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Estimating Undocumented Migration in the UK Using an Exclusionary Health Care Policy Reform

AUTHORS:

Alejandra Rodríguez-Sánchez

Jasper Tjaden



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Executive Summary

Estimating the number of undocumented migrants poses significant challenges, particularly due to data scarcity. This briefing outlines an approach based on 2014 policy reforms in England's National Health Service (NHS), which restrict healthcare access for migrants lacking valid residency documentation—commonly referred to as the NHS "hostile environment". These reforms primarily affected access to primary care, such as General Practitioner (GP) services. We present our methodology, the data used, and the insights it could offer if expanded with more granular data. Preliminary findings suggest that the reforms led to a slight reduction in new GP registrations in practices serving large migrant populations, implying that new arrivals were less likely to register. This trend, when paired with arrival data, could help estimate undocumented migration flows through a multiplier method.

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ACRONYMS

GP	General practitioner
LSOA	Lower Super Output Areas
NHS	National Health Service
ONS	Office for National Statistics

THE MIRREM PROJECT

MIrreM examines estimates and statistical indicators on the irregular migrant population in Europe as well as related policies, including the regularisation of migrants in irregular situations.

MIrreM analyses policies defining migrant irregularity, stakeholders' data needs and usage, and assesses existing estimates and statistical indicators on irregular migration in the countries under study and at the EU level. Using several coordinated pilots, the project develops new and innovative methods for measuring irregular migration and explores if and how these instruments can be applied in other socio-economic or institutional contexts. Based on a broad mapping of regularisation practices in the EU as well as detailed case studies, MIrreM will develop 'regularisation scenarios' to better understand conditions under which regularisation should be considered as a policy option. Together with expert groups that will be set up on irregular migration data and regularisation, respectively, the project will synthesise findings into a Handbook on data on irregular migration and a Handbook on pathways out of irregularity. The project's research covers 20 countries, including 12 EU countries and the United Kingdom.

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KEYWORDS

Irregular Migration; Public policy; Evaluation; Health inequalities; multiplier

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1. INTRODUCTION

An undocumented migrant status is a significant issue affecting many migrants, particularly in terms of access to healthcare (Bonneau, 2023). In the UK, a recent study estimated the number of undocumented migrants to be 674,000 (Jolly et al., 2020). Before the year 2017, access to health care services provided by the National Health Service (NHS) were free of charge for anyone who was currently residing in the country regardless of their migration status. This started to change in 2014 when a series of reforms aimed at reducing the costs associated with ‘health tourism’ were implemented across NHS institutions (McHale & Speakman, 2020). These reforms have created what some authors called a ‘hostile environment’ towards migrants (Shahvisi, 2019), who now are subjected to checks on their residence permits, and their entitlement to health care is put into question. We ask whether the impact of this ‘hostile environment’ has had on migrants’ health seeking behaviour could provide information on the size of the undocumented migrant population in England.

Prior to the reform, all migrants ought to be registered with a GP to receive the free access to primary care and referral to tests, treatments, or other specialists outside the GP (e.g., in hospitals), as well as other forms of health care (Grove-White 2014). After the reform, registration was hindered especially for migrants without a proof of a regular migration status, mostly overstayers, rejected asylum seekers, or migrants who arrived irregularly and did not register with immigration authorities (Potter et al., 2020).

Our initial idea was that the level in reduction in health care utilization provides information on the size of the underlying population affected by the policy change (i.e. undocumented migrants). Due to data limitations, however, we were only able to capture new GP registrations. It is unlikely that migrants no longer eligible to receive healthcare would have been de-registered from their GP. As such, the estimates refer to a reduction in new registrations rather than resident populations. Also, due to lack of individual-level data, we are unable to distinguish new registrations resulting from new immigration to England from new registration resulting from internal migration within England.

GP practices serve a very diverse population and can be found scattered across English cities. Taking stock of the geographic distribution of migrants across lower super output areas (LSOA) in England and of GP practices, we ask whether new registrations at GP practices located in areas of high concentration of migrants were lower than new registrations at GP practices in areas of low to no concentration of migrants (assuming that the population in areas with more migrants is more likely to be affected by exclusionary policy). We employ a two-way fixed effects regression design with a pre-intervention period (2010-2017) and a post-intervention period (2017-2020), and a continuous, as well as categorized, definition of the share of migrants within a small geographic area that is served by the GP.

Our findings suggest that GP practices in areas with a high share of migrants saw stronger declines in new registrations, indicating the law discouraged migrants from registering and accessing healthcare.

2. CONCEPTS & DEFINITIONS

Starting with the 2014 UK Immigration Act, important changes were made to access to healthcare for specific migrant categories (Grove-White 2014). These reforms created the 'hostile environment' towards migrants (i.e., non-UK born and without citizenship) in their interaction with NHS institutions. Of special concern for migrants was the collusion and data sharing agreements between NHS and immigration authorities during the reform implementation (McHale & Speakman, 2020). In fact, the very act of the reform turned the administrative staff at NHS institutions into de facto immigration authorities who now had to conform with the new policies.

These reforms likely affected the most those immigrants with the least secure migration status, namely those more at risk of falling into irregularity or those already in a state of irregularity (i.e., fearing deportability). Although the reforms were geared towards combatting the problem of 'health tourism', where people supposedly travel to the UK with the sole purpose of obtaining free medical care, a care they would not have received in their home countries, the ultimate impact of the said reforms was a significant decrease in irregular migrants' use of healthcare services (Zhang et al., 2022). Several studies have documented the effects the 'hostile environment' has had on the health of migrants and the general population, basically deterring medically necessary treatments (Rassa et al., 2023).

As stated above, visa overstayers, rejected asylum seekers, and migrants who entered England irregularly, for example, by boat, and remain unknown to authorities, were the main groups among the irregular migrants to be affected by this law. According to the various pathways into irregularity discussed in Kraler (2023), loss of migration status and immigration are the two main ones this briefing paper is concerned with and the ones our approach could shed light on.

For the case of irregular migrants who, at the time of the law change, were already residing and well-established for some time in the UK, there were probably no changes in registration with their GP, unless they were to change residence. For them, however, although the reforms likely led to services no longer being available to that migrant, might not necessarily translate into a de-registration of the now irregular migrant from their GP register records. Therefore, we do not capture this type of flow.

In contrast, new migrants, those arriving after or around 2017, as well as migrants already residing in the UK but who changed residence in the aftermath of the reform (though not likely because of it), and had to then register with another GP, are the main population that we can attempt at estimating with this approach. Therefore, our approach could capture two subpopulations in the flow of irregular migrants: those who arrived in the post-reform period to the UK and then lost their residence status, and those already with an irregular status prior to the reform who changed residence and would have had to register with a GP again.

3. METHODS AND DATA

3.1 METHODS

Our approach consists in examining whether following the implementation of the hostile environment we can see changes in new registrations of patients at General Practitioner (GP) practices across England. Prior to the reform, all migrants ought to be registered with a GP to receive the free access to primary care and referral to tests, treatments, or other specialists outside the GP (e.g., in hospitals), as well as other forms of health care (Grove-White 2014). After the reform, registration was hindered especially for migrants without a proof of a regular migration status, mostly overstayers, rejected asylum seekers, or migrants who arrived irregularly and did not register with immigration authorities (Potter et al., 2020).

GP practices serve a very diverse population and can be found scattered across English cities. Taking stock of the geographic distribution of migrants across lower super output areas (LSOA) in England and of GP practices, we ask whether new registrations at GP practices located in areas of high concentration of migrants were lower than new registrations at GP practices in areas of low to no concentration of migrants. We employ a two-way fixed effects regression design with a pre-intervention period (2010-2017) and a post-intervention period (2017-2020), and a continuous measure of the share of migrants within a small geographic area that is served by the GP, based on 2011 UK census data. The event of interest in our case corresponds to the stepwise implementation of a package of reforms that transformed the NHS into a 'hostile environment' for migrants (McHale & Speakman, 2020), and which developed during the years 2014-2017 (i.e., our intervention period). However, we consider the before-event years to be 2010-2017, and the after-event years as the 2017-2019, since the strictest of these reforms – those restricting access to all the services discussed above – were officially enacted in January 2017.

The method we employ in this pilot study incorporates ideas from two-way fixed effects and difference-in-differences (Wooldridge, 2021), in combination with the multiplier method (Jandl, 2009). The idea is that if it were possible to know how many migrants stopped attending their GP practices after the law change, meaning, were registered but stopped going for medical visits, for example, then we could identify these missing flows as potentially irregular ones, and compute a multiplier that would allow for an extrapolation of this finding for the whole population of migrants arriving in the post-reform period. Hence, we would obtain the number of missing patients at GPs by extrapolating this number, under some assumptions, to the whole population. The number of new registrations at GP practices is our main outcome variable and we want to compare the pre-event and post-event trends in new registrations. We measure the number of new registrations in a GP as the relative change in total number of registrations between any two months. The share of non-EU migrants served by the GPs is the main metric of our exposure.

To estimate the effect of this reform, we employ a fixed effects linear regression model with an exposure and treatment period (i.e., pre or post) dummy interaction term which measures the impact of the reform on the change in registrations at the GP. These are two-way fixed effect models where time and GP practice appear as fixed effects (allowing us to disentangle GP specific trends, as well as time specific trends).

This model considers an interaction between the share, as a numeric metric value, and the intervention periods. We focus on the share of non-EU migrants as migrants coming from the EU likely had health insurance that is considered equivalent for all purposes in the UK. This means we compare GP practices that fall in areas with different shares of non-EU migrants. Our approach relates to the multiplier method (Rodríguez-Sánchez & Tjaden, 2023) in that once we obtain an estimate of the impact of the policy, we can put that estimate in relation to the number of arrivals to England or the UK.

Given the limitations of the data at hand which we discuss below, our model is mostly concerned with potentially estimating only a fraction of the flow of irregular migrants, mostly post-reform arrived overstayers – though we are only able to capture a share of them and under the assumption that they locate in areas with high shares of migrants. For each new migrant in the UK who arrived after the reform, we can estimate the percentage corresponding to those who did not register with a GP practice based on our estimates from the two-way fixed effect models.

3.2 DATA

The main data source for this analysis comes from the NHS publicly available registers. We take the monthly number of patients registered at each GP practices across all England in the observation window of 2010-2019, considering only the GP practices that were active during both the pre and post intervention periods. To identify what share of the population served by each GP is non-UK born and not a citizen, we employ the 2011 census. After geolocating each GP, and spatially assigning each to an LSOA, we take the share of migrants in those LSOA and assign them to the GPs falling in those areas – ignoring, in the case of more than one GP in an area, whether within a given LSOA there are drastic differences in the populations attending those GPs. Therefore, each GP is assigned a share of non-UK born, most of whom are foreign nationals. In other words, we assume that a random GP in a location serves on average as many migrants as their share in the population where the GP is located.

The data on registrations at GP practices is publicly available, but the information on location had to be attached to this data. Using a web-based application that provides information about GP practices, we utilized a unique identifier for each GP to retrieve details on their location and the time they were actively operating as GP practices, including the start date and, when applicable, the end date. We have information on a total of 6784 GP practices in England that were active during the whole observation period.

There are important limitations in the GP practices data. First, the data on GP practices only offers total count of patients, without a further breakup by UK citizenship or any other metric that could allow us to identify immigrants. This is a major limitation in this data because we

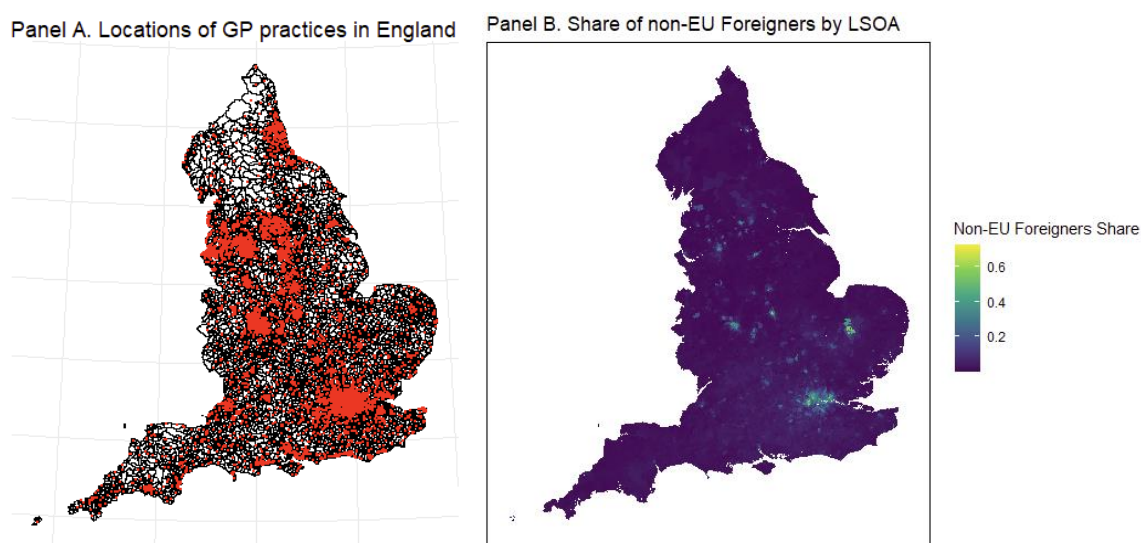
cannot isolate the behaviour of migrants from potential changes in health seeking behaviour among UK citizens, though this is unlikely to systematically differ strongly during the period observed. Second, the lack of updated registers of patients seriously hampers our ability to identify how many of them were denied access to health care services in the after-event period. Those irregular migrants who were already registered at a GP were not necessarily de-registered from the records, although access to health care might be restricted, nonetheless.

Other NHS aggregated data, such as the Hospital Episode Statistics (HES), does not have the level of granularity required to assess changes in the population served. Many of the hospitals in this data base are aggregated at the NHS Trust level, which are larger institutional merges of various hospitals, and cannot be geolocated into one single area. Therefore, the HES data combines NHS hospitals and NHS trusts, which makes trend comparisons meaningless for the purpose of this study.

Furthermore, census and household surveys usually do not cover a large enough probabilistic sample of irregular migrants. Migrants with a precarious legal status might avoid participating in such statistical operations, as they might fear disclosing their legal status to the government. Therefore, the information used from the 2011 census likely exclude the behaviour of irregular migrants which might differ substantially from the behaviour of a more settled migrant population (e.g., employment conditions, change of residence, etc.)

4. RESULTS

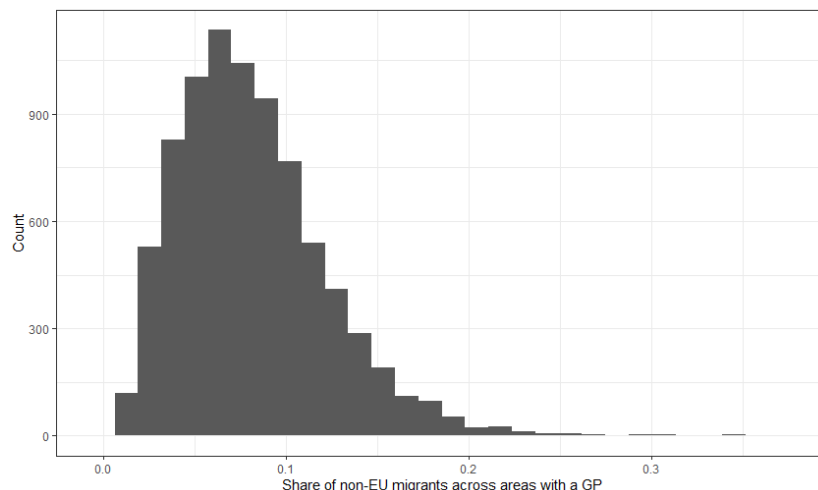
Figure 1 shows the geolocation of the GP practices in our data across the LSOA. Most GP practices are concentrated on the largest cities (e.g., London). And with a substantial number of LSOA areas without a GP. Figure 1 also shows the distribution of the share of non-EU foreigners in England, suggesting that higher shares are often found in large cities like London or



Note: Own elaboration. The map on the left (Panel A) shows the location of the GP practices that enter our study. The choropleth map (panel B) on the right shows the spatial distribution of the share of non-EU foreigners living in England

Figure 1 Location of GP practices (in red) across Lower Super Output Areas in the 2011 census and the spatial distribution of share of non-EU foreigners.

The overall trend in registrations shows an increase over the 2010-2020 period. The main reason why registration increases have to do with population growth, namely, fertility and migration. It is not possible to discern the contribution of each of these population processes without further data, but from demographic statistics we know most of the population growth in the UK is driven by migration (Cangiano & Brindle, 2024).² Most GP practices serve a population with rather low shares of non-EU migrants, with only very few having more than a fifth of its population being migrant according to the 2011 census, as shown in Figure 2. Although this share can change over time, we discard any drastic changes in terms of the population composition of LSOA areas to bias our assignment strategy.



Note: Own elaboration.

Figure 2 Distribution of share of migrants across our 6784 GP practices

The effect of our first model indicates that indeed there was an effect of a magnitude of less than -1% (i.e., estimate of the interaction term being equal to -0.0075 (s.e., 0.0031), and a p-value of 0.019941), meaning that among GP practices serving higher shares of migrants there were less new registrations. This is largely in agreement with our hypothesis, namely, that the reform did impact the health-seeking behaviour of migrants, net of all other time-constant differences across the GPs and time trends.

Hence, we conclude that the ‘hostile environment’ reduced the number of new registrations at GPs, something that could translate in worsening health conditions for irregular migrants who lack access to basic care. In principle, the magnitude of this effect highlights that it is possible to use this change in law to estimate changes in the irregular migrant population.

It could be further used in the estimation of the size of the incoming migrant population that should have registered with a GP but likely did not considering that they had an undefined legal status. For example, if we were to take this estimate, on average of 0.7% points, we would conclude that among new immigrants (i.e., assuming all of whom would have to register with a GP), 0.7% of them were in an irregular status. In the years 2017-2019, and according to data from the International Passenger Survey from the Office for National Statistics (ONS), net migration to the UK from non-EU countries was 478000 (ONS,2023), suggesting an increase in the number of migrants in the country.

However, lack of data makes using the effect of this change in law unfeasible. We do not know how many people arrived in the areas where GPs are present, nor how many usually would register with a GP. Many migrants can arrive in an area without registering with a GP, if they do not have health needs and depending on their length of stay. Moreover, we have only estimated the average over all regions, disregarding important differences in migrant groups’ health care seeking behaviours. Finally, migrants’ location decisions can be very different depending on various factors such as housing availability, type of migration – family relocation v. study, etc., therefore attributing this average change can be quite misleading.

Estimates of the stock of irregular migrants are not warranted with this data given that GPs do not deregister patients that are not frequenting their practice anymore. Lack of proper deregistration is a major issue affecting GP statistics (Burch, Doran, & Kontopantelis, 2018).

5. DISCUSSION

In this pilot study, we set out to study the size of the undocumented migrant population in the UK by assessing the reduction in healthcare utilization of migrants caused by exclusionary health care reform limiting health care utilization for undocumented migrants.

Through the course of the study, we encountered data access limitations which prevented us from providing a reliable estimate of undocumented migrant stock. Instead, we explored the publicly available NHS data to produce an estimate of the impact of the exclusionary health care reform on potential undocumented migrant flows to England (via new GP registrations in areas with a high concentration of migrants).

Employing aggregate register data from GP practices across England, census data, and a series of two-way fixed effect models, we have shown that the reform (NHS 'hostile environment') had a negative impact on new registrations at GP practices in England, particularly marked for GP practices serving an important share of migrants. Assuming several (problematic) assumptions hold, our estimate shows that 0.7% of new migrants were undocumented.

RELIABILITY

The reforms to NHS services were quite specific and would likely differ in other time periods. As a result, our approach lacks reliability in so far as this was a 'natural experiment' that by its nature cannot be repeated. Examining whether the estimates obtained are consistent with other results is also difficult given that no estimates of irregular migration flows for that period exist.

SCALABILITY

In theory, we could replicate the same approach in other country contexts where a similar law change restricting access to the health care for migrants was put in place. However, since policy reform are inherently tailored to the national context and varying health care systems, the effects of such reform and their impact on migrant populations will vary greatly. Access to health care for migrants in precarious living conditions, related to lack of a legal status or lack of resources, is an increasing issue in many countries hosting migrant populations (Bonneau, 2023). In principle, changes in laws granting or limiting access to health care for migrants, as recently the case in France, or it has been in the past in Spain and Germany, could be used to estimate a comparable quantity. However, disaggregated registers at the level appropriate for such a comparison or broken down by migration status or year of arrival are likely not available in those contexts either, especially in those where data protection regulations are far stricter.

ESTIMATION ASSUMPTIONS

The main assumptions employed in our approach refer to the behaviour of the GP practices and undocumented migrants' health seeking behaviour. For example, it is unclear to what

extent GP practices followed the new regulations and indeed stopped registering migrant patients without proper documentation. There is evidence that indeed many migrants were denied access to health care that would even be available under the most stringent regulations (Hodson et al., 2019), but there is no overall assessment of this across all GP practices in England. Regarding the health seeking behaviour of undocumented migrants, an important assumption is that undocumented migrants prior to the reform were indeed registering with a GP so that they were likely to appear in the registers in the pre-event period, something which the literature on the migrant health paradox and data on health outcomes among migrants might certainly argue against – given that migrants are in general healthier than the native population and would tend to use health care services with a lower frequency, e.g., a healthy undocumented migrant who never registered with a GP (Domnich et al., 2012). We are not aware of studies who have established systematic differences in health status or health seeking behaviour among migrants with and without documentation.

Another important assumption of our approach refers to the population served by the GP practices, namely that the share of migrants in an LSOA is indeed an adequate representation of the population served by any given GP. We are aware that not all inhabitants of an LSOA necessarily must register or attend the GP in their area, and the closest GP might be in another neighbouring LSOA, making our assignment of GP practices to LSOA areas an imperfect estimate – though we lack information on where patients registered with a GP reside.

According to various studies, residential segregation by race-ethnicity, related to migration, is well established in English cities (Benassi et al., 2020). Related to this, we also assume that the share of migrants in an LSOA did not change substantially in the study period, which is a problem related to the overall composition of the population served by the GP practices (e.g., an increasingly aging population with more health care needs). If there were large changes in the share of migrants across LSOAs, or if this were an effect of the package of reforms – which we consider unlikely – then our modelling might be inappropriate. A preliminary comparison of the share of non-EU migrants between the 2011 and 2021 census by local areas – larger geographical census areas in the UK – showed only slight changes in terms of this composition.

One key feature of the NHS data is that most of the migrants residing in the UK prior to the NHS reforms should have been registered with a GP and should, therefore, leave a trace in the NHS records. Therefore, NHS data likely contains some information on all migrants that have ever encountered an NHS institution. The use of such personal data for purposes other than medical research is not warranted and riddled with various ethical complications.

Other NHS register data, like patient-level healthcare usage, could provide insight into how many individuals stopped seeking healthcare, further disaggregating results by migration status of the patient. This data is not publicly available and is only accessible for specific medical research at a cost. Using it to identify undocumented migrants could harm an already vulnerable population and is therefore riddled with ethical problems. In the approach as it was currently implemented, we do not find any important ethical challenges as detailed in Cyrus (2023). Instead, we believe our approach invites further research into how policies hostile to migrants affect access to social services and the likely consequences said policies can have in the wellbeing of migrants.

We initially set out to estimate the size of the undocumented migrant population in the UK by exploiting a policy affecting undocumented migrants' access to health care services. Eventually, given data limitations, it was impossible to produce such an estimate. Instead, we were able to estimate the effect of the exclusionary health care reform in the UK on new registrations with a general practitioner. However, linking this reduction in new registrations to migration flows to the UK and further extrapolating the proportion of undocumented migrants is only valid if several questionable assumptions hold. As a result, we do not recommend pursuing this strategy with the existing data landscape but hope that this exploratory study provides points of departure for future attempts in case more suitable data becomes available.

ANNEX 1

The MIrreM Methods Lab conducted a review of 21 traditional and innovative methodological approaches for estimating irregular migrant stocks and flows. Each approach was assessed based on its core concept, data sources, definition and coverage of irregular migration, estimation assumptions, reliability, scalability, general assumptions, and ethical considerations.

Building on this review, we developed six innovative approaches that have the potential to advance research on irregular migration.

As part of the broader MIrreM project, the WP6 Methods Innovation Lab carried out the following six Pilot Studies (PS). Please find the MIrreM Briefing Papers about the other Pilot Studies linked below:

MIrreM Briefing Papers	Authors	DOI
PS1 - Exploring the use of aggregate air passenger data for estimating overstayer inflows	Luca Bernasconi Ettore Recchi	https://doi.org/10.5281/zenodo.14809013
PS2 - Measuring the participation of irregular migrants in the informal economy	Aslı Salihoğlu Carlos Vargas-Silva	https://doi.org/10.5281/zenodo.14809000
PS3 - Estimating irregular migrant stocks using social media data and machine learning	Alejandra Rodríguez-Sánchez Jasper Tjaden	https://doi.org/10.5281/zenodo.14808984
PS4 - Irregular migration: What can mortality reveal?	Johan Surkyn Tuba Bircan	https://doi.org/10.5281/zenodo.14808979
PS5 - Estimating irregular migration in the UK using a health care reform	Alejandra Rodríguez-Sánchez Jasper Tjaden	https://doi.org/10.5281/zenodo.14808948
PS6 - Measuring irregular migration stocks through social media surveys	Jasper Tjaden Alejandra Rodríguez-Sánchez	https://doi.org/10.5281/zenodo.14801999

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ABOUT THE AUTHORS

Alejandra Rodríguez-Sánchez is currently a postdoc at the University of Potsdam, Germany.

Jasper Tjaden is Professor of Applied Social Research and Public Policy at the Economic and Social Science Department of the University of Potsdam, Germany.

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