

# Bridging gaps: improving the access of primary health care in rural Ukraine through mobile health units

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Rural healthcare is an integral part of the Ukrainian healthcare system. However, access to healthcare for the rural population is uneven due to poor development of medical infrastructure and staffing. The problem of access to medical care in rural areas has been exacerbated by the full-scale war.

**The objective:** to study and analyze the current state of accessibility of primary health care in rural areas in Ukraine, followed by a discussion of promising areas for the introduction of mobile health units as a tool for implementing the “Medical Guarantees” program in hard-to-reach regions of Ukraine.

**Materials and methods.** The study included data from official statistical reports, regulatory documents and scientific sources. The methodology includes bibliosemantic, medical and statistical methods and the method of structural logical analysis.

**Results.** It has been established that the low level of access to primary health care for the rural population of Ukraine has been significantly exacerbated by the devastating impact of the war on medical and transport infrastructure, especially in the frontline and recently de-occupied rural areas, and by migration processes.

The situation is complicated by the fact that most patients in rural areas are elderly people who are physically unable to use public transportation, even if it is available. The analysis of international practice has shown that mobile health units can be introduced into the public healthcare system as a temporary measure to meet the urgent needs of the Ukrainian population, especially in rural areas.

Integration of mobile health units into the state program “Medical Guarantees” can effectively address the urgent health care needs to increase access to health care for the rural population of Ukraine. State regulation of the division of these units will eliminate problems such as duplication and uneven service delivery and will create a transparent system of remuneration for the staff included in these units.

**Conclusions.** The results of the study suggest that the practice of mobile medical units should be introduced as a tool for implementing the “Medical Guarantees” program for regions/locations of Ukraine with low access to medical infrastructure, namely remote rural areas and areas that have been devastated by the war. Mobile medical units will ensure the stability of access to primary health care services and contribute to improving the health of the population.

**Keywords:** rural population, access to health care, primary health care, rural medicine, medical infrastructure, mobile health units.

## Заповнюючи прогалини: покращення доступності первинної медичної допомоги сільському населенню України з використанням мобільних медичних бригад

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Охорона здоров'я у сільській місцевості є невід'ємною частиною української системи охорони здоров'я. Однак доступність медичної допомоги для сільського населення неоднакова з причини нерівномірності розвитку медичної інфраструктури та забезпечення кадрами. Проблема доступності медичної допомоги у сільській місцевості посилилась внаслідок повномасштабної війни.

**Мета дослідження:** вивчення і аналіз сучасного стану доступності первинної медичної допомоги у сільській місцевості в Україні з подальшим розглядом перспективних напрямів впровадження мобільних медичних бригад як інструменту реалізації програми «Медичні гарантії» у важкодоступних регіонах України.

**Матеріали та методи.** У ході дослідження використані дані офіційної статистичної звітності, нормативно-правові документи та наукові джерела. Методика включає бібліосемантичний, медико-статистичний методи та метод структурного логічного аналізу.

**Результати.** Установлено, що низький рівень доступності первинної медичної допомоги для сільського населення України значно поглибився руйнівним впливом війни на медичну та транспортну інфраструктуру, особливо у прифронтовій та нещодавно деокупованій сільській місцевості, міграційними процесами.

Ситуація ускладнюється тим, що більшість хворих у сільській місцевості – люди літнього віку, які фізично не можуть користуватися громадським транспортом, навіть якщо останній доступний. Аналіз міжнародної практики продемонстрував, що мобільні медичні пункти можуть бути введені у державну систему охорони здоров'я як тимчасовий захід для задоволення нагальних потреб українського населення, особливо у сільській місцевості.

Інтеграція мобільних медичних пунктів у державну програму «Медичні гарантії» може ефективно задовольнити нагальні потреби охорони здоров'я щодо підвищення доступності медичної допомоги сільському населенню України. Державне регулювання діяльності цих підрозділів знівелює такі проблеми, як дублювання та нерівномірність надання послуг, а також створить прозору систему оплати праці для персоналу, що входить до складу цих підрозділів.

**Висновки.** Результати дослідження дають підставу рекомендувати впровадити практику мобільних медичних пунктів як інструмент реалізації програми «Медичні гарантії» для регіонів/місцевості України з низьким рівнем доступності медичної інфраструктури, а саме – віддалені сільські регіони та місцевості, які зазнали руйнівного впливу війни. Мобільні медичні пункти зможуть забезпечити стабільність доступності послуг первинної медичної допомоги та сприяти-муть покращенню здоров'я населення.

**Ключові слова:** сільське населення, доступність медичної допомоги, первинна медична допомога, сільська медицина, медична інфраструктура, мобільні медичні бригади.

In the Ukrainian healthcare system, rural health comprises an integral component; however, inhabitants of rural areas manifest deleterious health outcomes [1]. These outcomes can, in part, be ascribed to impediments in the accessibility of primary healthcare services. Despite continuous attention to rural healthcare in healthcare reform initiatives, particularly with regard to enhancing accessibility for the populace, the challenges obstructing rural healthcare have been exacerbated by the extensive Russian invasion. This invasion has led to considerable damage to healthcare infrastructure, persistent shelling, and the displacement of civilians [2].

Because of the hostilities and population displacement, the conventional primary healthcare infrastructure has proved insufficient in meeting healthcare requirements in certain rural areas [3]. Although we do not advocate for the complete abandonment of reforming traditional primary healthcare delivery methods, the implementation of mobile health units within the government-funded program «Medical guarantees» could expeditiously address the most pressing healthcare needs of the rural population.

While the post-war reconstruction of the Ukrainian healthcare system has received considerable attention from policymakers and academics [4, 5], the satisfaction of current healthcare needs among the rural population has been relatively neglected. There are only a limited number of publications that offer insights into the management of specific aspects of the primary health care system during the war [6–8], and comprehensive research on this topic is lacking.

Consequently, this study takes guidance and inspiration primarily from the practices employed in other countries regarding mobile health units. We supplemented our theoretical framework with up-to-date data on the current state of rural healthcare in Ukraine, reports from international organizations detailing their own initiatives on the implementation of mobile health units in Ukraine, relevant publications from governmental authorities and legislation, as well as our own professional expertise.

**The objective:** the present work is focused on the examination and analysis of the existing accessibility status of primary healthcare services in rural regions of Ukraine. Subsequently, a deliberation on prospective avenues for the deployment of mobile health units is undertaken as a strategic measure to facilitate the implementation of the Medical Guarantees program within remote areas of Ukraine.

## MATERIALS AND METHODS

This study utilized a diverse set of research materials, including data sourced from scientific literature, statistical databases, legislative documents, and insights gained

from personal practical experience. The research methodology employed a systematic approach, incorporating the bibliosemantic method to analyze and extract meaningful information from the literature. Additionally, the study applied the method of structural and logical analysis to systematically organize and evaluate the collected data. These methods collectively provided a comprehensive framework for the investigation, ensuring a thorough examination of the subject matter.

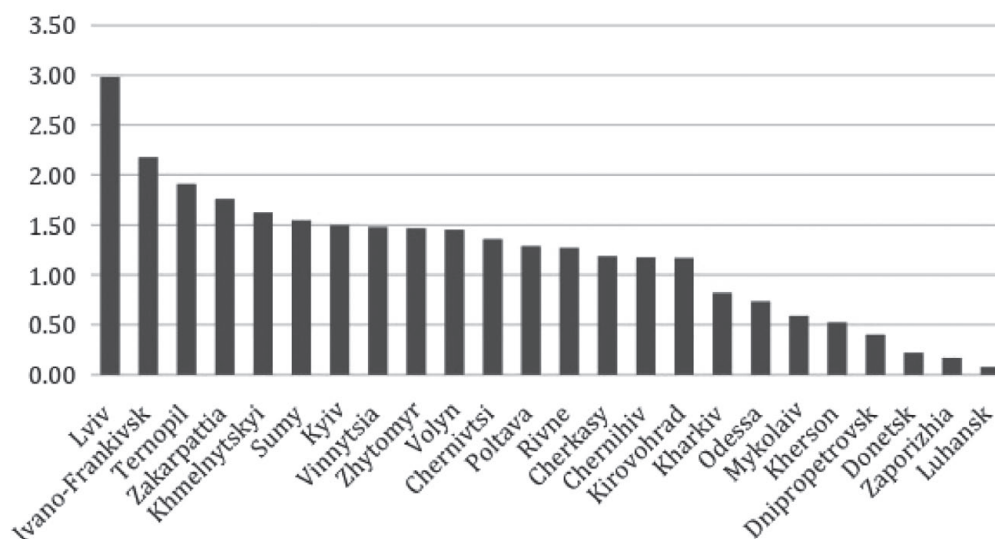
## RESULTS AND DISCUSSION

Given that almost  $\frac{1}{3}$  of the Ukrainian population resides in rural locales [1], it is imperative to prioritize the provision of healthcare access to this demographic as a crucial consideration in the evolution of the national healthcare infrastructure. Nevertheless, an examination of statistical metrics pertaining to parameters such as life expectancy, infant mortality, and the prevalence of infectious diseases reveals inferior outcomes within the rural populace when juxtaposed with their urban counterparts [1].

The aforementioned adverse health outcomes could be partly attributed to the lack of access to the qualified and available primary healthcare services. 23,000 Ukrainian villages have 4,000 dispensaries and 12,700 Paramedic and Midwifery Point (further PMP) [9]. Those facilities are in poor condition: 71% of PMP have no water supply, 75% of PMP lack drainage and there is no lavatory in the 82% of dispensaries [9]. Furthermore, a significant number of rural healthcare facilities, especially in the frontline and recently unoccupied rural regions, have been damaged by Russian troops [2].

The provision of high-quality primary healthcare services in rural areas is further complicated by the lack of the medical personnel. While the World Health Organisation (further WHO) recommended density of the medical personnel is 2,5 per 1000 individuals [10], as could be seen from the Figures 1,2 [11] the current number in almost all rural regions of Ukraine is far from the required threshold.

The lack of the medical personnel is expected to aggravate in the following years, since many of them are of the retirement age (Figure 3) [11]. Young professionals tend to work in the urban areas due to the higher prestige, better remuneration and career growth opportunities [12]. As a result, the recruitment of the general practitioner is an ongoing challenge for the rural self-government. Consequently, many rural localities have a single physician per number of villages [13]. In remote communities the situation is further exacerbated, due to the absence of the local medical specialist, local patients could obtain needed services only in the nearby villages [13].



**Fig. 1. Physicians' density in the rural regions per 1000 populations (2022)**

Due to the inadequate and unreliable public transport connection and poverty, the majority of the rural patients tend not to refer for the needed primary healthcare that is not accessible within their vicinity [14]. This is compounded by the fact that most of the patients in the rural areas are elderly, who are physically unable to use the public transport, even if the latter was available [15].

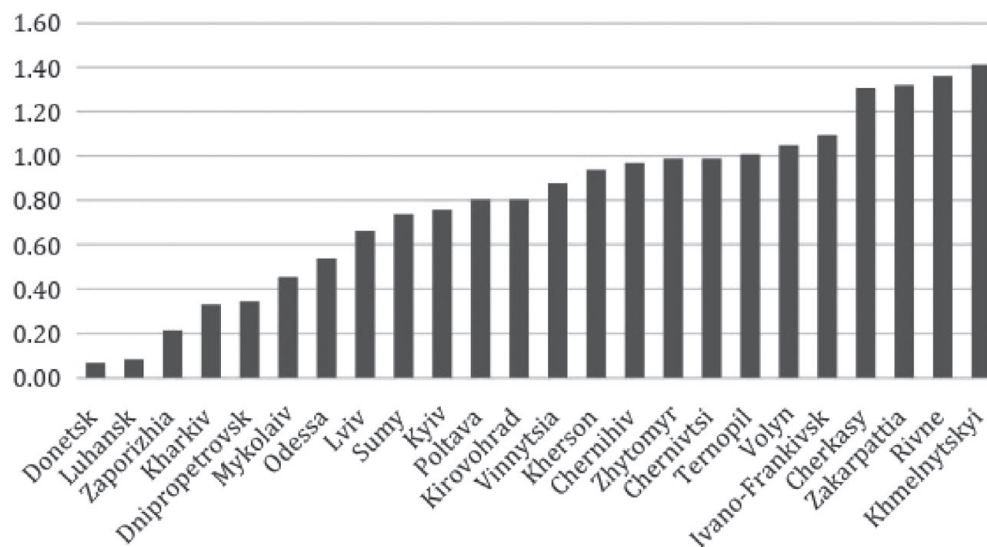
The Russian full-scale invasion exacerbated the situation even more, a significant number of medical professionals, especially from the occupied and frontline areas, migrated to the safer areas [16]. Destruction of the roads and bridges, coupled with the constant shelling impeded the access of the remaining physicians to the rural regions, thereby leaving

the local population without access to the primary healthcare services [17].

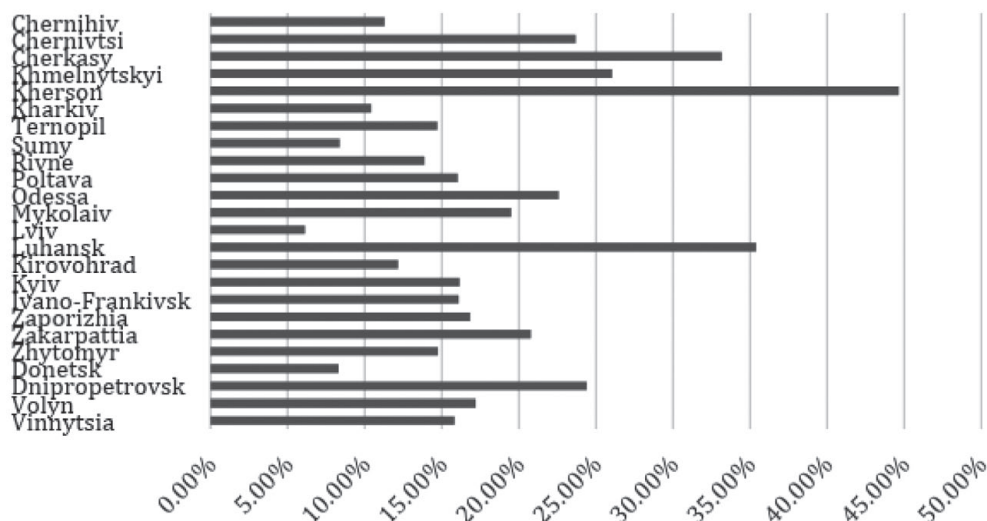
Furthermore, a mass war related exodus of Ukrainians to rural areas in Central and Western, caused significant pressure on the local primary healthcare infrastructure, which proved insufficient to cope with the overwhelming patient load [18, 19].

Accordingly, we can summarize the unique characteristics of access to the primary healthcare in the rural regions as follows (Figure 4):

- 1) Low density of medical personnel
- 2) Lack of healthcare facility and/or their inadequate conditions
- 3) Inability of patients to seek primary healthcare outside their locality.



**Fig. 2. Mid-level medical professional density in the rural regions per 1000 populations (2022)**



**Fig. 3. Percentage of the Rural physicians at the retirement age (2022)**

**Policy landscape analysis**

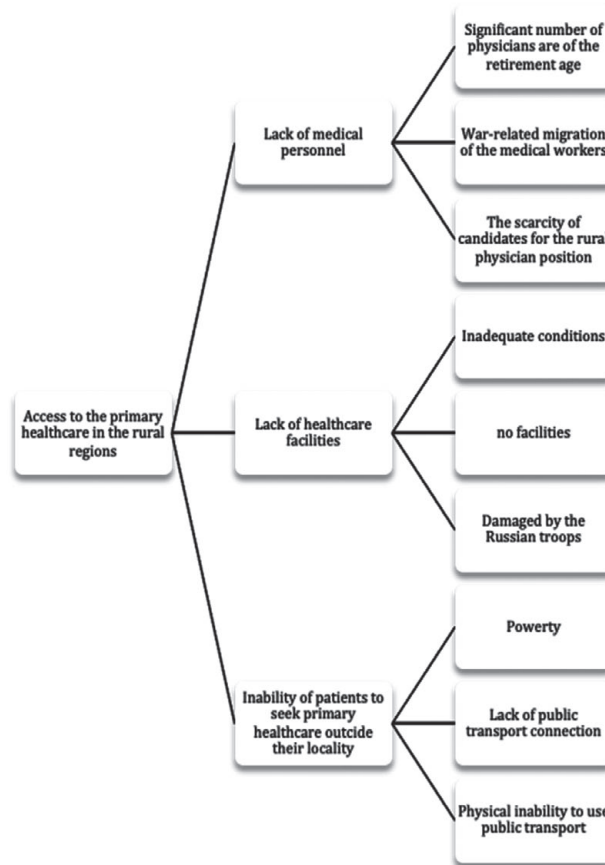
The issue of rural health has always been a challenge for the Ukrainian stakeholders, who tried to resolve it among others by the development of the rural primary healthcare facilities and increasing the number of medical staff. Notably, in 1990 the Government stipulated that *“the village should be favored over the city (per capita) in the construction of healthcare facilities”* [20]. In the following years, numerous attempts were undertaken to implement that proclamation.

In 2000 the Concept of health care development was adopted for reforming primary healthcare in line with the family care principle [21]. As part of this initiative, it was ordered to establish family medicine dispensaries in the rural settlements with more than 1 thousand people [22]. Subsequently, this system was expanded to include the paramedics and obstetricians' points [23]. In 2013 Ministry of health of Ukraine set the minimum number of 3,3 outpatients per 10 thousand rural population [24], which was significantly lower than in other European states (4.9) [25].

In terms of the medical personnel, it was attempted to encourage the young professionals to work in the rural localities by providing them with the one-time financial assistance [26]. Nevertheless, the aforementioned clauses were fragmented, underfunded and inconsistent with the Semashko system of the planned economy, thereby most of them did not bring the desired results and remained mostly on the paper.

The health care financing reform in 2017 was expected to improve primary healthcare provision in the rural regions. As part of this reform, the rural primary healthcare facilities network was reorganized based on the number of residents [27]. In addition, numerous rural health units were planned to be modernized and motivational packages for the rural practitioners were declared, including loans for construction or purchase of housing and abilities for promotion of professional knowledge [28].

Remuneration of the family doctors is based on the number of contracted patients and may be supplemented by the local authorities' financial support. Despite these



**Fig. 4. Attributes of Primary Healthcare Access in Rural Regions**

measures, the salary of the rural practitioner remains inadequate, which among other reasons causes a shortage of the latter.

Although there was some progress in the implementation of the aforementioned reform, especially in part of the

modernization of healthcare facilities, before the Russian full-scale invasion in 2022, majority rural localities still experienced the shortage of the family doctors and lack of the healthcare facilities. That problem has been further aggravated by the ongoing hostilities, attacks on the healthcare infrastructure and migration of the medical practitioners. Due to the lack of the physicians, destruction of the roads and bridges and unavailability of public transport connection many rural residents, especially in the frontline and unoccupied territories, remained without access to healthcare.

### ***Cross-country analysis***

While it is generally acknowledged that mobile health units cannot replace the conventional primary healthcare infrastructure, they could be a valuable interim solution until the stable primary healthcare network could be established [29]. Besides, there is a long-standing practice of successful application of this instrument in humanitarian settings [30].

As an illustration, the deployment of mobile health units in the conflict-affected areas of Democratic Republic of Congo in 2004 was instrumental in addressing the dire needs of the local population in primary healthcare. The aforementioned project was employed by the local non-governmental organization and aimed at provision of survivors and their families with such services as health education, hygiene promotion, laboratory testing and consultations on the most common diseases [31].

Besides, the project exhibited some deficiencies pertaining to infrequent visits of the mobile health units, lack of psychosocial services and inadequate coordination with the local authorities. Nevertheless, the project was successful in enhancing healthcare services accessibility to the target audience, improving the quality of health education, and ensuring continuity in healthcare provision.

Mobile health unit projects implemented in northern Afghanistan in 2008 proved to be beneficial in primary healthcare provision to the internally displaced persons and patients in the remote rural areas, where stable access to the primary healthcare services was hindered by ongoing hostilities [32, 33]. Those units were equipped with the physician, midwife, and nurse, who delivered basic primary healthcare services to the given population and facilitated the transportation of critically ill patients to the referral facilities. Despite the common deficiencies of the mobile health units, such as limited coverage and lack of sustainability for chronic illnesses management, the analysis of the effectiveness of this project in Afghanistan demonstrated that they better addressed the access to the remote villages, particularly during the winter month, when compared to the regular clinics [32].

The project on the utilization of mobile health units in the conflict-affected rural areas of South Sudan in 2017-2020, can be used as an additional illustration of this method of primary health care delivery [33]. Notably, the local office of WHO established their mobile health units that provided such primary healthcare services as immunization, screening, health education and treatment of common morbidities. Despite the deficiencies within team composition, the scope of services provided and the

degree of collaboration with the local authorities, mobile health units were able to satisfy the most urgent needs of the local population [30].

Thus, research conducted on the effectiveness of the aforementioned projects identified that due to the insufficiently defined schedules and geographic coverage, mobile health units have difficulties in ensuring the continuity of care and providing ongoing treatment to the respective patients [19, 30]. Nonetheless, these challenges relate to the defective management of the project, rather than inherent limitations of the instrument as such. Consequently, with appropriate implementation strategies, mobile health units could be an effective means of satisfying the dire needs of the Ukrainian rural population.

The lack of medical professionals and healthcare infrastructure, deficiencies in public transport connections and overloading of physicians in Central and Western Ukraine resulting from internal migration during the war, have posed significant challenges to the existing traditional primary healthcare system, rendering it incapable of effectively addressing the situation. While not replacing the conventional primary healthcare facilities, the mobile health units could be introduced into the public healthcare system as a provisional measure to fulfill the urgent needs of the Ukrainian populations.

Although no formalized state initiative in the field of primary healthcare existed in Ukraine, the country has already witnessed the successful operation of mobile health units for the provision of psychosocial support [34] and addressing Covid-19-related needs [35]. Moreover, volunteers, local authorities, and international organizations have already implemented various projects on primary healthcare services provision through the mobile health units.

An illustrative example can be found in the project initiated by the authorities of the Odessa region aimed at dispatching to remote villages mobile health units consisting of general practitioners equipped with diagnostic tools and physicians of other specializations (cardiologist, endocrinologist, etc.) [36]. Furthermore, noteworthy efforts are being made by WHO and the Red Cross, currently implementing their mobile health units' programs [37]. These initiatives focus on offering primary healthcare services and delivering humanitarian medicines to populations residing in frontline areas, recently unoccupied and remote localities [38].

Although contributing to the overall enhancement of primary healthcare service accessibility, the dispatch of the aforementioned mobile health units faced certain obstacles [38]. It is noteworthy that the absence of inter-organizational coordination occasionally resulted in the overlapping coverage in certain locations [39]. There were also instances, where inadequate dialog with the local authorities led to duplication of efforts in regions already enjoying stable access to primary health services [38]. Another challenge arises from the infrequent departures of those mobile health units, thereby impeding the ability to dynamically monitor the health of patients and make necessary adjustments to their treatment plans [37].

In any case, non-governmental initiatives offer distinct advantages in comparison to governmental initia-

tives. Particularly, international organizations possess significant expertise in deploying mobile health units within conflict-affected nations and consequently have developed pertinent strategies to address potential shortcomings associated with this approach [30]. Furthermore, despite having their own bureaucratic procedures, international organizations exhibit a swifter implementation of such projects compared to governmental endeavors operating within conventional protocols [40]. Lastly, international organizations enjoy superior funding resources relative to the war-impacted economy of Ukraine.

Even though mobile health units funded by international organizations have certain benefits in comparison to the state-funded projects, the latter are preferred considering the protracted war in Ukraine. Typically, initiatives of international organizations tend to be temporary and serve as pilot projects to pave the way for subsequent implementation of state-based programs [40]. Consequently, the present system of primary health care should be immediately modified in case of the possible recurrence of such a situation.

Therefore, it is recommended to incorporate mobile health units into the state-funded program of “Medical Guarantees”. By implementing regulatory measures and exercising supervision over the range of services and frequency of provision of mobile health units, the state authorities can effectively address the urgent healthcare needs of the Ukrainian population. Significantly, the implementation of centralized regulation for mobile health

units would serve to mitigate the issues of duplicative coverage, inconsistent and unreliable provision of medical services, and establish a transparent remuneration framework for the personnel comprising these units.

Furthermore, it is advisable to cover with the mobile health units’ program specific geographical areas, namely remote rural regions, conflict-affected localities, and areas characterized by a significant influx of internal migrants, where the local primary healthcare infrastructure is insufficient to handle the high volume of patients. Those rural areas in question presently encounter the most urgent requirements that the conventional primary healthcare system has been unable to adequately meet.

## CONCLUSION

The results of this study indicate that the implementation of a state-funded project involving mobile health units would have a notable impact on enhancing primary healthcare accessibility for the rural population residing in remote villages, conflict-affected areas, and regions experiencing a significant influx of internal migrants. Although this initiative may entail high costs and require substantial time investment, it has the potential to serve as an efficacious measure that complements the existing healthcare infrastructure. Notably, if under state control, mobile health units would be able to deliver consistent primary healthcare services and ensure ongoing care for the rural population, thereby leading to improved health outcomes.

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