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# Health and healthcare use of homeless population: Evaluation study of joint social work and healthcare provision



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ARTICLE INFO	A B S T R A C T	
<i>Keywords:</i> Homeless people Homelessness Healthcare availability Impact Evaluation study Social work	<ul> <li>Background: Homelessness as an extreme form of poverty perpetuates and exacerbates health inequalities. People experiencing homelessness face a mortality rate 10 times higher than that of the general population, with an average age of death at 45. There is a significant disconnect between the mainstream healthcare system and the specific health needs of people experiencing homelessness, leading to substantial human and economic costs. Objective: The objective of this evaluation study is to assess the impact of an intervention in nurse-led healthcare outreach services to people experiencing homelessness on their utilization of healthcare services. Design: This study is a part of research program aimed at assuring health equity of most vulnerable members of a society. Detailed understanding of barriers to care is a necessary precondition for improvements in healthcare use.</li> <li>Data: The study analyzes data on hospitalization and emergency department visits by people experiencing homelessness across three cities in Czechia from 2014 to 2021.</li> <li>Methods: A quantitative difference-in-differences approach is complemented by insights from field studies in these three cities.</li> <li>Results: The intervention in people experiencing homelessness, alleviating pressure on health service capacity and reducing associated healthcare costs. Enhanced primary nurse-led healthcare outreach, along with cross-sectoral integration and activation, has lowered the barriers to accessing essential healthcare services.</li> <li>Conclusion: A pivotal policy outcome of this study is the establishment of an insurance provision that allows medical doctors to claim additional costs incurred in treating people experiencing homelessness from a public insurance system.</li> </ul>	

#### What is already known

- Homelessness is a major yet unresolved healthcare and social issue across the world.
- Conventional healthcare systems fall short in addressing needs of people experiencing homelessness, notwithstanding the existence of universal health insurance.
- Emergency treatment and hospitalization of people who are homeless leads to high healthcare and societal costs, despite stemming from largely preventable diseases.

# What this paper adds

- Pre-post longitudinal design confirmed the efficiency of nurse-led outreach services to reduce hospitalizations of people experiencing homelessness and lower the frequency of emergency visits by people experiencing homelessness.
- New healthcare reimbursement codes for a treatment of patients who are homeless were introduced by an insurance provider as a tool to decrease barriers of care and increase health equity.
- Still, outreach services do not fully address all healthcare needs of people who are homeless and multiple barriers to care persists.

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#### 1. Introduction

### 1.1. Background

Addressing the healthcare needs of the population experiencing homelessness presents a significant challenge for public healthcare systems (The Lancet, 2018; Marmot, 2018), including general practice professionals who provide prevention and ambulatory healthcare to people experiencing homelessness (Lester et al., 2002). People who experience homelessness often face social exclusion, leading to lower healthcare utilization compared to the general population (Nagy-Borsy et al., 2021). Prioritizing basic needs such as food and shelter, they frequently avoid and delay seeking medical help (Kneck et al., 2021; Luchenski et al., 2018), a situation further exacerbated by severe material deprivation (Nagy-Borsy et al., 2021; Zlotnick et al., 2013). Moreover, people experiencing homelessness encounter numerous obstacles when using public healthcare, including issues related to demand, supply, accessibility, availability, affordability, and acceptability (Omerov et al., 2020), often resulting in a mismatch between healthcare demand and supply, leading to repeated emergency care (Pleace, 2023) and high mortality among people experiencing homelessness (Aldridge et al., 2018).

Non-governmental, non-profit organizations (NGOs) play a crucial role in providing health services to this hard-to-reach group in many EU countries and are considered irreplaceable (Trummer et al., 2020). This 'structural compensation' reflects a compensation for the lack of appropriate services from official public health systems for the people experiencing homelessness. Healthcare systems are primarily designed for the majority—housed, mobile, and insured populations—making services largely inaccessible (Liu and Hwang, 2021; Richards and Kuhn, 2023; Fornaro et al., 2022). This represents a failure of both government and market, where NGOs provide a significant portion of healthcare (Enich et al., 2022; Pleace, 2023), and evidence of health interventions (Kopanitsa et al., 2023; Trummer et al., 2020; Verlinde et al., 2010).

In Czechia, healthcare provision for people experiencing homelessness is inadequate (Barták, 2011; Kavková and Kottnauerová, 2018; Glumbíková et al., 2019). The public healthcare system is under immense pressure from demographic aging, while housing precarity and homelessness are on the rise. Czechia has one of the highest proportions of people who are homeless in the European Union, ranking fourth in Europe. According to the latest FEANTSA report (FEANTSA and The Abbé Pierre Foundation, 2023), approximately 0.2 % of the population, or 20,000 people, are homeless. Despite a legal right to healthcare treatment, this right is often unexercised by this group due to bureaucratic and organizational issues (Hladikova and Hradecky, 2007; Kavková and Kottnauerová, 2018). People experiencing homelessness exhibits a high prevalence of multiple diseases and disorders, low healthcare utilization, and low life expectancy (Kavková and Kottnauerová, 2018). In response to this situation, the Ministry of Healthcare initiated a pilot project to improve healthcare accessibility for people experiencing homelessness, focusing on strengthening primary care and prevention through the first point of contact with people 

Evidence on the health and healthcare of people experiencing homelessness is scarce (Omerov et al., 2020; Pleace et al., 2021; Kneck et al., 2021). Recent reviews on health interventions for people experiencing homelessness highlight limitations in the scope and focus of existing literature (Hwang and Burns, 2014; Kopanitsa et al., 2023; Luchenski et al., 2018) and a lack of pre/post design studies (Kopanitsa et al., 2023). Our study aims to determine whether an intervention could reduce hospitalizations and emergency visits of people experiencing homelessness. The intervention provided funding to enhance the capacity and practical knowledge of general practices and paired them with NGOs familiar with the target group, potentially increasing healthcare capacity and reducing taxpayer costs. The hypothesis that preventive healthcare for people experiencing homelessness is less costly than emergency visits or long-term hospitalization has been examined by Sadowski et al. (2009) and contested in the US context (O'Toole et al., 2015). However, studies from EU countries with universal healthcare systems are sparse and inconclusive (De Maio et al., 2014; Nagy-Borsy et al., 2021; Trummer et al., 2020; Verlinde et al., 2010). Thus, this study contributes to the existing body of knowledge and may inspire policy changes aimed at achieving health equity.

The article is structured as follows: First, we review the literature on health equity and identify key issues in healthcare provision for vulnerable populations. Second, we introduce the intervention, describe the health data and difference-in-difference approach as essential tools for evaluation analysis, with the evaluation's validity further supported by insights from interviews and case study analysis. Third, we demonstrate the effectiveness of the pilot healthcare intervention, showing that the combined social and medical outreach of mobile teams reduced the number of emergency visits and hospitalizations among people who are homeless. In conclusion, we summarize the practical outcomes of the evaluation and offer suggestions for the transferability and replication of the intervention.

#### 1.2. Barriers to healthcare provision in homeless population

The literature consistently highlights that providing housing is crucial for health of people experiencing homelessness, underscoring the principle that "housing is healthcare." The absence of stable housing impedes basic self-care practices, adherence to medication regimens, and maintenance of other life routines, potentially escalating minor illnesses into severe health issues (Zlotnick et al., 2013). Studies examining the social gradient of health reveal that individuals experiencing rough sleeping face significantly poorer health outcomes than those who are sheltered (Nagy-Borsy et al., 2021; Ra et al., 2023). Providing shelter can enhance access to healthcare and increase the utilization of nonurgent care services (Trummer et al., 2020), addressing the issue of neglected health prevention and early treatment that leads to the inefficient use of healthcare services (Davies and Wood, 2018; Lewer et al., 2021; Reilly et al., 2022).

People experiencing homelessness encounter numerous and persistent barriers to healthcare access, including challenges with patient identification, appointment scheduling, stigma, hygiene, psychological barriers, treatment costs, medication access, and health insurance coverage (see, Davies and Wood, 2018; for a perspective of women experiencing homelesness see Kneck et al., 2021). A major consequence of health system inequalities is the under-treatment of populations experiencing homelessness (Omerov et al., 2020). Many existing healthcare settings and practices are not designed to accommodate homeless users, who lack tools and resources for basic everyday mobility (see Simon et al., 2019, 2020 on spatial mobility of people experiencing homelessness), but rather tailored for housed and mobile individuals (Lyon-Callo, 2000). People experiencing homelessness struggle with personal autonomy, health literacy, transportation, and the opportunity costs of seeking care. These invisible barriers hinder their ability to perceive, seek, reach, and afford healthcare services (Ashcroft and Adamson, 2022, p. 145). In a recent study by Nagy-Borsy et al. (2021), only 35 % of ill people experiencing homelessness had taken medication in the past year.

Access to healthcare is influenced by the application of specific regulations and the practices of care provision—or the lack thereof—by relevant entities. General practices and other healthcare system components seldom track patients' housing status (Routhier et al., 2022), rendering health-vulnerable populations often invisible in routine health information systems (Aldridge et al., 2018). Healthcare personnel typically discover a patient's homeless status upon dismissal from the hospital. The invisibility of people experiencing homelessness is a common issue within public administration systems (Treherne and Singer, 2009), which often create additional barriers, such as requiring a permanent residential address for treatment eligibility or to avoid out-

of-pocket payments (Robben et al., 2023; Trummer et al., 2020).

Healthcare professionals also face barriers in caring for people experiencing homelessness, who are often perceived as demanding in terms of time and resources (Lester et al., 2002). A lack of training and awareness about homelessness among healthcare professionals diminishes their ability to refer patients to appropriate social services or to accurately record treatments in the system (Rodriguez et al., 2020). Capacity of people experiencing homelessness to assess their own health needs is limited. Multiple studies highlight homeless people's poor health literacy (e.g., Nagy-Borsy et al., 2021). As a result, health services are predominantly utilized in critical situations, with follow-up treatment being rare (Hajek et al., 2021). Statistics on hospital admissions show that people experiencing homelessness have a six fold higher rate of hospitalizations compared to the general population, particularly for acute hospital-based care (Brown et al., 2022; Kushel et al., 2001; Trummer et al., 2020).

The configuration of healthcare systems significantly affects access to healthcare, especially for economically disadvantaged and socially vulnerable groups. Funding models and the extent of universal healthcare access vary widely across countries. The role of health insurance is pivotal, as it facilitates the use of outpatient care and generally reduces barriers to access (Kushel et al., 2001). In the United States, the lack of health insurance is a significant obstacle to healthcare access (Kushel et al., 2001; Lee et al., 2022). Conversely, in the EU, where universal healthcare access is often mandated, health insurance is less contentious, though substantial disparities in access exist between member states (Trummer et al., 2020). For people experiencing homelessness, legal entitlement to basic or emergency healthcare persists even without public health insurance contributions, as seen in Czechia. Special arrangements for pay-for-service healthcare for people who are homeless are also in place (De Maio et al., 2014; Verlinde et al., 2010). Despite these provisions, the healthcare needs of people experiencing homelessness is largely unmet, contributing to their significantly lower life expectancy. People experiencing homelessness face a mortality rate 10 times higher than the general population, with an average age of death at 45 (Aldridge et al., 2018).

# 1.3. Alternative paths of healthcare provision

Healthcare systems are structured to deliver a wide array of services, optimizing a complex network of institutions, organizations, and logistics. Yet, conventional healthcare delivery models often fall short in addressing accessibility issues for people experiencing homelessness, who typically express low spontaneous demand (Omerov et al., 2020; Pleace, 2023). There is an ongoing debate on how much service provision should be customized for specific groups, including how to effectively incorporate the needs of people experiencing homelessness (Borysow et al., 2017; Jego et al., 2018; Kopanitsa et al., 2023; Verlinde et al., 2010). Despite warnings against healthcare segregation—where the creation of parallel health systems risks permanently excluding people experiencing homelessness from standard healthcare services (O'Carroll et al., 2017)—this issue persists.

Services for people experiencing homelessness often fail to align with the principles of patient-centered healthcare (Flike et al., 2022; McNeill et al., 2022). The person-centered framework is a holistic approach to care which fully acknowledges the person, its individual needs, values and preferences and thus ensures provision of respectful and responsive care (Santana et al., 2018). Universal healthcare systems frequently overlook such equity-seeking populations (Purkey and MacKenzie, 2019). To bridge this gap, NGOs frequently step in to compensate for these shortcomings, offering targeted healthcare outreach to people experiencing homelessness through social work and professional healthcare staff. This approach, known as 'structural compensation,' operates alongside the primary healthcare models. Trummer et al. (2020) observed this phenomenon in diverse countries, including Austria, Greece, Poland, and Romania, where, regardless of economic conditions and the universality of healthcare access, services for people who are homeless were predominantly provided by NGOs (Kaduszkiewicz et al., 2017; Omerov et al., 2020).

Healthcare outreach models differ significantly in their scope, scale, and structure (Borysow et al., 2017), with their integration of resources and expertise from the conventional medical and welfare systems varying by local context (Trummer et al., 2020). NGOs have pioneered various effective health outreach initiatives for homeless communities. Notably, in the U.S. and Brazil, mobile units targeting HIV-positive individuals and substance users among the people experiencing homelessness have demonstrated success. This approach has been expanded and recognized as a commendable primary care practice (Zlotnick et al., 2013). The strength of these outreach models lies in their ability to bypass barriers posed by mainstream health services, by engaging with patients within their environments and by acknowledging their unique needs and experiences (Kopanitsa et al., 2023).

Despite their advantages for people experiencing homelessness, these alternative healthcare delivery methods have significant limitations (Hwang and Burns, 2014; Routhier et al., 2022). Outreach organizations often rely on fluctuating funding, volunteer efforts, and may not consistently adhere to ethical care standards or achieve comprehensive territorial coverage (Trummer et al., 2020). The sporadic and unevenly distributed nature of these services underscores the critical need for proactive outreach to those in need of healthcare (Davies and Wood, 2018). However, these services are typically designed as shortterm solutions for immediate crises, aiming to prevent a chronic illness. In case of chronic homelessness, reliance on emergency departments may sustain life without improving overall health and wellbeing (Davies and Wood, 2018), highlighting the necessity of a broader framework that addresses 'non-medical' factors to achieve health equity (Luchenski et al., 2018).

#### 2. Methods and data

The intervention underwent a mixed process and impact evaluation (see section 2.1), employing a quasi-experimental design for selected evaluation questions where it was necessary to demonstrate the links between innovation and impact. We used a non-intervention office to compare data from the information systems of supported GP practices on health outcomes, and we used data from the general population to compare longitudinal data on hospitalization and emergency visits with the people experiencing homelessness (section 2.2). The causal link between the observed changes and the project was assessed using, among other methods, a reconstructed theory of change (White, 2009), as well as a range of statistical analytical methods, including difference-in-difference analysis (Gertler et al., 2016). The principles of triangulation were respected, especially due to intensive cross-talk between various qualitative and quantitative data sources (section 2.3). An overview of data sources is summarized in the Table 1.

#### 2.1. Intervention design

We describe the intervention according to Skivington et al. (2021) and the TIDieR approach (Hoffmann et al., 2014; see Annex).

#### 2.1.1. Context

The intervention "Increasing accessibility and creating health care options for the people experiencing homelessness" (project ID: CZ.03.2.63/0.0/0.0/15\_039/0009641) was an activity resulting from the Conception of prevention and solution of homelessness in the Czech Republic until 2020 (Government Resolution No. 666 of 28 August 2013). It aimed to promote a broader procedural view of homelessness and the need for a comprehensive and coordinated solution. The resolution acknowledged the underlying need for better integration of social and health services and the need to improve the legal framework (missing integration of social and healthcare services).

#### Table 1

Summary of data sources.

Data sources	Data characteristics	Method of analysis
Monthly monitoring sheets by GP offices (4 intervention GP offices)	Qualitative and quantitative data: mini-case studies, frequency of visit to GP, no. of mobile outreach, no. medical procedures specific to the target group, no. of various provided services and consultations	Statistical analysis, content analysis, qualitative coding
Semi-structured interviews with stakeholders	prevalently qualitative data	Content analysis
In-depth semi-structured interviews with people experiencing homelessness	prevalently qualitative data	Open coding, content analysis
Data from information systems of GP practices (four intervention GP offices plus one non- supported GP office working with the target group)	Anonymized quantitative data (patients' code, gender, year of birth, date and code of treatment, no. of performance points, price per point, main and secondary diagnosis	Statistical analysis, the difference in difference method
bata from the central health registry (three intervention GP offices - a key source of data presented in the article)	Aggregated quantitative data of patients on hospitalizations and emergency visits	Statistical analysis, the difference in difference method

The intervention coincided with the COVID-19 pandemic, which underscored the existing inadequacies in healthcare provision and accessibility for people experiencing homelessness (Routhier et al., 2022). The pandemic introduced unforeseen challenges, including quarantines, stay-at-home orders, and new epidemiological measures (Vašát and Váně, 2023). A recent FEANTSA report (Pleace et al., 2021) reviewed the varied responses to the health crisis across Europe, noting both significant accommodations for rough sleepers in vacant hotels and hostels and more tepid reactions or outright neglect. Overall, the pandemic did not prompt significant shifts in homelessness policy, except in cases where it accelerated strategies already in development (Pleace et al., 2021).

# 2.1.2. Program theory

The primary goal of the intervention was to enhance the health of the people experiencing homelessness while substantially reducing overall treatment expenses. The intervention tackled aspects of the disconnect between homelessness and healthcare by (1) normalizing healthcare interactions to mitigate stigma and logistical challenges, with doctors collaborating closely with social workers to improve hygiene, transportation to medical facilities, medicine distribution, and other forms of assistance; (2) equipping healthcare professionals with the skills to serve this specific target group through psychological training and education; (3) augmenting the mobile outreach of social services with additional funding, including the novel provision of nursing staff. The intended outcome of the intervention was to demonstrate the efficacy of mobile outreach and preventive measures and propose targeted health insurance reforms to achieve public financial savings.

# 2.1.3. Stakeholders

Czechia's healthcare system is predominantly served by the General Health Insurance Company of the Czech Republic, which provides insurance to the majority of the population (Bryndová et al., 2023) and was a close collaborator throughout the evaluation project. Another key group of stakeholders included hospitals (ambulatory specialists, social health care workers working in hospital admissions, paramedics), relevant units under city and regional administrations, and ministerial project staff. The target group consisted of supported medical staff and social workers, homeless patients of GP practices, and a sample of the homeless population identified by social services, living both with and without a roof (see ETHOS typology, 2019).

#### 2.1.4. Key uncertainties

The impact of the current ineffective healthcare system for people experiencing homelessness on public funding was somewhat unclear but predictable. However, the main question was how to establish systematic support for the additional care required for people experiencing homelessness. Firstly, how to achieve sustainable financing of GP practices when scaled up to other cities. Secondly, how to compensate doctors and nurses for the additional time typically spent with people experiencing homelessness. Therefore, the evaluation aimed to provide i) a calculation of the costs of repeated emergency visits, ii) a comparison of hospitalization frequency between the population of people experiencing homelessness and the general population, and iii) suggestions for sustainable financing of GP practices. There was also a discussion on whether deploying a nurse during mobile outreach would be sufficient or if it would be advisable to transition to street medicine services and modify the legal framework.

#### 2.1.5. Intervention activities

The project activities aimed at supporting the health care of people experiencing homelessness and their social inclusion. These activities were provided through GPs who provided urgent, standard, and preventive care and could accommodate 20 people at risk of homelessness per day (providing capacity for the target group). A key activity was visits to the target group in their environment. The aim was to reduce the frequency of disease appearance due to higher vaccination coverage and increase the detection of infectious and parasitic diseases. These health activities were complemented by social support in the form of help to find housing, accompany to institutions and assist with debt issues.

#### 2.1.6. Refining of intervention

The evaluation study employed both quantitative and qualitative methods to assess the pilot operations of general practitioners (GP) practices over 18–24 months in three Czech cities (Olomouc, Ostrava, and Pardubice). The city of Prague was also included in the intervention but was excluded from the evaluation analysis of data from the National Healthcare Register (NHIS). The reason was the concurrent intervention providing humanitarian shelter and healthcare for people experiencing homelessness in Prague, making it difficult to attribute changes in the health of people experiencing homelessness solely to this intervention. Additionally, the GP practice in Prague had limited mobile outreach due to external factors, such as maternity leave of nurses and staff affected by COVID-19. The intervention in Prague is not included in our analysis.

The involvement of pilot GP practices was enabled by grant support, for which the GP practices co-applied with local NGOs providing social services. The introduction of mixed mobile social outreach teams, comprising both a social worker and a nurse, represented a significant innovation. While the implemented model of homeless outreach attempted to address the structural compensation issue by integrating health and social services, the geographic fragmentation of health services (ambulances, clinics, GPs, specialists) proved to be a barrier to effectively treating people experiencing homelessness (Davies and Wood, 2018; Šimon et al., 2019, 2020). It was acknowledged that a multidisciplinary team with key specialists (such as a psychiatrist/psychologist) would be more effective during mobile outreach.

#### 2.1.7. Economic considerations

The decision-makers were primarily interested in cost calculations based on the frequency of emergency visits and associated costs. Given the relatively low number of their clients who were experiencing homelessness and the economic feasibility, the General Health Insurance Company of the Ministry of Healthcare of the Czech Republic prepared two new healthcare reimbursement codes for treating people experiencing homelessness. When calculating the costs associated with the care of people experiencing homelessness in hospitals, the most appropriate approach would be to use microdata at the individual patient level and compare it with the general population. Such data would reveal which patients were hospitalized, the diagnoses they received, and the duration of their hospital stays. It would also clarify the costs associated with each hospitalization. However, due to the anonymization of personal data, the evaluation team could not access this information.

## 2.2. Register data and analysis

This paper examines hospitalization and health emergency visit data for people experiencing homelessness to assess the effectiveness of health outreach services on reducing hospitalization rates and emergency visits. Systematic reviews by Kopanitsa et al. (2023) and Jego et al. (2018) have endorsed these metrics as valuable evidence-based indicators of outreach service efficiency. The analysis spans from January 2014 to December 2021, focusing on three cities - Ostrava, Olomouc, and Pardubice in Czechia, Central Europe. GP practices in these cities participated in data collection and the health outreach intervention, which was conducted from 2020 to 2022. Prior to the intervention, these GP practices were operational but at a reduced capacity and without the support of combined mobile outreach teams, typically relying solely on social workers to assist people experiencing homelessness.

The study compared data on hospitalizations and emergency visits of people experiencing homelessness with that of the general population, with monthly detail from 2014 to 2021, thus capturing the effects of the health intervention over time. Due to privacy concerns, we were unable to access individual medical records of patients who are currently homeless from the pilot GP practices. Only the GP practices had access to the identities of the individuals from the target group within the system. Instead, we utilized aggregated long-term patient data from the National Healthcare Register (NHIS) covering the period before and during the intervention. The NHIS provides comprehensive patient data by monitoring all healthcare utilization in the country (for detail about the NHIS see Komenda et al., 2020). Given that the GP practices involved were pre-established and exclusively served the population experiencing homelessness, it was unnecessary to further define the target group through secondary characteristics, such as specific diagnoses. The study includes a sample of 3317 patients experiencing homelessness from the three cities. Considering the estimated total homeless population in Czechia is around 20,000 (FEANTSA and The Abbé Pierre Foundation, 2023), our sample accounts for approximately 13.8 % of the country's population of people experiencing homelessness. The data from the GP practices reveal that 28.1 % of the patients experiencing homelessness in the sample are women, an average birth year of 1967.

The difference-in-differences method, as described by Gertler et al. (2016), is highly suitable for our dataset and the objectives of this study. This approach belongs to counterfactual impact evaluation methods and is commonly used to estimate impacts in evaluation studies (Gertler et al., 2016). This method presupposes that the development of both supported and unsupported groups (the first difference) are analyzed in relation to their states before and after the intervention (the second difference). We employed this approach to examine variations in hospitalizations and health emergency visits before and during the intervention period for both the target group and the general population. The analysis leveraged aggregated data from the National Healthcare Register NHIS to assess two primary indicators: (1) the decrease in hospital admissions (specifically emergency bed usage) and (2) the reduction in emergency department visits, with a focus on the average number of initial visits per patient (encompassing all sanctioned visits, categorized as either 'transferred to hospital' or 'left on site').

### 2.3. Qualitative data and case study analysis

#### 2.3.1. Qualitative analysis

The mixed-methods research design aimed at evaluating the intervention incorporated qualitative methods for data validation and triangulation. The methods included: i) desk research of relevant data and monitoring reports, ii) semi-structured interviews with key stakeholders (n = 50), involving representatives of key stakeholders in cities of intervention. These include GP practice staff, team leaders from emergency units, social health care units at hospitals, social services involved in the implementation, non-intervention social service, ambulatory specialists, debt counselors, municipal registry unit, Ministry of Health project office, insurance companies, GP at non-intervention GP practices), iii) in-depth interviews with people experiencing homelessness (n = 74), iv) questionnaires to health departments at 14 regional offices (response rate was 11 out of 14 regions in Czechia).

The qualitative data were further analyzed using content analysis (Krippendorff, 2013) and/or open coding for case studies (Strauss and Corbin, 1990). The synthesis of findings involved an effort to verify the impact of the intervention. The evaluation was conducted in accordance with the Ethical Code of Evaluators of the Czech Evaluation Society (Czech Evaluation Society, 2011), and the Formal Standards for Conducting Evaluations set by Czech Evaluation Society (2013).

#### 2.3.2. Case studies

A multiple-case study approach (Yin, 2017) where each person experiencing homelessness served as a unit of analysis was adopted (n = 57). This included 28 cases of repeated interviews supplemented by field notes and observations, and 29 mini-case studies drafted by social workers in their monthly monitoring reports. The repeated interviews had a high dropout rate, only 38 % of respondents from the first round were reached. However, the sample reached saturation and adding new cases did not lead to new findings.

Sample selection focused on inclusivity. Firstly, people experiencing homelessness who do not typically seek healthcare and often receive care or services anonymously were addressed. This subgroup is necessary to reach in the field and interviews would typically take place in squats, marginalized areas, or at makeshift shelters. Secondly, individuals who are in contact with the clinic or social service facility were reached. The interviews typically took place at the site of the service. The gender distribution in the sample corresponds to the country data. In the sample, the share of women was 40 % for sheltered and 16 % for unsheltered. In Czechia, among people experiencing homelessness women represents 34 % of asylum shelters and 20 % of rough sleepers (FEANTSA, 2020).

A pilot test of the research tools was conducted initially to ensure appropriate length and clarity. Interviews were recorded with the informed consent of the respondents. Representatives of social services organized meetings with respondents. Internal validity was verified by comparing cases (and discrepancies), and reliability was strengthened by comparing with similar cases. When incoherent, answers were usually triangulated with social workers who knew the history of the clients or verified during the second round of interviews with the people experiencing homelessness. All data collection and processing complied with the ethical guidelines and regulations set forth by the Ministry of Health and the institutions involved, ensuring the anonymity of people experiencing homelessness in the study. The main goal of case studies was to document the experiences of people experiencing homelessness at the intersection of social and healthcare services. Qualitative data were analyzed using open coding, categorized and assessed according to frequency of occurrence to test the hypothesis and verify program theory. Thus, it could verify the hypotheses arising from the initial and process evaluation, validate the proposed recommendations and assess the suitability of alternative solutions. For example, in how many cases was successful outreach to people experiencing homelessness in the field/repeated emergency visit/re-hospitalizations demonstrated across

data. Critically, the study allows to gather a feedback from people experiencing homelessness on the functioning of the project/clinic for them (benefits, impacts).

#### 3. Results

#### 3.1. Quantitative findings

The analysis reveals a notable decrease in both the relative number of hospital admissions (Fig. 1) and emergency visits (Fig. 2) among patients experiencing homelessness following the implementation of the intervention. Specifically, the reduction in hospital admissions during the intervention period fell below the long-term trend. Conversely, the long-term trend for emergency visits was on an upward trajectory, which shifted to a decline with the commencement of the intervention. The intervention began in April 2020 for the target groups in Olomouc and Ostrava cities, with Pardubice city joining in August 2020. Consequently, the timelines in the figures are standardized to the number of months before and after the intervention. Additionally, the data underwent testing for seasonal variations in both hospitalizations and emergency visits, revealing no significant seasonal influence. Therefore, the observed changes in event averages are attributed to factors other than cyclical time events.

The COVID-19 pandemic coincided with the intervention period, impacting healthcare delivery and population health behaviors. The observed decline in both indicators, even prior to the intervention, is attributed to the COVID-19 lockdown announced in March 2020. This trend shift was also noted in the general population, prompting an extension of the analysis to include a statistical comparison of average hospital admissions and emergency visits for the general population as well. This comparative analysis corroborated the initial visual assessment of the changes.

In the case of hospitalizations (Table 2), the relative number of hospitalizations decreased about five times more for the people experiencing homelessness than for the general population. Thus, we can eliminate the pandemic effect, as it should affect all patients similarly. The intervention's estimated positive effect is an annualized mean reduction of 0.157 in hospitalizations (p-value = 0.000), which is somewhat lower than the impact reported by Sadowski et al. (2009),

who estimated a reduction of 0.5. This equates to 43.45 fewer monthly hospitalizations among the population experiencing homelessness, calculated by multiplying the total sample size of 3317 by the per-person monthly effect of 0.013 (as detailed in Table 2).

The impact of the intervention on emergency visits is particularly notable. While the general population experienced an increase in emergency visits during the intervention period, the population experiencing homelessness witnessed a significant decrease in the number of emergency visits (Table 3). The intervention's estimated positive effect is a reduction of 0.016 emergency visits per person per month (p-value = 0.000), translating to 53.40 fewer emergency visits among the population of people experiencing homelessness each month (calculated as 3317 multiplied by 0.016). Compared to Sadowski et al. (2009), who reported a positive impact of 1.2 annualized emergency department visits, our estimations indicate a positive annualized effect of the intervention of 0.193, underscoring the substantial benefits of the intervention for the homeless community.

#### 3.2. Qualitative evaluation

The qualitative data enriches our understanding of the healthcare disparities faced by people experiencing homelessness and the implications for the healthcare system. Insights from pilot studies consistently highlight the intervention's beneficial impact on healthcare delivery for all involved stakeholders. GP practice staff pinpointed the keys to the intervention's success as: (1) enhanced collaboration with social services, leading to a deeper understanding of the target group, (2) fostering trust with people experiencing homelessness through the presence of nurses in the field, thereby establishing meaningful connections with people experiencing homelessness, and (3) making healthcare more accessible by providing pre-treatment care and lowering barriers to entry. The improved capacity of outreach teams enabled them to assess health conditions more accurately and intervene medically at an early stage, potentially preventing the progression and spread of diseases. Assistance with transportation and hospital admissions was provided to people experiencing homelessness requiring hospitalization.

Echoing the quantitative findings, the analysis of healthcare records of people experiencing homelessness revealed numerous instances of



Fig. 1. Average number of hospitalizations.

Source: Own elaboration based on National Healthcare Registry - IHIS (2022), On the horizontal axis, the months before (during) participation in the intervention are marked as negative (positive).



#### Fig. 2. Average number of emergency visits provided.

Source: Own elaboration based on National Healthcare Registry - IHIS (2022). On the horizontal axis, the months before (during) participation in the intervention are marked as negative (positive).

Table 2			
Comparison of hospitalizations before and during the intervention.			
	before	during	differen

	belote	during	uncrence
General population Homeless patients	0.0151 0.0369	0.0122 0.0209	$-0.0029 \\ -0.0160$

Note: per capita and month, t-test p-value = 0.000.

#### Table 3

Comparison of emergency visits before and during the intervention.

	before	during	difference
General population	0.0071	0.0081	$0.0010 \\ -0.0151$
Homeless patients	0.0565	0.0414	

Note: per capita and month, t-test p-value = 0.000.

underutilization of healthcare services, frequent repeated hospitalizations, and short-term hospital stays without adequate recovery. However, interviews with social workers indicated a reduced reliance on emergency services because of the intervention. Key factors contributing to this change included better awareness of healthcare options among people experiencing homelessness and a more effective referral system by social workers to GP practices. Targeted referrals to the homeless GPs were preferred over preventative referrals to an inpatient provider or hospital for less severe conditions. The intervention appeared to be less effective with younger people experiencing homelessness, who, according to social workers, often do not seek medical help as they have not yet experienced serious illnesses.

Interviews with social workers highlighted three primary barriers to healthcare access. Firstly, the co-location of health services with social services emerged as a significant incentive for people experiencing homelessness to engage with GP practices, offering a convenient 'onestop-shop' solution that reduced entry barriers to the social care system. Secondly, the nursing outreach component of the project played a crucial role in building rapport with patients and enhancing their participation in healthcare. Despite legal restrictions preventing streetbased medical treatment in the Czechia, the provision of professional health consultations and materials was seen as a significant improvement. Lastly, participating GP practices offered free certification of infection-free status, a requirement for admission to social residential services that typically costs 20 EUR. This indirect financial incentive helped retain people experiencing homelessness in the care system.

The evaluation study outlined the limitations of the intervention and the inherent challenges of effecting change from within the healthcare system. Stakeholders identified the primary unresolved issue as the lack of options for long-term treatment, highlighting the absence of a 'home' for recovery after illness. The scarcity of respite care and limited availability of asylum houses for people experiencing homelessness contribute to a cycle of recurrent healthcare use and chronic homelessness. The lack of treatment for acute or septic conditions can result in permanent physical disabilities, further hindering societal integration. Overcoming these challenges is hampered by a lack of coordination and resources between healthcare and social care services, with social workers and care homes struggling to bridge this gap due to chronic underfunding.

### 4. Discussion

This evaluation study adds new evidence on healthcare provision to people experiencing homelessness in two aspects. First, leveraging a prepost longitudinal design, the study confirms the effectiveness of outreach interventions in reducing hospitalizations and emergency department visits among people experiencing homelessness. Our findings confirm the results of randomized controlled trials like that of Sadowski et al. (2009), demonstrating decreased frequencies of hospitalizations and emergency visits through outreach healthcare services. In scenarios where people experiencing homelessness seldom utilize standard outpatient services (Kaduszkiewicz et al., 2017), an active approach and tailored measures are essential to lower the barriers preventing people experiencing homelessness from seeking primary care (De Maio et al., 2014), thereby addressing a broader spectrum of accessibility issues within a patient-centered framework (Gibson et al., 2014).

The integration of social and healthcare services, including service colocation and nursing outreach, emerges as a pivotal element of the project. While ongoing debates surrounding the optimal model for healthcare provision to people experiencing homelessness persist, the consensus is that care systems are deeply embedded within specific institutional contexts (Treherne and Singer, 2009). A blend of main-stream healthcare services with a strong emphasis on social work

outreach is advocated (Verlinde et al., 2010), with specialized healthcare programs for people experiencing homelessness deemed more efficacious (Hwang and Burns, 2014). Variations exist among different service delivery models (Kopanitsa et al., 2023). Our study reinforces the notion that ensuring the provision of 'something rather than nothing' is crucial (Wright and Tompkins, 2005; Zlotnick et al., 2013).

Second, the study illustrates that even specialized services for people experiencing homelessness have limitations in significantly impacting the health outcomes of the homeless. Offering pathways out of homelessness facilitates a holistic approach to treating homelessness as a healthcare issue (Davies and Wood, 2018; Hwang and Burns, 2014; Luchenski et al., 2018; Marmot, 2018). Homelessness not only diminishes life expectancy and increases mortality but also incurs substantial social, economic, and societal costs (Davies and Wood, 2018; Pleace, 2023). Thus, the evaluation underscores the necessity for both 'within-system changes' (medical care, outreach activities, social work) and 'out-of-system changes' (housing, social protection, poverty alleviation) to enhance the health of people experiencing homelessness.

The results of the study highlight the positive effects of the intervention. Yet, the time series analysis reveals that despite a reduction in hospital admissions and emergency visits, these rates remain higher than those of the general population, aligning with findings by Davies and Wood (2018) and Verlinde et al. (2010). This result indicates that the intervention has not fully addressed all the challenges related to medical care access for people experiencing homelessness. Remaining issues include people experiencing homelessness compliance (Kopanitsa et al., 2023), persistent care barriers (Davies and Wood, 2018), difficulties in engaging younger people experiencing homelessness (Gallardo et al., 2020), and a lack of data on specialist referrals (De Maio et al., 2014).

#### 5. Conclusion and policy impact

This study substantiates the positive healthcare outcomes resulting from outreach services for people experiencing homelessness. The effectiveness of integrating social work with healthcare provision for the people who is homeless is robustly supported by the data, both through quantitative analysis of hospitalization and emergency visit records from the National Healthcare Registry (NHIS) involving both the target group and the general population, and through qualitative insights from interviews and comprehensive case studies. Notably, the deployment of nurses within mobile social teams and the specialized training of general practitioners to address the unique needs of people experiencing homelessness have significantly enhanced the intervention's impact. This approach has led to a reduction in hospital admissions and emergency visits among the population people experiencing homelessness, thereby preventing the onset of chronic and severe illnesses that often result in prolonged hospital stays and lasting disabilities.

The implications of this study for health policy are direct and significant. In response to the findings, the Ministry of Health, in collaboration with the primary state health insurance provider that covers the majority of Czech citizens, has introduced two new healthcare reimbursement codes. These codes are designed to compensate for the additional time required to treat patients experiencing homelessness, covering: (1) medical treatment provided by a doctor to a person experiencing homelessness, and (2) nursing care provided to a person experiencing homelessness. The application of these new codes is restricted to GPs who regularly serve the homeless community and necessitates a 'diagnosis of homelessness' by a GP, effectively recognizing homelessness as a 'social diagnosis' that entails time-intensive care, similar to the treatment protocols for patients with autism or those who are deaf-mute, which already have specialized insurance codes in the Czech healthcare system. This policy acknowledges that the organization and management of care for the people experiencing homelessness are predominantly orchestrated by social NGOs within an integrated social-health framework, often directly employing the GPs. The new insurance codes were officially implemented in January 2023, enabling GP practices to offer healthcare services to people experiencing homelessness with reduced reliance on external funding sources.

Furthermore, this study addresses the issue of structural compensation in healthcare provision for people experiencing homelessness. With NGOs providing a significant portion of social and primary health services for the people experiencing homelessness, the new insurance codes facilitate easier access to care for people experiencing homelessness at the entry point of GP practices. We posit that this model could be adopted in other countries with universal healthcare systems or where NGOs play a crucial role in delivering support services to people experiencing homelessness. The declining trends in hospitalization and emergency visit rates documented in this evaluation study may have broader applicability, especially in regions where high rates of hospitalization and emergency hospital-based care for people experiencing homelessness are prevalent (Hajek et al., 2021; Kushel et al., 2001; O'Carroll et al., 2017; Trummer et al., 2020).

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#### CRediT authorship contribution statement

Martin Šimon: Writing – review & editing, Writing – original draft, Methodology, Funding acquisition, Conceptualization. **Barbora** Latečková: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. Oto Potluka: Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Data curation, Conceptualization.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Annex 1. Template for Intervention Description and Replication (Tidier checklist)<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> See Hoffmann et al. (2014) and Skivington et al. (2021) for details on reporting of complex intervention.

Nr.	Item	Description	Information placed
1	BRIEF NAME	Increasing accessibility and creating health care options for the people experiencing homelessness	Section "Intervention design", Context
2	WHY	<ol> <li>normalizing healthcare interactions;</li> <li>equipping healthcare professionals with the skills;</li> <li>mobile outreach of social services and nurse</li> </ol>	Section "Intervention design", Program theory
3	WHAT	<ol> <li>Training to GPs (7x team supervision, 1x wound healing);</li> <li>Equipment to GPs;</li> <li>Expenses for renting and operating a technical vehicle for transport services</li> </ol>	Refining of intervention, project website (https://mzd.gov.cz/catego ry/evropske-fondy/projekty-ministerstva-zdravotnictvi-v-letech-2014-2 020/zvyseni-dostupnosti-a-vytvoreni-moznosti-zdravotni-pece-pro-oso by-bez-pristresi/)
4	WHAT	<ol> <li>(1) health care of people experiencing homelessness;</li> <li>(2) social services to people experiencing homelessness</li> </ol>	Section "Intervention design", Intervention activities
5	WHO PROVIDED	GPs - part-time job min. 0.2, Nurse - 1.0, Admin - 0.5, Driver - 0.5	Refining of intervention, (https://mzd.gov.cz/category/evropske-fondy/ projekty-ministerstva-zdravotnictvi-v-letech-2014-2020/zvyseni-dos tupnosti-a-vytvoreni-moznosti-zdravotni-pece-pro-osoby-bez-pristresi/)
6	HOW	face-to-face delivery	Section "Intervention design", Intervention activities
7	WHERE	<ol> <li>(1) in GPs' practices</li> <li>(2) outreach services in the target group environment</li> </ol>	Section "Intervention design", Refining of intervention
8	WHEN and HOW MUCH	Each care activity with a frequency, duration, and intensity; opening hours varied (different size of target group population): typically ranged from one to two times a week half a day with doctor's presence, other days would be covered by nurse only); no. of average mobile outreach per month per GP office was 22, average no. of persons reached per month was 36	Section Quantitative findings, websites of GPs, Quantitative findings
9 10	TAILORING MODIFICATIONS	Individualized interventions According to the GPs and target group feedback; during COVID-19 pandemic COVID-19 tests were provided to all GPs; portable ECG to mobile outreach; after mid-term evaluation the General insurance company started preparing the rolling out of two new medical treatment provision (treating of patient experiencing homelessness by nurse/doctor, which was previously not planned, aimed to sustain current GPs and motivate new ones)	Section "Intervention design", Intervention activities Section "Intervention design"
11	HOW WELL	A pilot study to test the feasibility; Ministry of Labour and Social Affairs CZ as the managing authority carried out interim control, control of annual reports, audit controls	Section "Intervention design", Refining of intervention
12	HOW WELL	The measure of emergency visits, and hospitalizations	Section "Intervention design", Refining of intervention

## Data availability

The authors declare that the data used in this publication are not publicly available and cannot be made available on request to authors. Data usage rules are defined by Ministry of Health of the Czech Republic.

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