

EHMA 2024

Shaping and managing
innovative health ecosystems

Use of a Geographic Information System (GIS) in the analysis of patients' access to the Permanent Centers of Family Physicians (PCFPs) in Bihor County

Presenter: Dorel-Petru Tirt, University of Oradea, Public Health Directorate of Bihor County

Authors: Dr. Dorel-Petru Tirt, Dr. Cristian Marius Daina, Dr. Daniela Rahotă

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Context (I)

- Access to healthcare is a complex issue influenced by both the individuals needing services and the healthcare system.
- Access can be categorized into spatial and aspatial components.
- Two categories of healthcare access: potential and realized provision of services.

Context (II)

- Permanent Centers of Family Physicians (PCFPs) provide family medicine services outside regular GP working hours (during nights and public holidays).
- PCFPs activity prevents overloading of hospital emergency services by offering alternative medical care options.
- This paper calculates potential access to PCFPs in Bihor County based on travel time between localities.

Methods(I)

Data used

- the postal addresses of the PCFPs in Bihor County (<https://www.dspbihor.gov.ro/>),
- the population of the localities in Bihor County (<https://www.recensamantromania.ro/>)

GIS

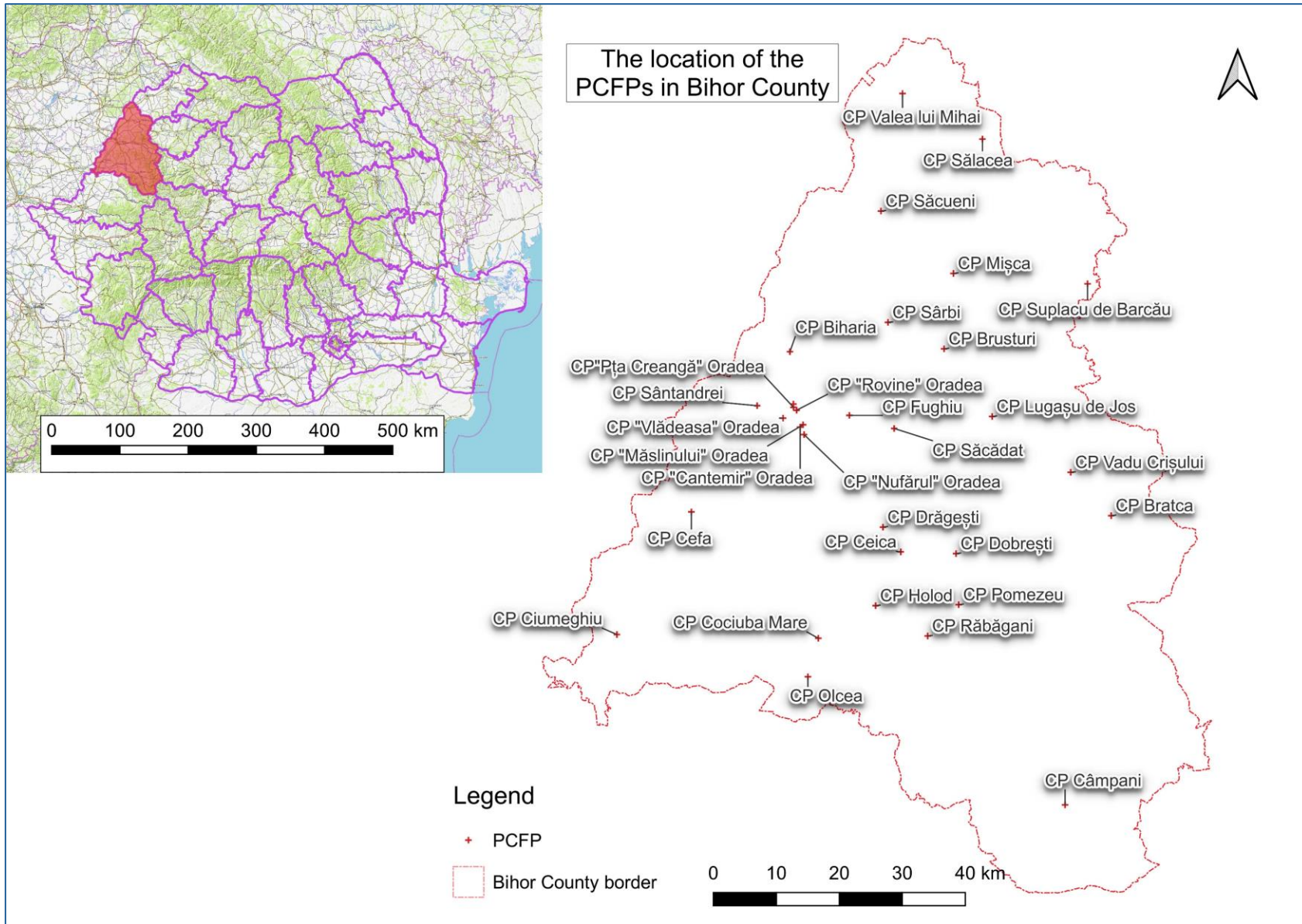
- with QGIS (version 3.28.5) layers were created containing: the boundary of Bihor County, the centroid of the localities in Bihor County, the georeferenced postal addresses of the PCFPs. With ORS Tools plugin isochrones were created for the distance corresponding to a 15-minute travel-time with car.

Methods (II)

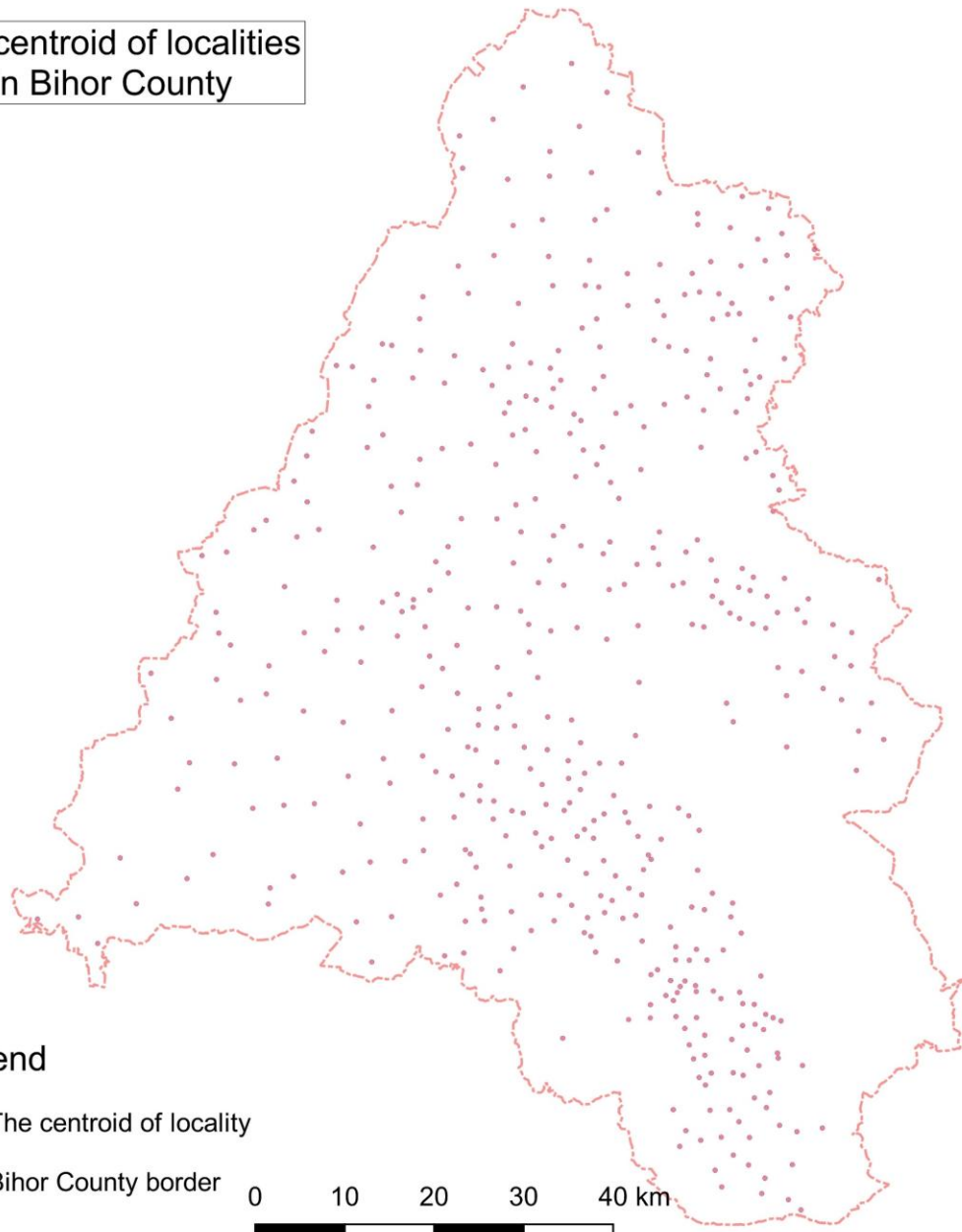
Statistical analysis

- for each PCFP, we considered the potential access to localities and the corresponding number of inhabitants located up to 15 minutes away by car travel.
- the data for each center were obtained in the QGIS program and then summed up for the entire Bihor County.
- the statistical difference in potential access to PCFPs situated in urban and rural environments was tested from the perspective of the number of localities and the population number, the SPSS program version 22 being used for independent sample t-test.

Results



The centroid of localities in Bihor County



Legend

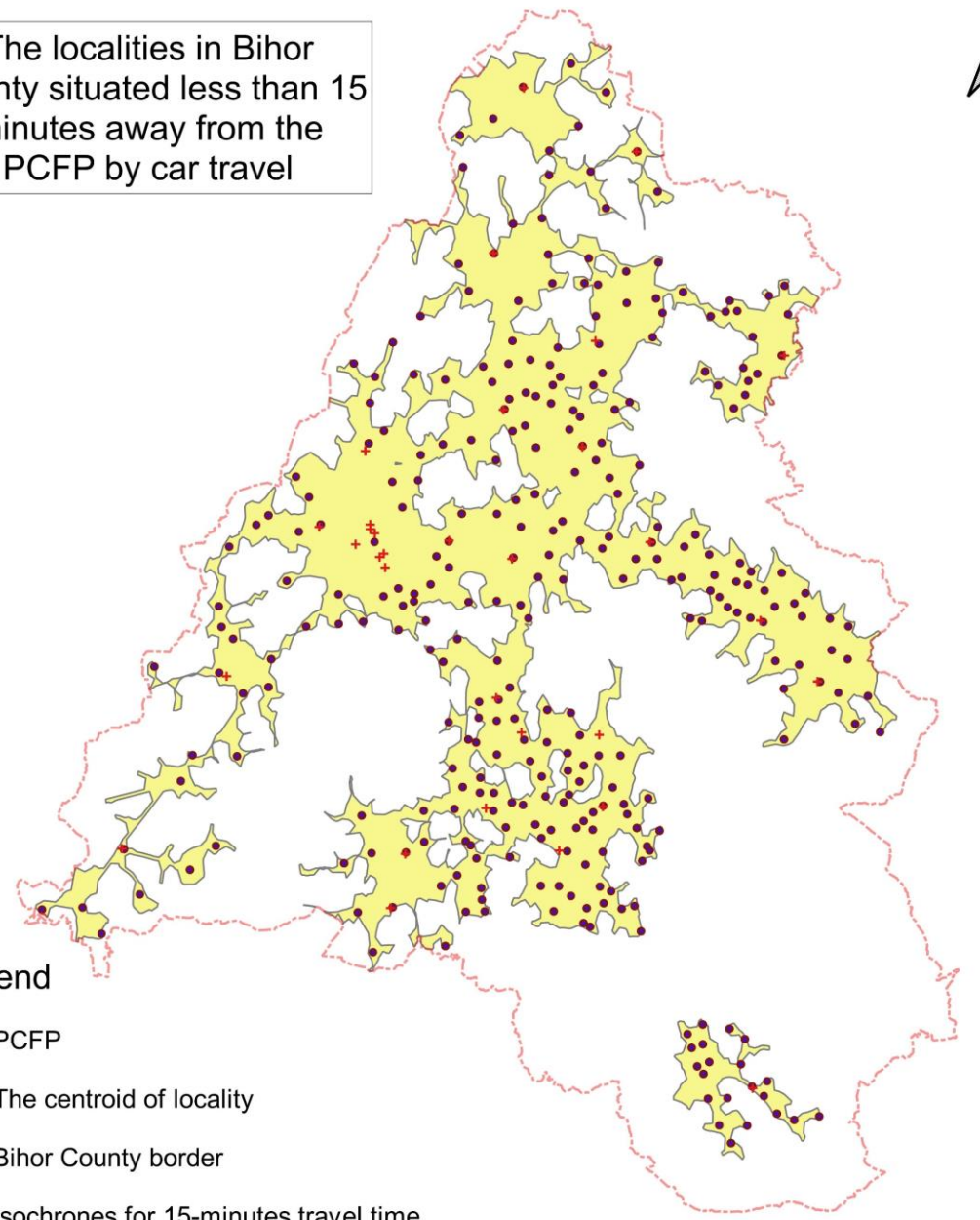
• The centroid of locality

▭ Bihor County border

0 10 20 30 40 km



The localities in Bihor County situated less than 15 minutes away from the PCFP by car travel



Legend

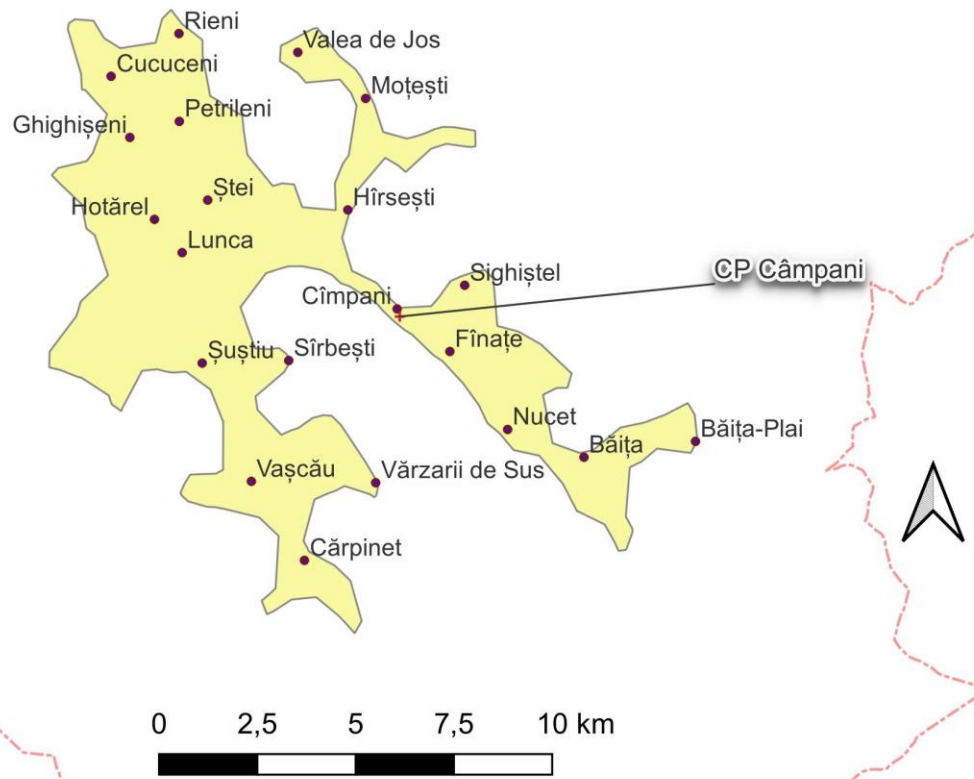
+ PCFP

• The centroid of locality

▭ Bihor County border

▭ Isochrones for 15-minutes travel time

Example of an isochrone for a PCFP and the included localities (less than 15 minutes by car)



- Legend**
- + PCFP
 - The centroid of locality
 - Bihor County border
 - Isochrone for 15-minutes travel time

Nr. crt.	Name of PCFP	Localities up to 15 minutes	Population up to 15 minutes	PCFP localization
1	CP "Cantemir" Oradea	14	214840	U
2	CP "Maslinului" Oradea	13	214245	U
3	CP "Nufarul" Oradea	14	215104	U
4	CP "Olimpiadei" Oradea	8	204071	U
5	CP "Rovine" Oradea	8	207020	U
6	CP "Pta Ion Creanga" Oradea	9	208192	U
7	CP "Vladeasa" Oradea	14	210466	U
8	CP Biharia	14	18110	R
9	CP Bratca	13	10262	R
10	CP Brusturi	26	8721	R
11	CP Cefa	10	8807	R
12	CP Ceica	21	8350	R
13	CP Campani	21	15242	R
14	CP Ciumeghiu	8	23859	R
15	CP Cociuba Mare	14	11015	R
16	CP Dobresti	10	5988	R
17	CP Dragesti	15	8046	R
18	CP Fughiu	15	24821	R
19	CP Holod	21	7191	R
20	CP Lugasu de Jos	16	19970	R
21	CP Misca	27	25064	R
22	CP Olcea	10	10582	R
23	CP Pomezau	20	9747	R
24	CP Rabagani	33	20880	R
25	CP Sacadat	19	21634	R
26	CP Sacuieni	15	17438	U
27	CP Salacea	6	6556	R
28	CP Sarbi	27	13173	R
29	CP Santandrei	9	206858	R
30	CP Suplacu de Barcau	16	10017	R
31	CP Vadu Crisului	25	17322	R
32	CP Valea lui Mihai	8	17705	U
Total PCFP		312	477063	

Statistical analysis

- 312 localities (68% of the country's localities) are at most 15 minutes away from a PCFP (86% of the country's population)
- **there is a significant difference in the number of localities with access to PCFP between those located in urban areas (mean=11.44, SD=3.087) and those located in rural areas (mean=17.22 SD=1.484); $t(30)=2.327$, $p=0.027$.**
- **there is a significant difference in the number of population with access to PCFP between those located in urban areas (mean=167678, SD=85184) and those located in rural areas (mean=22270 SD=40724); $t(30)=6.588$, $p=0.000$.**

Discussion and conclusion

- there is a good PCFP coverage of the territory of Bihor County.
- GIS aids in identifying population with low access and areas for new PCFPs.
- further studies needed on accessibility on each PCFP.
- analysis aids health policymakers in ensuring optimal PCFP coverage.



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Thank you!

Dr. Dorel-Petru Tirt, Faculty of Medicine and Pharmacy – University of Oradea, Public Health Directorate of Bihor County

E-mail: doreltirt@gmail.com

Phone: +40740206434