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Health Needs in Italy, Between Medical Desertification and the National Recovery and Resilience Plan. Province Where You Go, Shortage of Health Personnel That You Find

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Abstract:
From the North (Bolzano) to the South (Caltanissetta) of the Country, health worker shortages run across Italy. Realized by the NGO Cittadinanzattiva an analysis on the phenomenon of "medical desertification" in Italy and the measures planned by the National Recovery and Resilience Plan. From the point of view of citizens and patients, this can only translate into a difficulty of access to care, an issue particularly close to Cittadinanzattiva's heart, which monitors it on a daily basis at national and local level thanks to the 250 sections of the Tribunal for Patients' Rights active across Italy. In particular, in Italy there are nine regions most affected by the above-mentioned phenomenon [1], which is not limited to the recent cases, however striking, of emergency room operators ignored in the budget law [2], and the growing voluntary post-pandemic resignation of nurses and social-health workers [3], but also concerns general practitioners, freely chosen paediatricians and many other specialists working in the National Health Service [4]. An initial civic mapping of the phenomenon of "medical desertification", combined with a detailed analysis of the actions planned on the territory under the measure of the NRRP Mission 6 Health - component C1: Proximity networks, facilities and telemedicine for territorial health care (all merged in the Operational Plans of the CIS-Contratti Istituzionali di Sviluppo [5] for the execution and implementation of direct investments, signed by Italian Regions and Autonomous Provinces with the Ministry of Health in May 2022), has been carried out in Italy by Cittadinanzattiva, and the related public presentation at the national level was realized on 19 January 2023 in Rome in the presence of institutions and stakeholders [6]. As part of the European project AHEAD - Action for Health and Equity Addressing Medical Deserts [7], together with the other project partners, Cittadinanzattiva has also produced an online map [8] with information, for each province, on certain categories of health professionals working in public hospitals (hospital gynaecologist, hospital cardiologist and hospital pharmacist) rather than in primary care (general practitioner and paediatrician of free choice). [9]

Keywords: Medical desertification, NRRP-National Recovery and Resilience Plan, access to care, patients' rights, civic participation, AHEAD-Action for Health and Equity: Addressing Medical Deserts, EU4Health, Inner Areas, health inequalities.

INTRODUCTION

Health workers wanted throughout Italy: from the North to the South there is a shortage of doctors, both GPs and hospital doctors, as well as nurses and pediatricians. The so-called medical desertification is particularly evident in territories where people find it difficult to access care due to, for example, long waiting times, a shortage of health care workers or long distances from the point of care delivery.

Overcrowding in the offices of general practitioners and pediatricians is especially evident in the North of the country, while the shortage of hospital gynecologists affects not only Caltanissetta, where there is one hospital gynecologist for every 40565 women, but also Macerata, Viterbo, La Spezia and three provinces in Calabria (Reggio Calabria, Vibo Valentia and Cosenza).

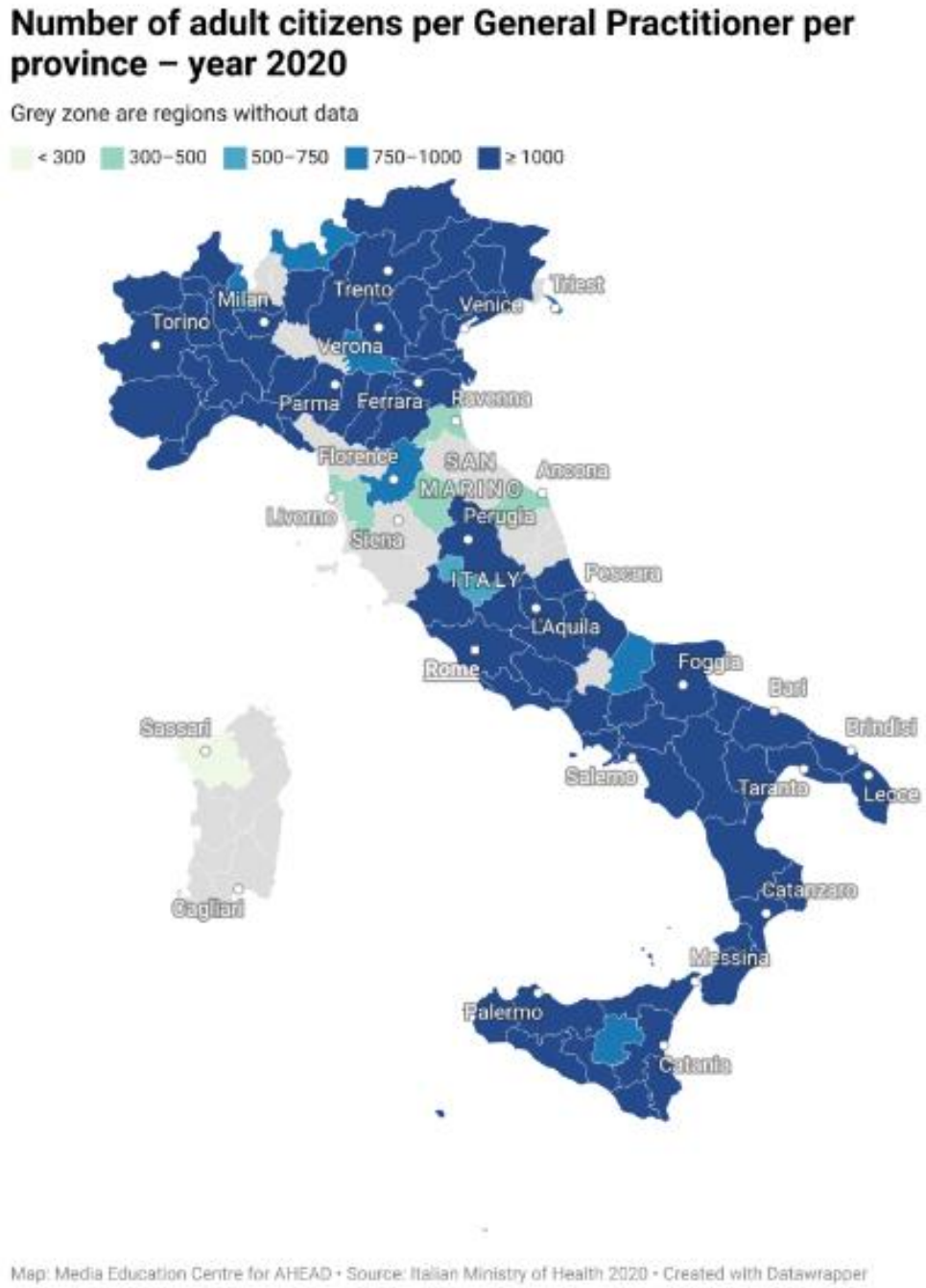

Fig. 1: Number of adult citizens per General Practitioner per province – year 2020. The map shows how many inhabitants in the 15 – 65+ age group there are – at the provincial level – for each General Practitioner (GP) in Italy. The colour code ranges from the lightest (the lowest number is 248) to the darkest (the highest number is 1539). The data refer to 2020 and the sources are the Italian Ministry of Health and Eurostat. https://ahead.health/number-of-adult-citizens-per-general-practitioner-per-province-year-2020/

Going into detail, Asti and its province have the fewest pediatricians per number of children (each professional cares for 1813 children between the ages of 0 and 15 years, the national average is 1/1061 and the regulations stipulate about 1 pediatrician per 800 children).

In the province of Bolzano, each general practitioner cares for an average of 1539 citizens aged 15 years and older (the national average is 1 doctor per 1245 patients, although the regulations set this ratio at 1/1500). In Caltanissetta and its province there is one hospital gynecologist for every 40565 women (the Italian average is 1/4132), the best figure is in Rome with a ratio of 1/2292: in other words, the situation in the province of Caltanissetta is 17 times worse than for those living in the province of Rome.

On the other hand, considering hospital cardiologists, the situation in the Autonomous Province of Bolzano is even 71 times worse than those living in the province of Pisa: in Bolzano there is one hospital cardiologist for every 224706 inhabitants (the average is 1/6741), the best rate in Pisa and province with 1/3147. Regarding hospital pharmacists, however, the worst ratio is reported in the province of Reggio Emilia where there is one professional for every 264805 inhabitants (the average is 1/26182), the best is in the province of Forlì-Cesena with 1/9982.

METHODOLOGY

The analysis conducted by Cittadinanzattiva used official data provided by the Ministry of Health related to 2020, regarding the following health care figures: pediatricians of free choice, general practitioners, gynecologists, cardiologists and pharmacists (the latter three hospital-based) for each Italian province. The choice of the five occupational categories may appear arbitrary but, in fact, it responds to a methodological decision shared in the context of the European AHEAD project to facilitate a comparison of data between all the countries involved in the project [10].

Moreover, a crucial and critical aspect of data collection in Italy concerned the unavailability and/or absence of this type of information. In fact, in most cases, these data were not publicly accessible and had to be requested expressly from the competent interlocutors (Ministry of Health, Federfarma, etc.).

The biggest obstacle was the total lack of these data for some other important professional categories. Finally, it was not possible to receive information at a higher level of accuracy (i.e., at municipal level) because it does not exist.

The full Report, which also contains specific regional focuses, can be downloaded at the official website of Cittadinanzattiva [11].

RESULTS

The following tables show the ten Italian provinces with the most marked disproportions in the ratio of people to health personnel.

Paediatricians and General Practitioners

The highest number of children [12] per free-choice paediatrician is found in the following provinces:

Tab. 1: N° of minors per Paediatrician in Italy

Position in the ranking	Province	N° of minors per Paediatrician
1	Asti	1.813
2	Brescia	1.482
3	Novara	1.370
4	Vercelli	1.367
5	Bolzano	1.364
6	Cuneo	1.331
7	Torino	1.320
8	Perugia	1.252
9	Udine	1.237
10	Alessandria	1.236
National average		1.061

Source: Elaboration Cittadinanzattiva on Ministry of Health data, 2020

Table almost hegemonised by Piemonte, and negative primacy for the northern provinces, a primacy that is also confirmed with regard to the family doctor. In fact, the data on the number of citizens [13] per General Practitioner (GP) tell us that the provinces in which the doctor has to divide himself among several people are as follows:

Tab. 2: N° of persons per General Practitioner in Italy

Position in the ranking	Province	N° of persons per General Practitioner
1	Bolzano	1.539
2	Bergamo	1.517
3	Brescia	1.516
4	Treviso	1.445
5	Trento	1.403
6	Pordenone	1.397
7	Verona	1.395
8	Imperia	1.392
9	Milano	1.392
10	Parma	1.391
National average		1.245

Source: Elaboration Cittadinanzattiva on Ministry of Health data, 2020

Hospital-Based Professionals

On the other hand, with regard to data on the female population [14] per hospitalgynaecologist, the provinces with the most complex situation are as follows:

Tab. 3: N° of women per hospital-based Gynaecologist in Italy

Position in theranking	Province	N° of women per hospital-based Gynaecologist
1	Caltanissetta	40.565
2	Macerata	18.460
3	Reggio Calabria	9.992
4	Viterbo	9.163
5	La Spezia	8.061
6	Vibo Valentia	8.002
7	Venezia	7.647
8	Lodi	7.528
9	Savona	7.370
10	Cosenza	7.229
National average		4.132

Source: Elaboration Cittadinanzattiva on Ministry of Health data, 2020

As can easily be seen, there is a worrying 'off the charts' situation in the province of Caltanissetta. The number of persons [15] per hospital-based cardiologist is particularly high in the following provinces:

Tab. 4: N° of persons per hospital-based Cardiologist in Italy

Position in theranking	Province	N° of persons per Hospital-based Cardiologist
1	Bolzano	224.706
2	Potenza	105.789
3	Crotone	72.172
4	Caltanissetta	36.941
5	Viterbo	34.137
6	Cosenza	21.584
7	Como	19.953
8	Reggio Calabria	15.278
9	Macerata	13.602
10	Brindisi	12.074
National average		6.741

Source: Elaboration Cittadinanzattiva on Ministry of Health data, 2020

In Bolzano, hospital-based cardiologists seem to be hiding among the population like a needle in a haystack! Certainly, the figures are far above any other province.

The last data collected concerns hospital-based pharmacists who present the highest imbalances in the ratio to the population [16] in the following provinces:

Tab. 5: N° of persons per hospital-based Pharmacist in Italy

Position in the ranking	Province	N° of persons per hospital-based Pharmacist
1	Reggio Emilia	264.805
2	Campobasso	108.681
3	Reggio Calabria	75.852
4	Piacenza	71.608
5	Lecco	55.827
6	Alessandria	52.161
7	Latina	46.883
8	Trieste	46.289
9	Como	45.972
10	Gorizia	45.932
National average		26.182

Source: Elaboration Cittadinanzattiva on Ministry of Health data, 2020

Again, the figures for the first two provinces in the ranking, Reggio Emilia and Campobasso, appear to be decidedly 'out of the league' because they are very far from the orders of magnitude found in the other Italian provinces.

Comments

In summary, from the analysis of official sources (Eurostat 2020 for population, Ministry of Health 2020 for number of professionals) and with reference to the top ten provinces - for each of the five professional figures mentioned - it emerges that in at least 39 provinces - and thus abundantly one third of the Italian provinces - a marked imbalance is evident, with two provinces (Bolzano and Reggio Calabria, at the extremes of the country, almost as if to underline how the phenomenon of medical deserts crosses the whole of Italy) that simultaneously reveal three shortages, and a further seven provinces (Alessandria, Brescia, Caltanissetta, Como, Cosenza, Macerata, Viterbo) that reveal two shortages. Specifically:

- Hospital-based pharmacists: the greatest imbalance between the number of professionals and the target audience is registered in the provinces of Reggio Emilia (1 in every 264805 people), Campobasso (1 for every 108681) and Reggio Calabria (1 for every 75852), while the best ratio at national level (1 for every 9883) is recorded in the province of Forlì-Cesena.
- Hospital-based cardiologists: the greatest imbalance between the number of professionals and the target group is registered in the provinces of Bolzano (1 per 224706 people), Potenza (1 in every 105789) and Crotone (1 in every 72172), while the best ratio at national level (1 in every 3147) is recorded in the province of Pisa.
- Hospital-based gynaecologists: the greatest imbalance between the number of professionals and target is recorded in the provinces of Caltanissetta (1 for every 40565 women), Macerata (1 for every 18460) and Reggio Calabria (1 for every 9992), while the best ratio at national level (1 for every 2292 women) is recorded in the province of Rome.

- There are clear territorial health inequalities, not necessarily between North and South, but also between provinces in the same region: in terms of hospital-based pharmacists, the situation in the province of Reggio Emilia is respectively 20 and 26 times worse than in the neighbouring provinces of Modena and Forlì-Cesena.
- Speaking of hospital-based gynaecologists, the situation in the province of Caltanissetta is 17 times worse than in the province of Rome. Considering instead hospital-based cardiologists, the situation in the Autonomous Province of Bolzano is even 71 times worse than in the province of Pisa!
- Keeping in mind the 39 provinces where the imbalances, between number of professionals and citizens, are most marked, nine are the most affected regions: Lombardia (Bergamo, Brescia, Como, Lecco, Lodi, Milano) and Piemonte (Alessandria, Asti, Cuneo, Novara, Torino, Vercelli) excel with six provinces, followed by Friuli Venezia Giulia (Gorizia, Pordenone, Udine, Trieste) and Calabria (Cosenza, Crotone, Reggio Calabria, Vibo Valentia) with four provinces. They are followed by Veneto (Treviso, Venezia, Verona), Liguria (Imperia, La Spezia, Savona) and Emilia Romagna (Parma, Piacenza, Reggio Emilia) with three provinces each, Trentino Alto Adige (both autonomous provinces of Bolzano and Trento) and Lazio (Latina and Viterbo) with two provinces.

Community homes and hospitals: what (and where) the NRRP foresees, between health desertification & proximity health services With the publication in the Official Gazette of the Regulation for the definition of models and standards for the development of territorial care within the National Health Service (Ministerial Decree N°77) and the signing of the CIS-Contratti Istituzionali di Sviluppo (Institutional Development Contracts) between the Ministry of Health and each Region and Autonomous Province, two important goals envisaged in Mission 6 Health of the National Recovery and Resilience Plan (NRRP) have been achieved to make the National Health System increasingly effective, with the aim of guaranteeing equal access to care, and strengthening prevention and services in the territory [17].

The NRRP provides funding for investments and only a small part for personnel-related management costs. But in order to make the new community health services work, it will be necessary to recruit staff and finance their costs [18]. Without an adequate link between structures and personnel - who will be called upon to work in those structures - as well as a careful analysis of the needs of the communities, the risk is that we will move towards a lack of effectiveness of the interventions. Hence Cittadinanzattiva's interest in monitoring both the state of progress of the NRRP with the presence and dislocation of Community Homes (CH) and Community Hospitals (HH), and the presence and dislocation of healthcare personnel, trying to match the data.

Thus, for example, the 39 provinces with the highest person/healthcare staff ratio (highlighted in pink in the following tables) do not correspond with the provinces receiving the highest number of Community Homes & Hospitals.

Fig. 2: Rome, 19 January 2023, European Commission Representation in Italy. The co-authors Mariano Votta and Bianca Ferraiolo together with Margherita Riccitelli from Cittadinanzattiva Piedimonte Matese at the conference "Health needs in inner areas, between medical desertification and NRRP".

Tab. 6: What the NRRP provides for the Community Houses in Italy

What the NRRP provides for	Community Houses (CH)		
	Total. CH	CH in Inner Areas [19]	
		(D)	(E-F)
Roma	**91**	13	5
Napoli	**88**	2	3
Milano	**55**	0	0
Torino	**42**	4	0
Palermo	**37**	9	16
Bari	**36**	7	1
Salerno	**33**	3	7
Brescia	**30**	7	10
Caserta	**30**	6	4
Catania	**29**	8	16
Foggia	**26**	12	10
Lecce	**24**	6	8
Cosenza	**22**	8	6
Bergamo	**21**	1	3
Messina	**21**	5	10
Agrigento	**21**	6	8
Varese	**20**	2	0
Padova	**20**	0	0
Bologna	**20**	5	2
Firenze	**20**	3	2
Sassari	**19**	6	7
Genova	**17**	2	0
Monza e Brianza	**17**	0	0

Vicenza	**17**	0	1
Treviso	**17**	0	0
Frosinone	**17**	5	1
Taranto	**17**	5	4
Reggio Calabria	**17**	9	2
Verona	**16**	0	0
Venezia	**16**	3	0
Latina	**15**	3	1
Chieti	**15**	2	9
Modena	**13**	3	6
Potenza	**13**	2	9
Trapani	**13**	2	3
Como	**12**	3	4
Pisa	**12**	0	1
Perugia	**12**	2	4
Siracusa	**12**	7	2
Sud Sardegna	**12**	2	4
Pavia	**11**	2	0
Udine	**11**	5	1
L'Aquila	**11**	3	3
Benevento	**11**	5	1
Catanzaro	**11**	4	2
Cuneo	**10**	1	0
PA Bolzano	**10**	2	4
PA Trento	**10**	3	3
Reggio Emilia	**10**	4	3
Avellino	**10**	3	2
Mantova	**9**	5	0
Parma	**9**	1	1
Campobasso	**9**	1	6
Brindisi	**9**	6	0
Barletta-Andria Trani	**9**	0	1
Caltanissetta	**9**	3	4
Ragusa	**9**	6	0
Alessandria	**8**	1	0
Lecco	**8**	0	0
Ravenna	**8**	0	0
Forlì-Cesena	**8**	1	0
Livorno	**8**	1	2
Ancona	**8**	0	1
Macerata	**8**	3	0
Teramo	**8**	2	0
Novara	**7**	2	0
Sondrio	**7**	2	3
Arezzo	**7**	5	0
Viterbo	**7**	0	0
Nuoro	**7**	2	5
Cagliari	**7**	1	0
Savona	**6**	1	0
Piacenza	**6**	0	0

Ferrara	**6**	4	1
Siena	**6**	1	2
Grosseto	**6**	2	2
Pescara	**6**	1	0
Matera	**6**	0	6
Crotone	**6**	2	1
Asti	**5**	1	0
Imperia	**5**	1	0
La Spezia	**5**	0	0
Lodi	**5**	0	0
Rovigo	**5**	3	1
Pordenone	**5**	1	0
Rimini	**5**	0	1
Lucca	**5**	1	0
Pistoia	**5**	1	0
Terni	**5**	0	0
Ascoli Piceno	**5**	1	0
Rieti	**5**	2	0
Vibo Valentia	**5**	2	1
Enna	**5**	2	3
Oristano	**5**	3	0
Aosta	**4**	1	0
Cremona	**4**	0	0
Belluno	**4**	2	0
Gorizia	**4**	0	0
Massa-Carrara	**4**	1	0
Prato	**4**	1	1
Pesaro e Urbino	**4**	1	0
Fermo	**4**	0	0
Isernia	**4**	2	2
Vercelli	**4**	0	1
Biella	**3**	1	0
Verbano-Cusio-Ossola	**3**	0	0
Trieste	**3**	0	0

Source: Elaboration of Cittadinanzattiva-Civic Evaluation Agency on data:
CIS-Contratti Istituzionali di Sviluppo [20], 2022 and ISTAT- La geografia delle aree interne nel 2020 [21]

Tab. 7: What the NRRP provides for the Community Hospitals in Italy

What the NRRP provides for	**Community Hospitals (HH)**		
	Tot. HH	**HH in Inner Areas**	
		(D)	**(E-F)**
Napoli	**23**	2	3
Roma	**22**	4	0
Milano	**19**	0	0
Torino	**15**	1	0
Palermo	**10**	1	3
Catania	**10**	2	7
Bari	**9**	2	1
Cosenza	**9**	2	4
Brescia	**8**	3	3

Verona	**8**	3	0
Caserta	**8**	2	2
Salerno	**8**	0	4
Vicenza	**7**	0	1
Foggia	**7**	2	4
Genova	**6**	2	0
Bergamo	**6**	2	0
Treviso	**6**	0	0
Bologna	**6**	3	1
Frosinone	**6**	1	0
Brindisi	**6**	2	1
Lecce	**6**	2	1
Barletta-Andria Trani	**6**	1	1
Messina	**6**	2	1
Sassari	**6**	1	2
Como	**5**	1	1
Mantova	**5**	4	0
Firenze	**5**	0	1
Benevento	**5**	3	1
Varese	**4**	2	0
Lecco	**4**	0	0
Pavia	**4**	1	0
Venezia	**4**	1	0
Padova	**4**	0	0
Modena	**4**	1	1
Livorno	**4**	2	0
Latina	**4**	1	0
Avellino	**4**	1	0
Taranto	**4**	2	0
Catanzaro	**4**	3	1
Reggio Calabria	**4**	0	3
Siracusa	**4**	2	1
Cuneo	**3**	0	0
Alessandria	**3**	0	0
Sondrio	**3**	2	1
Cremona	**3**	0	0
Monza e Brianza	**3**	0	0
PA Bolzano	**3**	1	0
PA Trento	**3**	0	0
Belluno	**3**	1	1
Rovigo	**3**	1	0
Udine	**3**	1	0
Parma	**3**	1	0
Reggio Emilia	**3**	1	1
Rimini	**3**	0	1
Lucca	**3**	0	1
Arezzo	**3**	1	1
Perugia	**3**	1	0
Ancona	**3**	0	0
L'Aquila	**3**	0	0

Pescara	**3**	2	0
Chieti	**3**	0	2
Potenza	**3**	0	3
Trapani	**3**	1	0
Agrigento	**3**	0	2
Ragusa	**3**	1	0
Novara	**2**	1	0
Savona	**2**	1	0
La Spezia	**2**	1	0
Lodi	**2**	0	0
Pordenone	**2**	1	0
Gorizia	**2**	0	0
Piacenza	**2**	0	0
Ferrara	**2**	0	1
Ravenna	**2**	0	0
Forlì-Cesena	**2**	0	0
Pistoia	**2**	0	0
Prato	**2**	0	0
Grosseto	**2**	0	1
Terni	**2**	0	0
Pesaro e Urbino	**2**	1	0
Macerata	**2**	0	0
Ascoli Piceno	**2**	0	0
Viterbo	**2**	0	0
Rieti	**2**	1	1
Teramo	**2**	1	0
Matera	**2**	0	2
Vibo Valentia	**2**	1	0
Caltanissetta	**2**	0	1
Enna	**2**	0	2
Nuoro	**2**	0	2
Cagliari	**2**	0	0
Oristano	**2**	1	1
Vercelli	**1**	1	0
Biella	**1**	0	0
Verbano-Cusio-Ossola	**1**	0	0
Asti	**1**	0	0
Aosta	**1**	0	0
Imperia	**1**	0	0
Massa-Carrara	**1**	0	0
Pisa	**1**	0	0
Siena	**1**	0	0
Isernia	**1**	1	0
Campobasso	**1**	0	1
Crotone	**1**	0	1
Sud Sardegna	**1**	0	0
Trieste	**0**	0	0
Fermo	**0**	0	0

Source: Elaboration of Cittadinanzattiva-Civic Evaluation Agency on data:
CIS -Contratti Istituzionali di Sviluppo, 2022 and ISTAT- La geografia delle aree interne nel 2020

The same is true for 9 regions (highlighted in pink in the following tables) most affected by the phenomenon of "medical deserts": the correlation with the number of Community Homes & Community Hospitals envisaged by the NRRP is not particularly strong.

Tab. 8: What the NRRP provides for the Community Houses in each Italian Region

What the NRRP provides for	
Regions	**N° Community Houses**
Lombardia	199
Campania	172
Sicilia	156
Lazio	135
Puglia	121
Veneto	95
Emilia Romagna	85
Piemonte	82
Toscana	77
Calabria	61
Sardegna	50
Abruzzo	40
Liguria	33
Marche	29
Friuli Venezia Giulia	23
Basilicata	19
Umbria	17
Molise	13
PA Bolzano	10
PA Trento	10
Valle d'Aosta	4

Source: Cittadinanzattiva Civic Evaluation Agency on official data
CIS/Contratti Istituzionali di Sviluppo, 2022

Tab. 9: What the NRRP provides for the Community Hospitals in each Italian Region

What the NRRP provides for	
Regions	**N° Community Hospitals**
Lombardia	66
Campania	48
Sicilia	43
Puglia	38
Lazio	36
Veneto	35
Piemonte	27
Emilia Romagna	27
Toscana	24
Calabria	20
Sardegna	13
Liguria	11
Abruzzo	11
Marche	9
Friuli Venezia Giulia	7

Umbria	5
Basilicata	5
PA Bolzano	3
PA Trento	3
Molise	2
Valle d'Aosta	1

Source: Cittadinanzattiva Civic Evaluation Agency on official data:
CIS/Contratti Istituzionali di Sviluppo, 2022

CONCLUSIONS

Many countries in the European region struggle with severe shortages of health personnel and an ageing and burned-out health workforce. This is leading to a lack of access to healthcare for many European citizens. Several countries, such as Italy, Romania, Serbia and Moldova, also face the challenge of so-called "medical deserts". These are areas with limited health services, resulting in unmet health needs of the population. They can exacerbate health inequalities, mostly affecting vulnerable groups.

Medical deserts and the lack of access to care for European citizens are therefore an increasingly urgent joint public health concern in Europe. This EU-wide problem needs EU-wide collaboration to come up with an EU-level sustainable solution, to ensure that European citizens receive optimal access to skilled and motivated health workers. Europe cannot wait – it is time to act now! For this reason, on 27 April 2023, a policy dialogue event, hosted by the Italian Member of the European Parliament Beatrice Covassi, was organised at the European Parliament in Brussels, in the presence of Members of European Parliament, the European Commission (DG Santè and DG Agri), the WHO, the President of the Italian National Institute of Health, civic organizations, patient's advocacy groups and other relevant stakeholders. Experts debated and agreed about the following four pillars and recommendations:

- European Institutions should prioritise the problem of medical deserts on the political agenda throughout the next European Commission's mandate – and beyond.
- The national governments of European Member States should improve the quality, systematic collection and analysis of data related to the health workforce, health services, and related indicators to medical deserts.
- Health professionals' associations should advocate the right to health for all, especially people in areas with limited or difficult access to health services, both in rural and remote areas, as in urban areas.
- Citizens should call for multi-dimensional actions by duty-bearers to improve their health and well-being, especially for the most vulnerable.

Fig. 3: Brussels, 27 April 2023, European Parliament. Beatrice Covassi, Member of the European Parliament - Group of the Progressive Alliance of Socialists and Democrats (S&D) together with Anna Lisa Mandorino, Secretary General at Cittadinanzattiva at the conference "Addressing medical desertification in Europe: a call to action".

DECLARATIONS

Each of the authors confirms that this manuscript has not been previously published by another international peer-review journal and is not under consideration by any other journal. Additionally, all of the authors have approved the contents of this paper and have agreed to the submission policies of the journal.

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REFERENCES

[1] The term "medical desert" is used to refer to various situations or areas where people have difficulty accessing care due to, for example, long waiting times, a shortage of health personnel or long distances from the point of care. See: www.agenas.gov.it/oases-promoting-evidence-based-reforms

[2] The EUR 200 million increase in the allowance for emergency medical workers, which had been promised by the government, found no place in the budget law. The reason for the allocation was explained by the Italian Minister Schillaci himself. Those who work in emergency departments do not do private work, and therefore have lower incomes than many colleagues. The aim would be 'to make these specialities more attractive', the

health minister had explained. See: www.open.online/2022/12/28/legge-di-bilancio-sanita-fondi-tumori-pronto-soccorso/

[3] www.insalutenews.it/in-salute/oltre-2mila-tra-infermieri-e-oss-hanno-dato-le-dimissioni-dal-ssn-nel-2021-nursing-up-dati-allarmanti/

[4] www.sanita24.ilsole24ore.com/art/aziende-e-regioni/2022-11-10/fiaso-grandi-dimissioni-sanita-2021-via-servizio-national-health-3 thousand-medics-155536.php?uuid=AESsHuFC&refresh_ce=1

[5] Institutional Development Contracts

[6] More info here: www.activecitizenship.net/insights/1070-shortage-of-doctors-and-medical-desert-nine-italian-regions-with-the-smallest-workforce.html

[7] https://ahead.health/

[8] Available at https://ahead.health/italy/

[9] The paediatrician of free-choice is the doctor who assists children from 0 to 14 years of age, affiliated with the National Health Service. In a nutshell, he is the equivalent of the general practitioner in paediatrics, i.e. a doctor who offers his services free of charge on behalf of the SSN.The paediatrician of free-choice is mandatory for all children up to the age of 6, in order to access all services and benefits guaranteed by the public health service, including the Essential Levels of Care (LEA). After the age of 6, the parent is free to decide whether to keep the paediatrician or to rely on their general practitioner.
www.salute.gov.it/portale/lea/dettaglioContenutiLea.jsp?area=Lea&id=4697&lingua=italiano&menu=distrettuale

[10] Italy, Moldova, the Netherlands, Romania and Serbia. See: https://ahead.health.

[11] The Report was presented by Cittadinanzattiva on occasion of the **event** "Health needs in inner areas, between medical desertification and NRRP"**,** held in Rome at the European Commission Representation in Italy on January 19, 2023. The Report was edited by Mariano Votta, Head of European Policies of Cittadinanzattiva, in collaboration with his colleagues Maria Vitale, Senior Project Manager, and Bianca Ferraiolo, Head of Cittadinanzattiva's representativeoffice at the European Institutions and Head of the AHEAD Project. Data processing was carried out by Cittadinanzattiva's Civic Evaluation Agency in the persons of Maria Eugenia Morreale and Maria. Vitale. Claudia Ciriello,Cittadinanzattiva Project Manager, also collaborated in the data collection. The Report, which also contains specific regional focuses, can be downloaded at this webpage: www.activecitizenship.net/insights/1070-shortage-of-doctors-and-medical-desert-nine-italian-regions-with-the-smallest-workforce.html.html

[12] AHEAD project target population: children and adolescents from 0 to 15 years of age.

[13] AHEAD project target population: people aged 15 and over.

[14] AHEAD project target population: female population aged 10 and over.

[15] AHEAD project target population: people aged 15 and over.

[16] Target population from AHEAD project: total population.

[17] www.agenas.gov.it/comunicazione/primo-piano/2099-missione-6-salute-pnrr-in-gazzetta-il-dm-77-siglati-i-contratti-institutional-development

[18] www.luoghicura.it/sistema/finanziamento-e-spesa/2021/06/i-finanziamenti-per-la-missione-salute-del-pnrr-opportunities-and-risks/

[19] Italian municipalities are classified between centres and inner areas. Centres are classified as follows: (A): Polo (Polo); (B): Polo intercomunale (Inter-municipal pole); (C): Cintura (Belt). Inner areas are classified as follows: (D): Intermedio (Intermediate); (E): Periferico (Peripheral); (F): Ultraperiferico (Ultraperipheral).

[20] PNRR- Contratti Istituzionali di Sviluppo tra il Ministero della Salute e le Regioni e Province Autonome Anno 2022, cfr: www.salute.gov.it/portale/documentazione/p6_2_2_1.jsp?lingua=italiano&id=3240

[21] Cfr: www.istat.it/it/archivio/273176