Macedonian Pharmaceutical Bulletin, 72 (Suppl 1) 485 - 486 (2026)
Online ISSN: 1857-8969
DOI: 10.33320/maced.pharm.bull.2026.72.03.233
Short communication

Mobile pharmacy of Karlovac County: improving access to pharmaceutical care in rural and underserved areas

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Introduction

Access to medicines and pharmaceutical counselling is a core element of primary health care, but rurality, distance, transport barriers and pharmacy deserts can limit access to pharmacy services (Mathis et al., 2025; Miller et al., 2025). In rural parts of Karlovac County, Croatia, older adults, patients with chronic conditions and residents without personal transport often depend on long travel or informal support to obtain regular therapy.

The Mobile Pharmacy of Karlovac County was launched in September 2025 as a public-health response to this gap, with support from the European Union - NextGenerationEU, the National Recovery and Resilience Plan of the Republic of Croatia, the Ministry of Health, Karlovac County and Karlovačka ljekarna Karlovac. This paper presents the service model and early implementation outcomes of the first mobile pharmacy service in Croatia.

Service model and implementation

The mobile pharmacy operates as a specially equipped vehicle functioning as a community pharmacy in field conditions. It is integrated with the national e-prescription infrastructure and pharmacy information system, while temperature-sensitive medicines are managed through cold-chain monitoring. The vehicle is equipped for safe storage, dispensing and pharmacist counselling during regular field work.

Two regular weekly routes start and end in Karlovac. The south route, performed on Tuesdays and Thursdays, covers Saborsko, Tounj and Barilović (approximately 189 km). The north route, performed on Wednesdays and Fridays, covers Bosiljevo, Ribnik and Kamanje (approximately 113 km). These settlements have no permanent pharmacy and were selected according to distance from fixed pharmacies, demographic vulnerability, road accessibility and proximity to family medicine practices.

The model combines fixed scheduling with adaptive field communication. Arrival times are announced through the institution's website, social media, local practices and printed leaflets. Patients may arrive without appointment, obtain prescription and non-prescription medicines, receive counselling and reserve unavailable medicines for the next scheduled visit.

Results and discussion

Operational monitoring was conducted from 10 September 2025 to 30 April 2026. During these 7.5 months, the mobile pharmacy recorded 5,080 patient visits and dispensed 9,524 prescriptions and medical supply orders. A total of 129 field service days were completed, with no cancelled visits, including operation under winter conditions down to -21 °C.

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The vehicle covered 19,536 km and the team spent more than 659 hours at field locations.

The regular route covers approximately 6,370 residents. Recorded patient visits should not be interpreted as unique users: some patients used the service repeatedly, while others used it once. Nevertheless, the volume of visits and almost two prescriptions or medical supply orders per visit indicate substantial early uptake in relation to the needs of the covered rural population.

Indirect benefits were estimated by simulating a counterfactual scenario in which each recorded patient encounter/receipt would require a round trip by private car to the nearest fixed pharmacy. Road distances and travel times were based on average Google Maps estimates. Financial savings were calculated using an estimated driving cost per kilometre derived from average fuel price and consumption assumptions; avoided CO_2 emissions were estimated using 0.12 kg CO_2/km for private cars, while mobile pharmacy diesel emissions were calculated separately from fuel consumption using 2.68 kg CO_2/l.

Using this methodology, an estimated 150,756 km of patient travel were avoided, corresponding to approximately 3,009 hours of patient time saved, 14,774 EUR in travel-cost savings and a net reduction of 11,892 kg of CO_2 emissions. These indicators are pragmatic service-evaluation estimates rather than a formal health-economic analysis, but they illustrate that the model has social, economic and environmental relevance beyond medicine dispensing alone.

The service introduced a predictable pharmacy contact point into rural communities and supported continuity of therapy, pharmacist counselling and coordination with family medicine teams. For transferability, route selection should combine population needs, distance from fixed pharmacies, road accessibility and local health-care infrastructure. Operational reliability also depends on vehicle maintenance, cold-chain monitoring, stable information systems, stock-management procedures and contingency plans for weather, electricity or communication failures.

The main limitation is that this report describes early implementation results from one county and relies on routine monitoring indicators rather than a prospective comparative design. Patient visits were recorded as service encounters and cannot be used as a direct measure of unique patients. Patient satisfaction, adherence, clinical outcomes and avoidable hospital use were not systematically measured in this phase.

Conclusion

The Mobile Pharmacy of Karlovac County demonstrates that a structured, institutionally supported mobile pharmacy service can improve access to medicines and pharmacist counselling in rural and underserved areas. Early implementation showed high use, continuity of service, operational resilience and measurable reductions in patient travel, time costs and CO_2 emissions. Long-term sustainability will require stable financing, continuous route evaluation and systematic monitoring of patient-centred outcomes. The model may serve as a transferable example for regions facing similar geographic and demographic barriers to pharmacy access.

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