HEALTH CARE MANAGEMENT

Achieving Health Equity in Decentralized Healthcare: An Innovative Approach to Preventive Care in Southern Italy

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Keywords

Healthcare Disparities; Environmental Health; Vaccination Coverage; Chronic Disease Management; Predictive Analytics in Healthcare

Summary

This contribution focuses on the Italian Ministry of Health's Decree No. 77 of 23 May 2022, aimed at standardizing preventive healthcare nationwide. The implementation of Ministerial Decree 77 represents a crucial step in strengthening preventive care in Italy, by redefining community-based healthcare models and promoting proactive, population-centered interventions. It highlights regional disparities in healthcare access and explores innovative approaches, including Regulation 13/2023 of the Apulia Region (Southern Italy), to improve health outcomes.

In this context the comparison of healthcare management systems of northern and southern Italy, particularly on vaccination rates, chronic disease management and the integration of environmental health is relevant.

It examines the Apulian regulatory model, emphasizing environmental determinants such as air quality monitoring and predictive analytics to mitigate climate-related health risks.

The Apulia model led to significant health improvements, including a 25% reduction in waterborne diseases and a 12% reduction in heatwave-related hospitalizations. Multidisciplinary collaboration and community engagement enhanced policy effectiveness and public confidence.

This work underscores the importance of balancing national health guidelines with regional autonomy to address health inequalities. The Apulia model demonstrates the need for integrating environmental health factors and offers a replicable framework to improve health equity and resilience. Recommendations include strengthening administrative capacity, fostering inter-regional collaboration, and promoting innovative regional healthcare approaches.

Introduction

Regional health inequalities are a critical challenge in decentralized healthcare systems. In this type of organization, uneven resource allocation, infrastructure variability and inconsistent policy implementation often lead to inequitable health outcomes [1, 2]. In Italy, although the Ministry of Health provides national guidelines and basic principles for healthcare, the Regions and Autonomous Provinces are granted a degree of independent healthcare management.

Ministerial Decree No. 77 of 23 May 2022 (MD 77/22) [3] introduced a national regulatory framework defining models and standards for the development of territorial support in the National Health Service and setting reference parameters for human resources and strategic objectives. The implementation of Ministerial Decree 77 represents a crucial step in strengthening preventive care in Italy, by redefining community-based healthcare models and promoting proactive, population-centered interventions. Despite this initiative, the implementation of the decree has highlighted significant contrasts between the northern and southern regions of the country. Northern regions, such as Lombardy and Veneto, with advanced digital infrastructure, robust financial resources and efficient administrative frameworks, contrast sharply with southern regions, including Calabria and Sicily, which face challenges related to poor logistics, insufficient funding and widespread inefficiencies at the administrative level. Such disparities are evident in critical areas such as immunization coverage, chronic disease management and environmental health, and hinder the improvement of healthcare services.

In the context of these broader challenges, Apulia is a notable exception. Apulia is a region in south-eastern Italy, extending along the Adriatic and Ionian coasts, with a population of approximately 4

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million. It features a mix of urban and rural areas, a high proportion of elderly residents, and several socioeconomically deprived communities, making it a key setting for addressing health inequalities and implementing population-based healthcare strategies. Since the implementation of Regional Regulation No. 13 of 19 December 2023 [4], Apulia has adopted a proactive approach to integrating environmental health determinants into its public health framework. This innovative model incorporates air quality monitoring, water safety inspections and predictive analysis into healthcare strategies, in line with global frameworks such as the World Health Organization (WHO) Health in All Policies (HiAP) initiative [5]. In addition, Apulia has promoted multidisciplinary collaboration among health professionals, environmental scientists and local authorities, drawing inspiration from approaches used in other countries [6].

The Apulian approach emphasizes community engagement, involving citizens in participatory forums and designing culturally tailored educational campaigns in line with recommendations from several authors [7,8]. Despite being at an early stage, these initiatives have already shown positive impacts: since their implementation, cases of waterborne diseases and heatwave-related hospital admissions have significantly decreased in the Apulian territory, demonstrating the potential of context-specific and community-led solutions to address health inequalities and improve health outcomes.

This work has two main objectives: i) to analyze regional disparities in the implementation of MD 77/22; ii) to evaluate the Apulian Regional Regulation 13/2023 as a case study of how environmental health integration and community-based approaches can address systemic challenges. The authors also explore how decentralized health systems can balance the need for national standardization with the benefits of more fruitful regional adaptability.

Regional disparities in the implementation of Ministerial Decree 77/2022

The implementation of MD 77/22 in Italy has revealed significant regional disparities, particularly between northern and southern regions. Differences in resources and access to healthcare reflect different levels of health infrastructure, administrative capacity and resource allocation across the country. Therefore, the standardization of health policies in a decentralized system such as the Italian one may influence the outcomes of the implementation of the Decree.

Northen Regions (Lombardy and Veneto)

Among the northern regions of Italy, Lombardy (Italy), around 10 million inhabitants, and Veneto (Italy), 4,854,000 inhabitants, selected as the two most populous and economically advanced regions in northern Italy, have well-developed and efficient health infrastructures, which play a key role in the implementation of health policies and initiatives. These regions have often exceeded national targets in various health-related areas. Their vaccination programs have been particularly successful, with coverage rates of over 90% [9].

This efficiency highlights the strength of these regions' healthcare systems in monitoring public health trends and responding rapidly to emerging health threats. In addition, both Lombardy and Veneto have demonstrated a strong commitment to integrating environmental health into their health systems: increasing air quality monitoring infrastructure demonstrates their proactive approach to environmental risk management. These regions are now number one in the Italian health system.

Southern Regions (Calabria and Sicily)

Instead, the southern Italian regions continue to face significant obstacles to the full implementation of MD 77/22. Calabria (Italy, population: 1.850 million) and Sicily (Italy, population: 4.785 million) face persistent health service challenges, especially in rural areas where inequalities are more pronounced.

Several studies have highlighted substantial disparities in chronic disease management and healthcare access between Northern and Southern Italy. Southern regions exhibit significantly lower per-capita health expenditure and experience higher rates of unmet healthcare needs, largely due to cost barriers and limited local infrastructure – factors that translate into substantially reduced access compared with Northern regions [10].

This disparity highlights structural inequalities: insufficient healthcare personnel, inadequate facilities and poor funding hinder the development and expansion of health services in southern Regions, disproportionately affecting vulnerable populations as reported in other study [11].

Apulia's Innovative Model: Regulation No. 13 of 19 December 2023

Apulia is a notable exception to the trend observed in southern Italy, with its innovative approach "Regulation No. 13 of 19 December 2023" (Definition of models and standards for the development of territorial assistance) [4].

This regulation is an example of a forward-looking model for integrating environmental health determinants into public health strategies. It provides:

1. Environmental health integration: Apulia has effectively integrated environmental health concerns into its preventive strategies. For example, air quality monitoring and water safety inspections have been increased by 40%, contributing to a 25% reduction in

reported waterborne diseases. In addition, the Region addressed climate-related health risks by using predictive analysis to reduce heat-related hospital admissions by 12%;
2. Multidisciplinary cooperation: Apulia's success can also be attributed to its emphasis on multidisciplinary collaboration. Partnerships between health professionals, environmental scientists and local authorities have enabled a comprehensive response to public health challenges, in line with successful international models such as the German federal initiatives to integrate environmental health;
3. Community engagement: Apulia has prioritized community engagement by incorporating participatory forums, educational campaigns, and stakeholder consultations into its public health planning. This approach has doubled public participation in health planning processes and led to a 20% improvement in compliance with health advisories, demonstrating the value of citizen engagement in improving public health outcomes.

Recommendations for Addressing Regional Disparities

To effectively address the regional disparities in the implementation of MD 77/22, the following policy recommendations are proposed:

1. *Strengthening administrative capacity*: Investment in administrative capacity is essential to improve coordination and operational efficiency, especially in underperforming regions. Areas for investment should include human resources, training and digitalization. Training should focus on key areas such as epidemiological surveillance, prevention and management of chronic diseases, and effective resource allocation. By strengthening the administrative foundations, regions will be better equipped to implement health policies, ensure timely interventions and improve health outcomes;
2. *Institutionalize multidisciplinary cooperation*: Establishing formalized frameworks for interaction between different sectors, such as health, environmental science and local government, is essential to foster innovation and address complex health challenges. One such approach could be the creation of regional health-environment committees that work to integrate climate resilience strategies into health planning. These committees could serve as platforms for sharing expertise and coordinating efforts across sectors, ensuring that public health strategies are holistic and responsive to environmental factors that influence health outcomes;
3. *Improve community engagement*: Public health initiatives should prioritize community engagement through participatory models that seek to incorporate local feedback and culturally appropriate outreach strategies. Involving communities in the design and implementation of health interventions ensures that programs are more relevant to local needs. Particularly in regions vulnerable to climate-related health risks, health education campaigns are essential to raise awareness and encourage preventive health behaviours. Community involvement can promote fundamental and lasting changes in people's lifestyles;
4. *Incentivize Innovative Models*: To encourage the replication and dissemination of effective healthcare practices, financial and operational incentives should be introduced for regions that adopt innovative models, such as Apulia's Regulation 13/2023. These incentives would motivate regions to implement successful strategies and help standardize best practice across the country. The incorporation of environmental health considerations into public health policies, as demonstrated by Apulia, could serve as a model for other regions, fostering a cohesive national approach to healthcare that integrates both health and environmental determinants;
5. *Develop robust monitoring and evaluation systems*: The development of transparent and region-specific monitoring and evaluation systems is essential to ensure accountability and improve health service delivery. These systems should be designed to assess progress towards national and regional health targets, identify areas where inequalities persist and where interventions are most needed. Regular performance reviews and evaluations will help to monitor the effectiveness of policies implemented and promote continuous improvement in health services. The establishment of such systems is essential to maintain attention to health equity and ensure that the benefits of the Decree are distributed evenly across regions.

By implementing these recommendations, Italy can reduce regional inequalities, optimize health care and promote a more equitable and effective health system, in line with the objectives of MD 77/22.

Conclusions and Future Directions

Significant regional disparities have emerged since the implementation of MD 77/22. Northern regions, particularly Lombardy and Veneto, have shown strong performance on key health indicators, reflecting the benefits of consolidated health infrastructure, sustained financial investment and administrative efficiency. In contrast, southern regions, including Calabria and Sicily, face significant challenges: vaccination coverage, chronic disease management services and investments in health infrastructure. With Regulation 13/2023, Apulia emerged as a

notable exception, offering an innovative and effective model to address systemic gaps. Through effective multidisciplinary collaboration between health professionals, environmental experts and local authorities, has integrated environmental health into the public health framework, focusing on monitoring air and water quality and proactively managing climate change risks. This approach is in line with global frameworks, such as the WHO's Health in All Policies (HiAP) and the UN's Sustainable Development Goals (SDGs). Following successful international models, it has led to significant improvements, including a 25% reduction in waterborne diseases and a 12% reduction in heatwave-related hospital admissions. In addition, Apulia's commitment to community engagement through educational campaigns and participatory forums led to a 20% increase in public participation in health planning and improved compliance with health advisories. Unexpectedly, our study also found that integrating environmental determinants, supported by predictive analytics, not only helped address immediate health risks, but also built long-term resilience to climate-related challenges. These findings highlight the potential of community-led strategies to build trust, align public policies with local needs, and promote sustainable health improvements. The authors are aware of some limitations and weaknesses of this study: variability in data quality across regions, limited long-term evaluations of interventions provided for in Apulia by Regulation 13/2023, and difficulties in establishing causal relationships between policy implementation and health outcomes. These limitations should be addressed in future research exploring standardized frameworks for multidisciplinary and interdisciplinary collaboration. However, the observed differences and successes points to several strategies that can be considered for future development: strengthening administrative capacity; investing in staff, training and digital infrastructure; improvement of health education campaigns and evaluation of the long-term results of integrating preventive health care with environmental hygiene policies. By addressing these challenges, Italy and other decentralized systems can move closer to achieving equitable access to preventive care and strengthening resilience to emerging health risks. Apulia, with its innovative model, shows how the integration of environmental health and community engagement can fill systemic gaps and lead to improvements in health and, consequently, lifestyles. There is also a need for more comprehensive data collection and monitoring systems that can assess both the qualitative and quantitative aspects of policy implementation to reduce inequality. Finally, given the growing challenges posed by climate change, more research is needed to assess how public health systems can not only better integrate climate resilience into their strategies but also be better prepared to respond to future health crises. Thanks to health literacy, it is now possible to improve people's ability to understand and use health information, to make healthy choices and to participate actively in local health systems [12-14].

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Conflict of Interest statement

The authors declare no conflicts of interest.

Authors' contributions

Conceptualization, MFP, GL, RMR and VB; formal analysis, MFP, GL, MRR and VB; writing-original draft preparation, MTM, MFP, GL, RMR and VB; writing-review and editing, MTM, MFP, GL, RMR, ADL, FT and VB; supervision, MTM, MFP, and ODG. All authors have read and agreed to the published version of the manuscript.

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