on the UHCN outcomes explained in the previous sections. We weight all estimates using cohorts' average population share. We also cluster standard errors at the cohort level.

In Table A8, we estimate the relationship between the refugee influx and the UHCN. Each column represents a different specification. Once we successfully add the region-specific time trends variable, we have very consistent magnitudes in all specifications. In our most enhanced Specification (6), we find that a one percentage point increase in refugee presence results in a 0.0024 percentage point increase in the UHCN with the OLS approach. According to the IV approach, a one percentage point increase in refugee presence results in a 0.0038 percentage

point increase in the UHCN. This finding points to an approximately 1.85 percent increase relative to the pre-treatment period's UHCN average.

In Table A9, we investigate the heterogeneity of the effect of refugee influx on the UHCN. We prefer to use the most enhanced Specification (6) and conduct it to systemic needs and personal needs, respectively. According to results, while the refugee influx affected systemic needs, we cannot find any significant relationship between the refugee influx and personal needs. Therefore, we can say that there is no common trend across the main components of UHCN. This result is essential since, in the case where there is a common trend across the components, we should consider the possibility of a spurious correlation between the refugee influx and the UHCN. According to the IV approach, a one percentage point increase in refugee presence results in a 0.0031 percentage point increase in systemic needs. This finding points to an approximately 2 percent increase relative to the pre-treatment period's average systemic needs.

We perform our study again by choosing different time-periods as a sensitivity analysis. In Table A15, we show that the refugee effect on the UHCN is more significant at the early stage of the migration influx. When we repeat this exercise using different IV strategies (Del Carpio and Wagner (2015), Kırdar et al. (2020)), we find the same results that the negative causal impact on the UHCN from the influx is more significant at the early stages of the migration crisis. When we calculate the elasticity of refugee effect on UHCN for the years between 2010 and 2014, we find that a one percentage point increase in refugee presence results in a 6.3 percent increase in UNCH.

8.2 Robustness Checks

To get more confidence in our results, we conduct a placebo analysis using dental care's unmet needs. Low-income communities that struggle for food and shelter prioritize their dental healthcare needs at the bottom of the list (Daiski, 2007; Gelberg et al., 2008; Wallace and MacEntee, 2012). We expect the same situation is valid for refugees. This expectation indicates that the mass refugee influx will not significantly affect the native-born population's dental healthcare needs. As shown in Tables A10-A11, although OLS estimates state some statistically significant relations, the refugee influx's impact on dental care's unmet needs is indistinguishable from zero with all estimates according to the IV approach. Therefore, these support our results that state the refugee influx has a negative causal impact on the UHCN.

The event-study analysis results can be seen graphically in Figures A1–A3. Also, one can follow the same results from Tables A12-A14. The estimates representing the periods before the refugee influx are all statistically insignificant, except in 2010, suggesting no evidence of differences in pre-existing trends in the UHCN indicators across regions using Specification (6).

9. Conclusion

In this research, we have questioned the impact of the mass refugee influx on the UHCN of the native-born population by exploiting the natural experiment. Our central hypothesis was that the mass refugee influx increases the ratio of the UHCN arising mainly from systemic reasons.

We have found that the UHCN of the native-born population has increased due to the mass refugee influx using a difference-in-differences approach. We have estimated the magnitude of this increase by nearly 6.3% at the beginning of the refugee crisis. We have shown that the impact diminishes as the imbalance of demand and supply of healthcare services diminishes. We have also verified our significant estimates with the event-study approach and estimating the impact of the refugee influx on the unmet dental healthcare needs. We have noted that low-income communities that struggle for food and shelter prioritize their dental healthcare needs at the bottom of the list. In line with our expectations, the mass refugee influx did not significantly affect the native-born population's dental healthcare needs.

We have also noted that the mass refugee influx was about 4 percent of the population in Turkey. We consider this as a robustness check for the health system in Turkey. Even though the migration shock is massive, the unmet healthcare needs' change remains at a reasonable interval.

The recent estimated increase in the refugee crisis's impact on the UHCN of the native-born population indicates that the Government needs to implement additional measures to control this increase. The figures of the UHCN calculated for each demographic unit can be a guideway for cautionary health policies.

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Appendix

Table A1: The percentage of individuals being in a hospital as an inpatient that is overnight or longer in the last 12 months

[15+ age**]**

	2008	**2010**	**2012**	**2014**	**2016**	**2019**
Total	**9.2**	**9.0**	**8.9**	**11.6**	**11.3**	**10.8**
15-24	6.1	6.8	5.9	8.0	7.5	6.5
25-34	9.5	9.1	8.4	10.6	10.7	9.7
35-44	7.1	7.1	7.2	8.9	9.0	9.0
45-54	8.8	8.1	7.8	10.9	10.6	10.1
55-64	12.0	11.3	11.3	14.1	13.4	13.6
65-74	18.4	15.2	17.8	23.2	20.5	18.3
75+	16.6	20.2	21.8	25.6	26.5	23.7

Source: Turkey Health Interview Survey

Table A2: The percentage of individuals had measurements during the last 12 months

[15+ age**]**

Measurements	**2008**	**2010**	**2012**	**2014**	**2016**	**2019**
Blood pressure	47.7	47.6	48.4	50.2	48.6	50.8
Blood cholesterol	24.7	28.5	30.4	34.4	36.7	41.2
Blood sugar	26.7	30.2	33.0	37.6	39.7	44.4

Source: Turkey Health Interview Survey

Table A3: Health expenditures by healthcare service providers

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total Health Expenditure	44,069	50,904	57,740	57,911	61,678	68,607	74,189	84,390	94,750	104,568	119,756	140,647	165,234
Central Government	11,766	13,966	15,948	17,946	17,209	19,086	16,493	18,425	21,282	25,286	28,731	35,316	40,461
General Government	30,116	34,530	42,159	46,890	48,482	54,580	58,785	66,228	73,382	82,121	94,012	109,744	128,021
Households	9,684	11,105	10,036	8,142	10,062	10,590	11,750	14,156	16,819	17,315	19,562	24,004	28,655
Local Government	683	867	865	667	577	557	662	810	744	927	1,118	1,303	1,439
Other Private Sector	4,269	5,269	5,545	2,879	3,134	3,438	3,654	4,006	4,549	5,131	6,182	6,900	8,558
Private Sector	13,953	16,374	15,580	11,021	13,196	14,028	15,404	18,162	21,368	22,446	25,744	30,904	37,213
Social Security	17,667	19,697	25,346	28,277	30,695	34,937	41,630	46,993	51,356	55,908	64,163	73,125	86,121
Total Health Expenditure / GDP (%)	5.58	5.78	5.80	5.80	5.32	4.92	4.73	4.66	4.63	4.47	4.59	4.52	4.44
Total Health Expenditure per capita	735	726	813	804	843	924	987	1,108	1,228	1,337	1,511	1,751	2,030
Annual change (%)	-1.24	-1.23	12.00	-1.08	4.90	9.61	6.77	12.30	10.77	8.90	12.99	15.93	15.90

Source: TURKSTAT

Table A4: Healthcare Professionals

	2000	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Inpatient medical institutions	1,183	1,203	1,317	1,350	1,389	1,439	1,453	1,483	1,517	1,528	1,533	1,510	1,518	1,534
Ministry of Health	861	767	848	847	834	843	840	832	854	866	865	876	879	889
Other	19	49	48	46	46	45	45	45	44	37	36	0	0	0
Private	261	331	365	400	450	489	503	541	550	556	562	565	571	577
University	42	56	56	57	59	62	65	65	69	69	70	69	68	68
Number of Hospital Beds[1]	2,1	2.5	2.5	2.6	2.6	2.7	2.6	2.6	2.6	2.7	2.7	2.7	2.8	2.8
Number of														
Physician	85,242	104,475	108,402	113,151	118,641	123,447	126,029	129,772	133,775	135,616	141,259	144,827	149,997	153,128
Dentist	15,906	18,332	19,278	19,959	20,589	21,432	21,099	21,404	22,295	22,996	24,834	26,674	27,889	30,615
Medical Institutions	10,747	9,831	11,839	13,818	15,205	26,993	27,997	29,960	30,116	30,176	30,449	32,980	33,587	34,559
Midwife	41,594	44,483	47,175	47,673	49,357	50,343	51,905	53,466	53,427	52,838	53,086	52,456	53,741	56,351
Nurse	69,550	82,626	94,661	99,910	105,176	114,772	124,982	134,906	139,544	142,432	152,803	152,952	166,142	190,499
Pharmacist	21,927	23,140	23,977	24,778	25,201	26,506	26,089	26,571	27,012	27,199	27,530	27,864	28,512	32,032
Patients Hospital Visits[2]	-	-	-	-	4,446.7	4,366.9	4,850.0	4,791.4	4,711.8	4,748.6	4,673.0	4,734.7	4,793.0	5,110.0
Number of Persons														
per Physician	753.8	667.4	651.2	632.1	611.6	597.2	592.9	582.8	573.1	572.9	557.4	551.1	539.0	536.0
per Dentist	4,039.5	3,803.7	3,661.5	3,583.2	3,524.3	3,439.9	3,541.6	3,533.3	3,438.8	3,378.7	3,170.7	2,992.2	2,898.0	2,679.0
per Midwife	1,544.7	1,567.6	1,496.3	1,500.2	1,470.1	1,464.4	1,439.6	1,414.5	1,435.0	1,470.5	1,483.3	1,521.6	1,504.0	1,455.0
per Nurse	923.8	843.9	745.7	715.8	689.9	642.3	597.9	560.6	549.4	545.5	515.3	521.8	486.0	430.0
per Pharmacist	2,930.3	3,013.4	2,943.9	2,886.3	2,879.3	2,781.4	2,864.2	2,846.2	2,838.3	2,856.6	2,860.2	2,864.4	2,834.0	2,560.0

[1] Per 1000 Persons [2] per Physician

Source: TURKSTAT

Table A5: Unmet need for healthcare in Turkey according to the reasons (%)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Systematic	18.86	13.95	13.09	14.75	16.19	12.11	10.23	10.33	9.02	7.01	4.03	3.02	3.59
Availability	1.66	0.94	0.70	0.75	0.61	0.53	0.57	0.58	0.43	0.35	0.27	0.46	0.74
Accessibility	17.20	13.01	12.39	14.00	15.58	11.58	9.66	9.75	8.58	6.67	3.76	2.56	2.85
Financial access	16.81	12.42	11.78	13.35	14.91	10.85	9.08	8.99	7.85	6.07	3.31	2.25	2.45
Transportation access	0.39	0.59	0.61	0.65	0.67	0.73	0.58	0.76	0.73	0.59	0.45	0.32	0.40
Personal	5.07	4.08	4.78	4.30	5.11	4.78	4.64	5.12	4.99	4.63	3.45	3.81	3.55
Total	23.93	18.03	17.87	19.05	21.30	16.89	14.88	15.45	14.00	11.64	7.48	6.83	7.14

Source: SILC, Authors' calculations

Table A6: Unmet need for healthcare in Turkey according to the systematic reasons (%)

		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Gender	*Female*	19.7	14.8	14.1	15.8	17.6	13.4	11.2	11.5	9.8	7.7	4.4	3.3	4.0
	Male	18.0	13.1	12.1	13.6	14.7	10.8	9.2	9.1	8.3	6.3	3.7	2.7	3.1
Age group	*15-24*	13.3	8.6	8.1	10.4	10.2	7.1	5.3	6.1	5.2	3.9	2.8	1.8	2.1
	25-34	19.4	14.4	12.7	14.4	15.8	11.2	8.6	9.4	8.1	6.8	4.0	2.9	3.4
	35-44	22.3	17.5	16.7	17.3	20.1	15.2	13.1	12.0	10.6	8.5	4.6	3.8	4.5
	45-54	20.7	14.6	14.8	16.0	19.0	13.9	12.5	12.3	10.7	8.4	4.3	3.5	4.0
	55-64	20.3	15.4	14.6	15.6	16.3	12.9	12.2	11.5	10.0	7.3	4.1	3.2	3.8
	65+	20.6	16.2	14.5	17.6	18.4	15.9	13.4	13.8	11.9	8.2	4.8	3.2	4.1
Region	*İstanbul*	15.0	9.7	9.6	12.4	12.5	10.2	7.9	7.8	6.0	7.3	3.4	4.3	5.6
	West Marmara	16.5	12.2	14.1	13.2	13.8	11.7	9.9	8.8	5.8	4.3	3.6	3.6	3.3
	East Marmara	17.4	15.1	14.0	12.3	14.1	8.8	8.1	8.3	8.8	7.0	2.6	1.8	2.0
	Aegean	15.3	9.3	10.7	9.6	11.4	8.9	10.0	8.3	7.1	4.5	2.2	0.7	1.4
	Mediterranean	12.1	7.9	8.2	12.6	10.5	8.6	6.2	5.8	6.2	3.8	2.1	1.3	1.8
	West Anatolia	24.6	19.4	18.6	20.1	24.3	14.1	13.4	14.3	11.6	8.7	5.5	3.5	4.3
	Central Anatolia	19.4	13.2	11.3	13.8	16.2	14.3	10.3	11.4	10.3	7.0	6.7	5.1	4.5
	West Black Sea	22.3	14.6	16.2	18.9	23.2	16.7	12.5	13.1	9.6	7.9	3.3	1.2	1.7
	East Black Sea	19.1	16.0	14.3	12.6	14.9	13.3	11.9	7.1	7.6	4.0	3.3	2.5	3.6
	North East	14.8	9.8	15.9	17.8	17.0	12.1	12.0	16.1	12.3	10.9	6.0	5.1	4.4
	Central East	20.9	18.1	14.1	18.9	16.9	21.4	17.7	13.1	13.4	11.4	7.7	4.2	4.6
	South East	33.1	25.0	15.5	20.3	23.0	16.2	12.2	16.6	15.2	8.9	6.5	4.9	5.3
Income group	*First quintile*	33.6	24.9	22.1	24.5	27.1	20.0	18.8	18.2	16.4	12.0	7.4	5.1	6.9
	Second quintile	25.4	20.5	18.4	20.8	21.8	17.5	14.1	14.7	11.7	9.1	5.1	3.4	4.2
	Third quintile	16.4	13.5	11.2	13.0	15.1	10.3	8.6	8.1	7.8	5.5	3.0	2.2	2.9
	Fourth quintile	12.4	9.3	9.2	9.4	10.6	7.6	7.2	6.9	6.1	4.7	2.0	2.0	1.9
	Fifth quintile	7.4	5.0	4.4	5.0	4.7	4.2	3.3	3.2	3.0	2.0	0.8	0.8	0.8
Education	*Students*	8.2	4.9	5.2	6.8	6.4	3.9	3.6	4.3	3.2	3.0	1.8	1.3	1.9
	Uncertificated	29.3	23.4	21.0	24.5	25.7	21.6	19.1	19.2	17.1	13.0	8.2	5.8	7.1
	Pri. or sec. school graduates	21.2	15.6	14.7	16.3	18.8	13.7	11.5	11.4	10.1	8.0	4.6	3.5	4.1
	High school graduates	10.4	7.2	7.0	8.9	9.2	6.5	5.4	6.2	5.1	4.5	2.6	1.9	2.3
	University graduates	3.6	2.9	2.3	3.1	4.3	3.2	2.4	2.9	2.6	2.0	0.8	1.0	1.2

Source: SILC, Authors' calculations

Table A7: Descriptive statistics (%)

Variables/Years		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Demographics	*Marriage*	72.7	71.8	71.9	70.9	71.3	71.0	70.2	70.0	68.6	68.0	67.6	67.9	67.4
	Household head	40.3	39.6	39.7	39.7	40.0	40.1	39.8	39.5	40.1	39.4	39.5	39.7	40.0
Household	*Single person household*	2.2	2.2	2.3	2.7	2.7	2.7	2.9	3.0	4.7	4.8	5.1	5.2	5.4
	A Household with child	70.3	69.4	68.0	65.8	66.6	67.0	65.4	65.6	65.8	64.4	63.4	62.5	57.4
	Other	27.5	28.4	29.8	31.5	30.8	30.3	31.7	31.3	29.5	30.7	31.6	32.3	37.2
Education Level	*Students*	6.2	6.3	5.9	7.4	7.9	8.2	8.9	9.7	10.5	11.4	12.3	12.4	11.9
	Uncertificated	26.0	24.9	24.8	23.9	23.7	23.2	22.4	21.6	21.0	19.9	18.3	17.7	17.1
	Primary	40.0	39.1	38.3	37.2	36.7	36.1	35.6	35.0	34.0	33.1	32.5	31.9	31.7
	Secondary	9.1	9.6	10.3	10.4	10.7	11.3	11.6	11.8	12.1	11.8	12.2	12.6	12.9
	High school	12.6	13.6	14.0	13.8	13.5	13.4	13.1	12.9	12.9	13.3	13.4	13.8	14.2
	University	6.1	6.6	6.6	7.4	7.5	7.8	8.5	9.0	9.5	10.6	11.4	11.7	12.2
Employment Status	*Employed*	44.9	45.7	46.2	45.4	46.3	46.4	47.2	47.3	46.0	45.7	46.0	45.6	46.0
	Unemployed	3.6	2.9	3.3	4.5	3.7	3.6	3.0	3.3	3.2	3.2	3.0	4.6	4.7
	Not in labor force	51.5	51.4	50.4	50.1	50.0	50.0	49.8	49.3	50.8	51.2	51.1	49.8	49.3
	Formal	17.9	19.9	21.4	20.0	20.8	22.4	23.9	25.0	26.0	27.2	28.5	28.3	28.5
	Informal	27.0	25.8	24.8	25.4	25.5	24.0	23.3	22.3	20.0	18.4	17.5	17.3	17.6
Income	*First quintile*	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1
	Second quintile	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1
	Third quintile	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1
	Fourth quintile	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1
	Fifth quintile	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7
Ownership	*Internet*	9.4	15.1	22.1	27.2	28.8	31.7	32.4	33.4	35.4	41.4	50.7	62.7	70.8
	Automobile/car	28.6	28.0	30.0	31.1	31.2	32.8	33.9	37.2	39.6	41.9	43.8	46.4	46.1

Table A7: Descriptive statistics (%) (Continued)

	Variables/Years	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Health condition	*Chronic disease case*	34.3	32.0	33.8	36.3	35.4	35.1	34.5	36.9	37.5	37.6	34.7	37.5	36.9
	General health good	57.0	61.3	61.5	59.3	60.1	61.4	63.1	62.9	63.6	63.4	66.2	65.8	65.5
	General health moderate	24.0	21.2	23.3	23.0	22.3	22.2	21.7	22.5	22.1	23.0	23.0	23.2	23.3
	General health poor	19.1	17.4	15.2	17.7	17.6	16.4	15.2	14.6	14.2	13.6	10.9	10.9	11.2
	First regular job (AGE)	18.5	18.5	18.5	18.5	18.4	18.4	18.3	18.3	18.4	18.5	18.5	18.6	18.6
Environmental Factors	*Damp walls*	45.5	41.0	40.7	42.9	44.4	43.1	41.5	40.9	37.6	39.0	38.9	37.3	36.7
	Heating problem	43.5	41.2	40.6	43.9	42.9	41.9	48.5	43.4	40.0	44.4	44.4	43.2	41.8
	Lack of daylight	21.3	19.9	18.7	26.4	25.5	25.8	26.9	25.4	24.2	19.9	19.6	18.0	17.0
	Environmental pollution	24.3	22.0	21.4	27.0	26.5	24.5	24.4	22.5	22.2	22.1	22.5	21.2	22.6
Health Supply (per 100.000 persons)	*Hospital bed per 100.000 persons*	24.7	23.7	24.0	24.6	25.8	26.1	27.6	27.5	27.7	27.7	28.2	28.9	29.1
	General practitioner	49.1	50.5	51.9	50.7	54.7	55.7	53.7	53.2	52.6	55.7	56.8	58.6	56.2
	Specialist	68.1	70.1	71.6	76.3	80.1	83.1	86.7	90.1	90.2	91.4	89.9	92.8	92.5
	Assistant doctor	22.3	24.2	25.2	27.2	25.5	24.2	24.6	25.2	25.0	25.4	26.9	27.7	28.8
	Dentist	22.6	23.8	24.3	24.9	26.2	25.2	25.3	26.3	26.7	28.5	29.6	30.4	34.3
	Pharmacist	31.0	31.9	32.3	32.5	33.8	32.9	33.3	33.6	33.4	33.5	33.4	33.9	37.8
	Health officer	104.6	120.9	133.2	138.1	145.9	162.0	173.3	191.4	208.7	200.1	196.3	209.3	226.4
	Nurse	122.8	138.0	142.4	147.5	158.0	173.3	185.3	190.4	191.1	199.9	197.5	212.9	236.6
	Midwife	69.3	72.4	72.1	73.4	73.9	75.3	77.3	76.5	74.2	73.1	70.7	72.3	75.0
	Number of Hospital	1.8	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1
	Family Health Center	0.0	0.2	0.5	0.8	1.8	2.8	3.7	4.7	5.7	6.6	7.5	8.4	9.3
	Health Investment ***(share of regional GDP)***	0.04	0.04	0.02	0.07	0.09	0.03	0.04	0.22	0.19	0.30	0.09	0.24	0.09

Table A8: Effect of Refugee Influx on Unmet Healthcare Needs (2006-2018)

N=3432	Variables	(1)	(2)	(3)	(4)	(5)	(6)
OLS	Refugee Effect	-0.0047***	0.0025**	0.0026**	0.0031***	0.0040***	0.0024**
		(0.0009)	(0.0012)	(0.0011)	(0.0011)	(0.0011)	(0.0010)
	Constant	0.2440***	0.2347***	0.4450***	0.6016***	0.7942***	0.6284***
		(0.0035)	(0.0031)	(0.0320)	(0.0486)	(0.0640)	(0.0764)
IV	Refugee Effect	-0.0064***	0.0036**	0.0040***	0.0042***	0.0052***	0.0038***
		(0.0010)	(0.0014)	(0.0013)	(0.0013)	(0.0013)	(0.0011)
	t stat	111.22	111.50	105.34	117.51	98.34	98.09
	F stat	12370.37	12432.82	11097.00	13808.33	9671.21	9621.60
	Outcome Mean	0.1572	0.1572	0.1572	0.1572	0.1572	0.1572
		0.0867	0.0867	0.0867	0.0867	0.0867	0.0867
	Year FE	Y	Y	Y	Y	Y	Y
	Region FE	Y	Y	Y	Y	Y	Y
	Region Specific Linear Trend	N	Y	Y	Y	Y	Y
	Health Condition	N	N	Y	Y	Y	Y
	Health Supply	N	N	N	Y	Y	Y
	Socio-economic Factors	N	N	N	N	Y	Y
	Environmental Factors	N	N	N	N	N	Y

Table A9: Effect of Refugee Influx on Unmet Healthcare (Heterogeneity, 2006-2018)

N=3432	Variables	General	Systemic	Personal
OLS	Refugee Effect	0.0024**	0.0028***	-0.0004
		(0.0010)	(0.0008)	(0.0004)
	Constant	0.6284***	0.5546***	0.0738*
		(0.0764)	(0.0651)	(0.0422)
IV	Refugee Effect	0.0038***	0.0031***	0.0007
		(0.0011)	(0.0010)	(0.0005)
	t stat	98.09	98.09	98.09
	F stat	9621.60	9621.60	9621.60
	Outcome Mean	0.1572	0.1122	0.0450
		0.0867	0.0767	0.0322
	Year FE	Y	Y	Y
	Region FE	Y	Y	Y
	Region Specific Linear Trend	Y	Y	Y
	Health Condition	Y	Y	Y
	Health Supply	Y	Y	Y
	Socio-economic Factors	Y	Y	Y
	Environmental Factors	Y	Y	Y

Table A10: Effect of Refugee Influx on Unmet Dental Healthcare Needs (2006-2018)

N=3432	Variables	(1)	(2)	(3)	(4)	(5)	(6)
OLS	Refugee Effect	-0.0033***	0.0022*	0.0024*	0.0021*	0.0028**	0.0010
		(0.0009)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0010)
	Constant	0.1690***	0.1641***	0.2197***	0.2280***	0.2911***	0.1395**
		(0.0032)	(0.0033)	(0.0308)	(0.0425)	(0.0544)	(0.0644)
IV	Refugee Effect	-0.0050***	0.0016	0.0018	0.0012	0.0021	0.0006
		(0.0011)	(0.0015)	(0.0015)	(0.0014)	(0.0014)	(0.0012)
	t stat	111.22	111.50	105.34	117.51	98.34	98.09
	F stat	12370.37	12432.82	11097.00	13808.33	9671.21	9621.60
	Outcome Mean	0.1040	0.1040	0.1040	0.1040	0.1040	0.1040
		0.0638	0.0638	0.0638	0.0638	0.0638	0.0638
	Year FE	Y	Y	Y	Y	Y	Y
	Region FE	Y	Y	Y	Y	Y	Y
	Region Specific Linear Trend	N	Y	Y	Y	Y	Y
	Health Condition	N	N	Y	Y	Y	Y
	Health Supply	N	N	N	Y	Y	Y
	Socio-economic Factors	N	N	N	N	Y	Y
	Environmental Factors	N	N	N	N	N	Y

Table A11: Effect of Refugee Influx on Unmet Dental Healthcare (Heterogeneity, 2006-2018)

N=3432	Variables	General	Systemic	Personal
OLS	Refugee Effect	0.0010	0.0018**	-0.0008*
		(0.0010)	(0.0008)	(0.0004)
	Constant	0.1395**	0.2225***	-0.0831**
		(0.0644)	(0.0571)	(0.0329)
IV	Refugee Effect	0.0006	0.0012	-0.0005
		(0.0012)	(0.0010)	(0.0005)
	t stat	98.09	98.09	98.09
	F stat	9621.60	9621.60	9621.60
	Outcome Mean	0.1040	0.0772	0.0269
		0.0638	0.0557	0.02166
	Year FE	Y	Y	Y
	Region FE	Y	Y	Y
	Region Specific Linear Trend	Y	Y	Y
	Health Condition	Y	Y	Y
	Health Supply	Y	Y	Y
	Socio-economic Factors	Y	Y	Y
	Environmental Factors	Y	Y	Y

Table A12: Event Study Estimates for Unmet Healthcare Needs (General, 2006-2018)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
T <=-4	0.0106***	-0.0040*	-0.0025	-0.0019	-0.0014	-0.0021
	(0.0012)	(0.0024)	(0.0023)	(0.0023)	(0.0025)	(0.0026)
T = -3	0.0057***	-0.0016	-0.0009	-0.0003	0.0006	-0.0003
	(0.0011)	(0.0016)	(0.0016)	(0.0016)	(0.0018)	(0.0018)
T = -2	0.0096***	0.0059***	0.0067***	0.0063***	0.0065***	0.0055***
	(0.0016)	(0.0017)	(0.0016)	(0.0015)	(0.0015)	(0.0016)
T = 0	-0.0012	0.0024*	0.0018	0.0019	0.0017	0.0005
	(0.0013)	(0.0014)	(0.0013)	(0.0013)	(0.0013)	(0.0013)
T = +1	0.0046***	0.0119***	0.0099***	0.0104***	0.0110***	0.0078***
	(0.0011)	(0.0016)	(0.0015)	(0.0015)	(0.0016)	(0.0015)
T = +2	0.0040***	0.0149***	0.0126***	0.0126***	0.0135***	0.0091***
	(0.0014)	(0.0024)	(0.0023)	(0.0023)	(0.0023)	(0.0022)
T = +3	-0.0033**	0.0113***	0.0101***	0.0100***	0.0117***	0.0085***
	(0.0013)	(0.0027)	(0.0025)	(0.0026)	(0.0028)	(0.0026)
T >= +4	-0.0030*	0.0189***	0.0165***	0.0163***	0.0174***	0.0135***
	(0.0018)	(0.0040)	(0.0039)	(0.0037)	(0.0039)	(0.0036)
Constant	0.2303***	0.2288***	0.4432***	0.5618***	0.7488***	0.5754***
	(0.0035)	(0.0033)	(0.0320)	(0.0480)	(0.0630)	(0.0774)
Outcome Mean	0.1572	0.1572	0.1572	0.1572	0.1572	0.1572
	0.0867	0.0867	0.0867	0.0867	0.0867	0.0867
Year FE	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y
Region Specific Linear Trend	N	Y	Y	Y	Y	Y
Health Condition	N	N	Y	Y	Y	Y
Health Supply	N	N	N	Y	Y	Y
Socio-economic Factors	N	N	N	N	Y	Y
Environmental Factors	N	N	N	N	N	Y

Table A13: Event Study Estimates for Unmet Healthcare Needs (Systemic, 2006-2018)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
T <=-4	0.0091***	-0.0057***	-0.0045**	-0.0045**	-0.0040*	-0.0046*
	(0.0011)	(0.0022)	(0.0022)	(0.0021)	(0.0024)	(0.0024)
T = -3	0.0047***	-0.0028	-0.0022	-0.0022	-0.0011	-0.0015
	(0.0011)	(0.0017)	(0.0017)	(0.0017)	(0.0018)	(0.0019)
T = -2	0.0091***	0.0054***	0.0061***	0.0058***	0.0062***	0.0056***
	(0.0015)	(0.0017)	(0.0016)	(0.0015)	(0.0015)	(0.0016)
T = 0	-0.0011	0.0026*	0.0021*	0.0024**	0.0023*	0.0012
	(0.0013)	(0.0013)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
T = +1	0.0041***	0.0115***	0.0100***	0.0110***	0.0117***	0.0090***
	(0.0011)	(0.0014)	(0.0013)	(0.0013)	(0.0014)	(0.0014)
T = +2	0.0026**	0.0137***	0.0118***	0.0124***	0.0133***	0.0099***
	(0.0013)	(0.0020)	(0.0019)	(0.0019)	(0.0021)	(0.0019)
T = +3	-0.0027**	0.0121***	0.0112***	0.0121***	0.0137***	0.0111***
	(0.0012)	(0.0023)	(0.0022)	(0.0022)	(0.0024)	(0.0023)
T >= +4	-0.0035**	0.0187***	0.0170***	0.0181***	0.0190***	0.0158***
	(0.0015)	(0.0034)	(0.0032)	(0.0032)	(0.0035)	(0.0032)
Constant	0.1817***	0.1791***	0.4288***	0.4431***	0.6297***	0.4884***
	(0.0031)	(0.0030)	(0.0280)	(0.0408)	(0.0553)	(0.0673)
Outcome Mean	0.1122	0.1122	0.1122	0.1122	0.1122	0.1122
	0.0767	0.0767	0.0767	0.0767	0.0767	0.0767
Year FE	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y
Region Specific Linear Trend	N	Y	Y	Y	Y	Y
Health Condition	N	N	Y	Y	Y	Y
Health Supply	N	N	N	Y	Y	Y
Socio-economic Factors	N	N	N	N	Y	Y
Environmental Factors	N	N	N	N	N	Y

Table A14: Event Study Estimates for Unmet Healthcare Needs (Personal, 2006-2018)

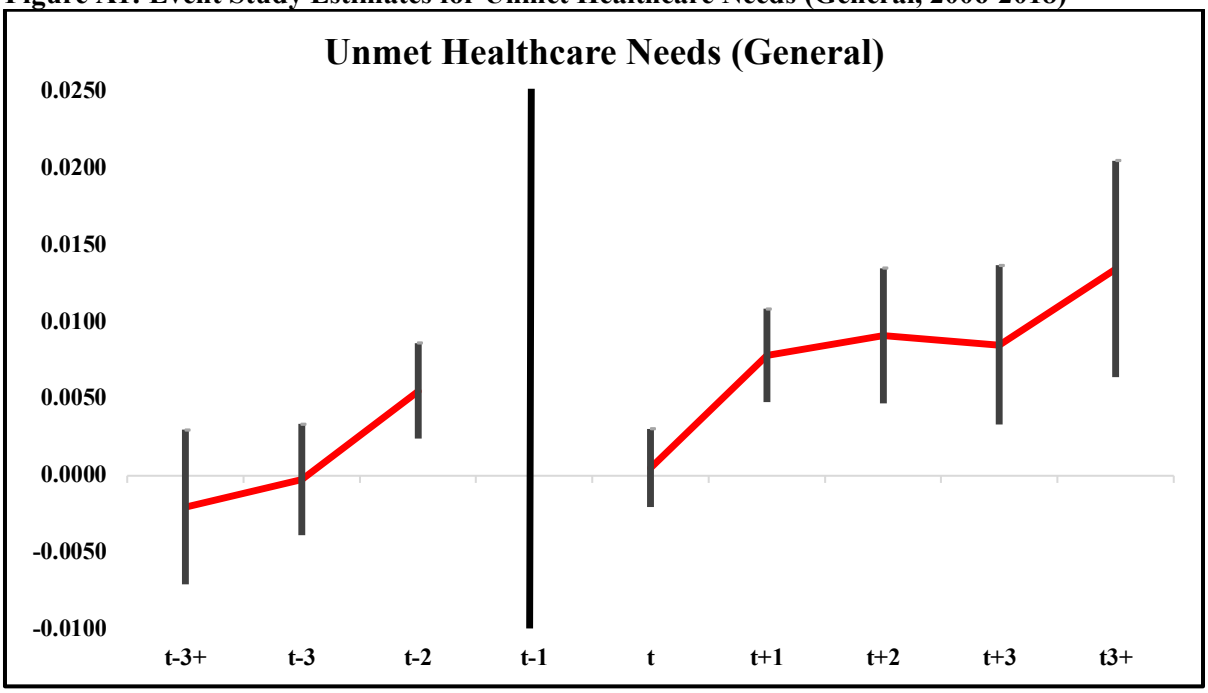
Variables	(1)	(2)	(3)	(4)	(5)	(6)
T <=-4	0.0015***	0.0017	0.0019	0.0026**	0.0027**	0.0026**
	(0.0005)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
T = -3	0.0010*	0.0011	0.0013	0.0019**	0.0018**	0.0012
	(0.0006)	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0009)
T = -2	0.0005	0.0006	0.0006	0.0005	0.0003	-0.0001
	(0.0008)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
T = 0	-0.0001	-0.0001	-0.0003	-0.0005	-0.0006	-0.0007
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0006)
T = +1	0.0006	0.0005	-0.0001	-0.0007	-0.0007	-0.0012
	(0.0005)	(0.0006)	(0.0006)	(0.0007)	(0.0007)	(0.0008)
T = +2	0.0014**	0.0012	0.0007	0.0001	0.0001	-0.0008
	(0.0006)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0010)
T = +3	-0.0006	-0.0008	-0.0010	-0.0021*	-0.0020*	-0.0026**
	(0.0006)	(0.0011)	(0.0012)	(0.0012)	(0.0011)	(0.0012)
T >= +4	0.0005	0.0002	-0.0005	-0.0018	-0.0016	-0.0024
	(0.0007)	(0.0016)	(0.0017)	(0.0016)	(0.0016)	(0.0016)
Constant	0.0486***	0.0498***	0.0144	0.1186***	0.1191***	0.0870**
	(0.0020)	(0.0019)	(0.0170)	(0.0286)	(0.0374)	(0.0438)
Outcome Mean	0.0450	0.0450	0.0450	0.0450	0.0450	0.0450
	0.0322	0.0322	0.0322	0.0322	0.0322	0.0322
Year FE	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y
Region Specific Linear Trend	N	Y	Y	Y	Y	Y
Health Condition	N	N	Y	Y	Y	Y
Health Supply	N	N	N	Y	Y	Y
Socio-economic Factors	N	N	N	N	Y	Y
Environmental Factors	N	N	N	N	N	Y

Table A15: Sensitivity Analysis

	2011-2013	2010-2014	2009-2015	2008-2016	2007-2017	2006-2018
OLS	0.0216	0.0093***	0.0014	0.0011	0.0017	0.0024**
	(0.0752)	(0.0025)	(0.0014)	(0.0012)	(0.0010)	(0.0010)
IV	0.0216	0.0120***	0.0024*	0.0017	0.0024**	0.0038***
	(0.0718)	(0.0026)	(0.0014)	(0.0014)	(0.0012)	(0.0011)
IV Del Carpio and Wagner (2015)	0.0216	0.0163***	0.0027	0.0014	0.0002	0.0010
	(0.0718)	(0.0039)	(0.0019)	(0.0019)	(0.0016)	(0.0015)
IV Kırdar et al. (2020)	0.0216	0.0335***	0.0089***	0.0029	0.0017	0.0018
	(0.0718)	(0.0075)	(0.0028)	(0.0022)	(0.0016)	(0.0015)
Outcome Mean	0.1686	0.1907	0.1906	0.1875	0.1864	0.1960
Elasticity(*)	12.81	6.29	1.26	0.91	1.29	1.94

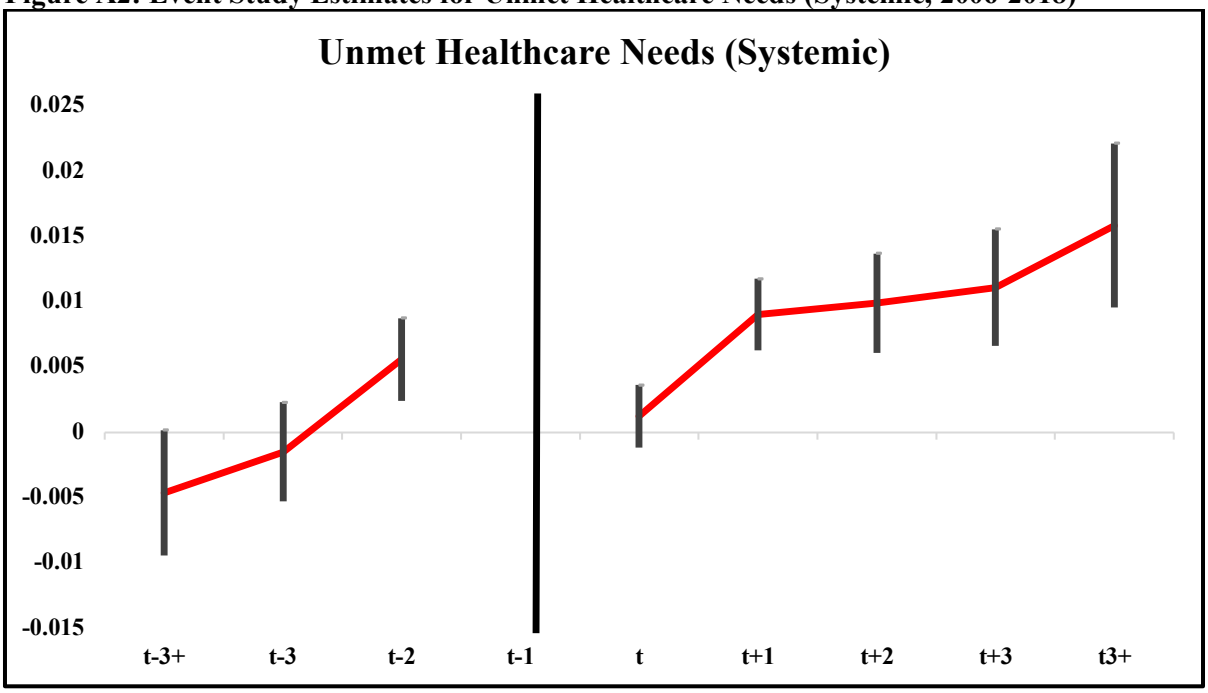
(*) We calculate elasticities using IV estimates.

Figure A1: Event Study Estimates for Unmet Healthcare Needs (General, 2006-2018)



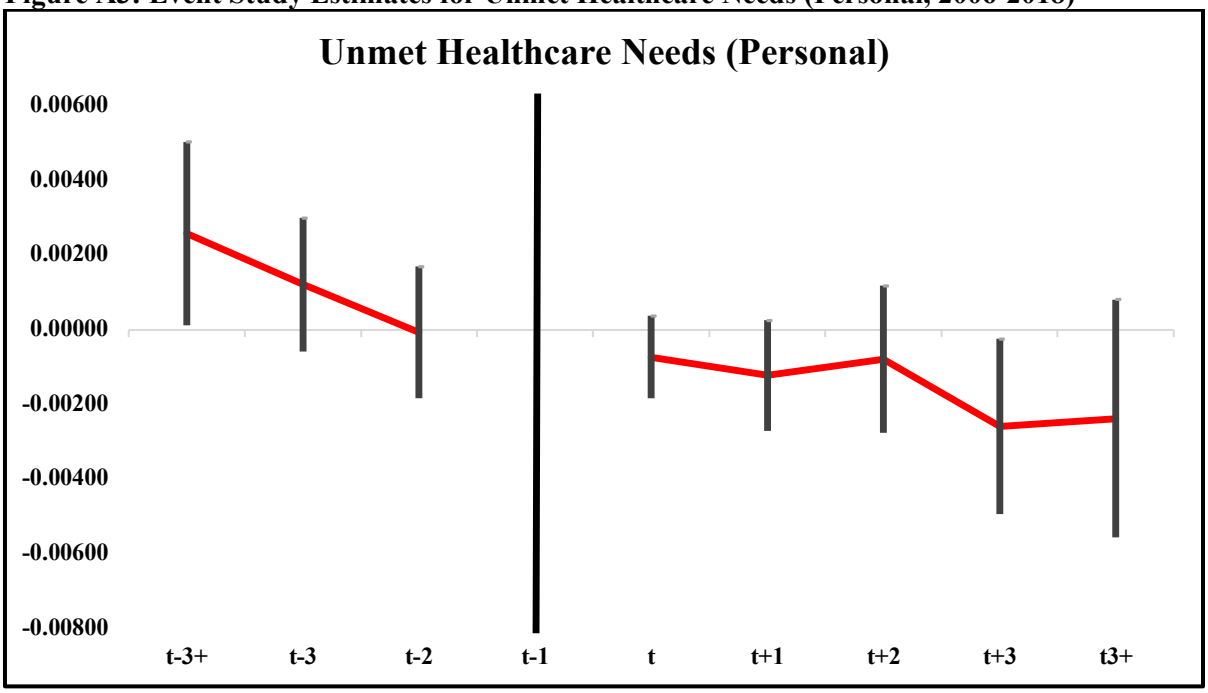
Notes: The figure shows the estimates and 95% confidence intervals. The base category is "one year before the refugee influx."

Figure A2: Event Study Estimates for Unmet Healthcare Needs (Systemic, 2006-2018)



Notes: The figure shows the estimates and 95% confidence intervals. The base category is "one year before the refugee influx."

Figure A3: Event Study Estimates for Unmet Healthcare Needs (Personal, 2006-2018)



Notes: The figure shows the estimates and 95% confidence intervals. The base category is "one year before the refugee influx."

Figure A4: Before-After Trends for Unmet Healthcare Needs and Refugee Location Preference