



## Equity in access to COVID-19 testing for undocumented migrants and homeless persons during the initial phase of the pandemic

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### ABSTRACT

**Introduction:** The COVID-19 pandemic has excessively affected socially and economically deprived groups of population. There is a dearth of empirical evidence about the effect of policies regulating access to care for such groups. This study aims to document the impact of an equity-based strategy to facilitate access to COVID-19 testing during the initial phase of the pandemic.

**Materials and methods:** This cross-sectional study included all outpatients presenting at the Geneva University Hospital for COVID-19 testing in March and April 2020. We compared the testing program uptake, and the proportions of positive tests and of complicated clinical course between undocumented migrants and homeless persons and the general population.

**Results:** Underserved patients represented 215 (6.5%) of the 3299 participants. There was no significant difference in the time-lag between the first COVID-19 evocative symptoms and the testing, the number of symptoms at presentation, and the participation to the program during its first month of implementation. The proportion of positive tests was significantly higher (32.1% vs. 23.6%,  $p=.005$ ) among undeserved while the proportion of complicated clinical course was comparable.

**Conclusions:** Equity-based policies can mitigate disparities in access to care during the pandemic and reduce the spread of COVID-19 in the community by early detection of infective cases. The high proportion of positive test in underserved patients highlight the need to include such groups into future COVID-19 immunization program. More globally, this study highlights the opportunity to reinforce healthcare systems to adapt to new threats and to contribute to a better protection of the whole of society.

### 1. Introduction

The COVID-19 pandemic has disproportionately affected socially and economically deprived groups of population in Europe and the US during the early phase of the pandemic (Williamson et al., 2020; Webb Hooper et al., 2020). For instance, in Chicago, Latino and African American residents presented a two-to three fold higher incidence of infection than White (Chicago Department of Public Health 2020). In the United Kingdom (UK), patients attended in the intensive care units were disproportionately belonging to minorities (Intensive Care National Audit and Research Centre 2020) and mortality was twice as high among residents belonging to ethnic and racial minorities in New York City and in the UK as compared to White residents (NYC Health. COVID-19: data 2020; Office for National Statistics 2020). Different hypothe-

sis have been formulated to explain these disparities in exposure and impact, including pointing out the role of individual, medical, socio-economic and structural factors (Bhala et al., 2020). Minorities and underserved groups have been shown to have more preexisting risk factors for severe COVID-19 infection (Agyemang and van den Born, 2019; Adams et al., 2020), to have less capacity to implement protective measures both at home and at the workplace (Burton-Jeangros et al., 2020), to delay seeking medical assistance upon the occurrence of suggestive COVID-19 symptoms and to present more severe disease at admission (Joseph et al., 2020). While some of these factors may be amenable to improvement by adapting healthcare structures to new COVID-19 related health needs of underserved populations, there is a dearth of empirical evidence about the effect of equity policies regulating access to care in this context.

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Among underserved populations, undocumented migrants and homeless persons are at particularly high risk of encountering cumulative barriers preventing timely and appropriate access to medical care in non-pandemic context. Concerns have been raised about an increased difficulty to meet their health needs during the current health crisis (Page et al., 2020; Tsai and Wilson, 2020). Indeed, in addition to facing administrative and financial structural barriers, undocumented migrants and homeless persons frequently delay or renounce to seek care at health institutions by fear of denunciation or inappropriate management (Woodward et al., 2014; Hwang and Burns, 2014). Moreover, lack of familiarity with the healthcare system, language barriers and limited cultural awareness along with difficulties in managing socially complex cases by health professionals may impede adequate navigation within the system (Priebe et al., 2011; Legido-Quigley et al., 2019).

The objective of this study was to explore the impact of an equity health policy aiming at facilitating undocumented migrants and homeless persons' access to COVID-19 testing in Geneva during the early phase of the pandemic. Our hypothesis was that testing was as accessible to the undeserved population as for the general population.

## 2. Material and methods

### 2.1. Design

This cross-sectional study compared the underserved (undocumented migrants and homeless persons) with the general population who visited the Geneva University Hospitals (HUG) outpatient COVID-19 testing centers from March 1st to April 23rd during the initial phase of the COVID-19 pandemic.

### 2.2. Setting

Access to the health care system in Switzerland requires the purchase of a mandatory private health insurance. Despite being applicable to all residents irrespective of their residency and social situation, around 2% of the population lacks this insurance, notably undocumented migrants and homeless persons (Biller-Andorno and Zeltner, 2015). The Geneva canton (population 500'000) hosts 10'000 to 15'000 undocumented migrants and homeless persons, most of whom lacking health insurance (Morlok et al., 2016). The HUG is the unique port of entry into the public healthcare system for these groups.

The first case of COVID-19 infection in Switzerland was identified on February 25th, 2020. In the Canton of Geneva, an outpatient COVID-19 testing program targeting the whole resident population was implemented in early March 2020 at the HUG and subsequently complemented by providers from the private sector. The Canton's health authorities emphasized on the importance of equity in timely access to COVID-19 testing and medical care irrespective of socioeconomic conditions and health insurance status. This translated into actions at different levels: a) implementing policies to facilitate underserved populations access to the testing program at HUG; b) engagement with community stakeholders to convey information to the targeted groups; c) allocating financial resources to provide free testing and to cover the medical costs; and d) cooperating with social services to ensure positive cases can spend their self-isolation period in appropriate housing conditions.

### 2.3. Participants

Patients presenting at the outpatient COVID-19 testing center were categorized in two groups on the basis of the administrative information. Those attributed to the underserved population were identified in presence of at least one visit at the HUG mobile outpatient community health center which attends to uninsured patients between January 1st, 2019 and May 31st, 2020 or following formal assessment by the HUG social workers. These information were extracted from the administra-

tive database of the HUG. All other patients were considered to belong to the general population with standard access to care.

### 2.4. Inclusion criteria

All residents in the Canton of Geneva, aged 16 or above, presenting at the HUG outpatient COVID-19 testing centers from March 1st to April 23th 2020 were included. We excluded patients who were triaged as probable severe COVID-19 disease before testing and referred to the emergency room for thorough medical evaluation and patients who did not undergo a SARS-CoV-2 test.

### 2.5. Data collection

All patients presenting at the HUG outpatient COVID-19 testing center were asked to fill an administrative, sociodemographic and health questionnaire available in different languages. Data, including the result of the COVID-19 test, were coded for subsequent analyses.

### 2.6. Variables

The main outcome was the time interval between the onset of the first symptoms evocative of COVID-19 infection and the date of presentation at HUG for COVID-19 testing center as a measure of the access to and use of the COVID-19 screening program. The variable was coded as "early visit" (0 to 3 days after symptoms onset) and "not early visit" ( $\geq 4$  days after symptoms onset).

Secondary outcomes included the month of testing (March or April), as a measure of the early uptake to the COVID-19 testing program; the number of COVID-19 evocative symptoms at the time of presentation to the testing center. Symptoms included anosmia, runny nose, sore throat, cough, difficulty breathing, fever, muscle pain, chills, headache, abdominal symptoms, fatigue, and thoracic pain. The total number of symptoms ranged between 0 and 12. We also recorded asymptomatic cases (patients with no symptoms). Additionally, we measured the occurrence of COVID-19-related hospitalizations at HUG from March 1st, 2020 to May 31st, 2020.

Other variables included age, gender, having at least one chronic condition (chronic respiratory disease, diabetes, heart disease, and immuno-suppression) and multimorbidity ( $\geq 2$  chronic conditions). We also assessed the positivity SARS-CoV-2 infection rate, using RT-PCR nasopharyngeal swab. Exposure to SARS-CoV-2 was assessed by enquiring about recent ( $< 14$  days) contact with confirmed COVID-19 cases or return from a highly endemic country.

### 2.7. Statistical analysis

Descriptive statistics were first computed for all variables and both groups, using percentages and means with standard deviations. We then compared groups using simple logistic and linear regressions, according to the distribution of the variables. Analyses were performed on the whole sample and on positive patients. As patients could come multiple times, analyses were performed at the level of the visit for the whole sample. As sensitivity analyses, we performed mixed-effect models to control for the effect of the participants' clustering. Results were similar as those reported in the manuscript. The level of statistical significance was set at 0.05. All analyses were performed using Stata 15.

### 2.8. Ethical considerations

This study received ethical clearance from the Geneva canton board of ethics for medical research (CCER 2020-00813).

**Table 1**  
Sociodemographic and clinical characteristics of the study participants.

	Participants			P-value
	All (n = 3299), mean (SD) or n (%)	Underserved (n = 215), mean (SD) or n (%)	General (n = 3084), mean (SD) or n (%)	
Sociodemographics and clinical characteristics				
Age	42.3 (14.9)	39.8 (12.7)	42.5 (15.0)	.012
Gender (female)	1764 (53.5)	111 (51.6)	1653 (53.6)	.575
Clinical risk factors				
≥ 1 chronic disease	1116 (33.8)	64 (29.8)	1052 (34.1)	.194
Multimorbidity (≥ 2 chronic diseases)	284 (8.6)	15 (7.0)	269 (8.7)	.379
Exposure to SARS-CoV-2				
Return from a highly endemic region	251 (7.6)	11 (5.1)	240 (7.8)	.157
Contact with a confirmed case	954 (28.9)	63 (29.3)	891 (28.9)	.898
Access to and uptake of testing				
Testing within 3 days after first symptoms' occurrence*	1401 (45.5)	79 (40.5)	1322 (45.8)	.149
Number of symptoms	4.3 (2.2)	4.2 (2.4)	4.3 (2.2)	.409
Testing during the first month of the program	1684 (51.0)	112 (52.1)	1512 (51.0)	.751
SARS-CoV-2 nucleic acid testing				
Positive	797 (24.2)	69 (32.1)	728 (23.6)	.005

\* Participants with asymptomatic presentation (n = 72) and missing value for the date of onset of symptoms (n = 148) were excluded.

**Table 2**  
Sociodemographic and clinical characteristics of participants with a positive SARS-CoV-2 test.

	Participants			P-value
	All (n = 797), mean (SD) or n (%)	Underserved (n = 69), mean (SD) or n (%)	General (n = 728), mean (SD) or n (%)	
Age	43.1 (14.4)	41.9 (13.4)	43.2 (14.5)	.495
Gender (female)	396 (49.7)	35 (50.7)	361 (49.6)	.857
≥ 1 chronic disease	227 (28.5)	20 (29.0)	2017 (28.4)	.923
Multimorbidity (≥ 2 chronic diseases)	53 (6.7)	4 (5.8)	49 (6.7)	.766
Testing within 3 days after first symptoms' occurrence*	340 (44.4)	24 (36.4)	416 (45.1)	.172
Number of symptoms	4.5 (2.1)	4.9 (2.4)	4.5 (2.0)	.139
testing during the first month of the program	305 (38.3)	29 (42.0)	276 (37.9)	.502
Hospitalization	65 (8.2)	7 (10.3)	58 (8.0)	.509

\* Participants with asymptomatic presentation (n = 7) and missing value for the date of onset of symptoms (n = 24) were excluded.

### 3. Results

There was a total of 4107 visits to the HUG testing center during the study period. Of these, 429 (10.5%) were excluded because they did not live in the Canton of Geneva. Of the 3678 remaining visits, 357 (9.7%) were excluded because patients were not tested. Finally, of these 3321 visits, 22 (0.7%) were excluded because patients did not consent for the reuse of their personal data. Thus, 3299 visits were included in the analysis, of which 215 (6.5%) related to patients in the underserved group. The patients were significantly younger than the general population but showed a comparable profile of clinical and exposure risk factors (Table 1). Overall, the proportion of visits occurring within the three first days after symptoms onset was similar in both groups ( $p=.149$ ). There were no significant differences in the average number of COVID-19 evocative symptoms upon presentation ( $p=.408$ ) and in the proportion of patients being tested during the first month of the program ( $p=.751$ ). The proportion of positive SARS-CoV-2 nucleic-acid tests was 24.2%. Patients belonging to the underserved population tested positive significantly more frequently ( $p=.005$ ).

Among the 797 patients with a confirmed SARS-CoV-2 infection, there was no significant difference in the proportions of participants with clinical risk factors, early testing, number of symptoms at presentation, month of consultation, and COVID-19-related hospitalizations (Table 2).

### 4. Discussion

This study shows that during the initial phase of the pandemic in Geneva, there was no significant difference in the access to COVID-19 testing between underserved groups traditionally facing barriers to meet

their healthcare needs and the general population as attested by comparable symptoms-to-testing time, gravity of the disease at presentation and early participation to the testing program. While undocumented migrants and homeless persons tested positive more frequently, the proportion of patients requiring subsequent hospitalization was similar in both groups.

Access to healthcare for undocumented migrants and other underserved groups depends on a range of structural and personal factors requiring multipronged policies and interventions (Legido-Quigley et al., 2019; Poduval et al., 2015). This is even more the case in situation of health crisis which poses the risk of increasing health inequalities (Okonkwo et al., 2020). Indeed, the social and economic consequences of the current COVID-19 pandemic have been shown to rapidly worsen the pre-existing vulnerability of underserved groups and concern have been raised that health policies may be blind to the need of groups at the margin of the mainstream society (Burton-Jeangros et al., 2020; Page and Flores-Miller, 2021; Bhopal, 2020).

The example described in this study shows that rapid adaptations to existing health programs can be implemented quickly and at limited cost in other health systems both at national and international level. In parallel, it calls for reexamining the perimeter of inclusion within the national healthcare system. Indeed, whereas undocumented migrants and other socially disadvantaged groups can theoretically purchase the mandatory health insurance in Switzerland, its cost and administrative complexity act as major deterrents (Morlok et al., 2016). Acting on the financial structure of the healthcare system, notably by providing tailored subsidies to those facing economic hardship, may allow for reducing the number of people experiencing de facto exclusion from the system.

Previous research has highlighted the multifold challenges faced by healthcare systems in addressing equity issues notably during health crisis (Shadmi et al., 2020). Our results support that health disparities may be mitigated when attention to equity is a key part of health policy implementation, even in situation of acute stress on resources. As a result, tackling the main barriers to care for underserved groups by tailored policies and practices may prove instrumental in controlling the spread of COVID-19 in the community thanks to timely identification and isolation of infective cases (Williams and Cooper, 2020).

Underserved patients had a higher proportion of positive tests. This result is in line with previous studies highlighting the excessive risk of exposure at the living and working place bore by socioeconomically deprived groups of population, notably precarious migrants and homeless persons (Martinez et al., 2020; Baggett et al., 2020). While most had mild diseases not requiring hospitalization, this poses a public health challenge to ensure patient are well informed and can adequately self-isolate and thus protect their family and friends from SARS-CoV-2 transmission. Innovative housing strategies have been required to respond to this risk along with interventions to ensure people meet their basic needs in absence of working capacities and social safety net (Baggett et al., 2020; MacKenzie et al., 2020).

Our results shed light on the importance to ensure high-risk groups are included in future SARS-CoV-2 immunization programs. Indeed, the high uptake of the testing program should be taken as a clear and sound indicator of the willingness of such groups to protect their own and their families' health. With strong and early engagement with community representatives to foster trust and tailored health information, the immunization coverage may be as high – or even higher – than in the general population.

While this study provides empirical evidence of the impact of an equity policy on access to testing for the first time in Switzerland, it has several limitation to account for. Further research on a larger and more varied sample of participants including patients with severe symptoms at presentation may contribute to better document the impact on COVID-19 mortality disparities between groups. Second, while underserved groups had no other access to care than at HUG, the general population could also be tested at a limited range of private providers, thus potentially biasing the recruitment. Finally, as insured patients could have to pay for the test depending of their health insurance plan, it may have discouraged some to test in presence of minor symptoms. Yet, we believe our results provide valuable information supporting the importance of equity as a key element in the strategy to tackle the COVID-19 pandemic.

In conclusion, pandemics like financial and environmental crisis uncover how the preexisting unequal distribution of resources in society expose the most vulnerable groups to higher odds of damages and lower ability to receive adequate protection (Berkowitz et al., 2020). In that sense, our findings show that political and public health attention to health equity may contribute to mitigate further disparities. More globally, our study reminds of the importance of including groups at the margins into the healthcare system and ensuring their access to other essential public services. Indeed, inclusive health systems have been shown to entail multifold benefits to the whole of society (Legido-Quigley et al., 2019). The immediate urgency is to ensure sustained, equitable and universal access to COVID-19 vaccine irrespective of position in society, origin and legal status. It will be only by doing so that the COVID-19 pandemic will finally abate. Governments and health authorities should thus take the opportunity of the current pandemic to work on structural changes and innovative policy implementation aiming at fostering better equity to build stronger and healthier communities for the post-COVID-19 era.

#### Declaration of Competing Interest

Authors have no competing interests to declare.

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