Ann Ig. 2025 Sep-Oct; 37(5): 618-624. doi: 10.7416/ai.2025.2703. Epub 2025 Apr 15.

# SHORT PAPER

# The New Guarantee System for Monitoring Healthcare Services Delivery in Italy: technical remarks and recommendations

Carlo Signorelli[1], Lorenzo Blandi[1], Rita Cuciniello[1], Rosaria Calabretta[1], Fabrizio Pregliasco[2], Anna Odone[3], Umberto Gelatti[4], Silvana Castaldi[2,5], Gabriele Pelissero[3]

*Keywords: Public health; health policies; indicators; National Health Service*
*Parole chiave: Sanità pubblica; politiche sanitarie; indicatori; Servizio Sanitario Nazionale*

**Abstract**

***Background.*** *Over the past 15 years, Italy's National Health Service has been the object of increased governmental attention, due to the need to control public spending, reduce waste, and maintain acceptable levels of quality, accessibility and appropriateness of healthcare services.*
***Methods.*** *One of the key mechanisms to achieve this has been the implementation of performance assessment systems. Among these is the New Guarantee System, introduced in 2019, which utilizes 88 indicators across three key macro-areas — public health and prevention, primary health care, and hospital care — to assess the quality and equity of essential healthcare services.*
***Results.*** *This paper critically analyzes the 2025 New Guarantee System report, identifying strengths, limitations, and potential improvements for a more effective monitoring system. The findings reveal significant gaps in the current healthcare performance evaluation system. The reliance on descriptive statistics limits the ability to interpret healthcare outcomes accurately. The absence of indicators addressing chronic diseases, health inequalities, new technologies and qualitative patient experiences suggests the urgent need of a more comprehensive evaluation approach.*
***Conclusions.*** *To improve the healthcare performance evaluation system, it is recommended to incorporate more comprehensive indicators that address the identified gaps. Enhanced data integration, qualitative assessments, and an increased focus on chronic diseases and health disparities are essential to provide a more accurate evaluation of healthcare services.*

[1] *Faculty of medicine and Surgery, Vita-Salute San Raffaele University, Milan, Italy*
[2] *Department of Biomedical Sciences for Health, University of Milan, Milan, Italy*
[3] *School of Public Health, Department of Public Health, Experimental and Forensic Medicine. University of Pavia, Pavia, Italy*
[4] *Department of Medical and Surgical Specialties, Radiological Sciences and Public Health, University of Brescia, Brescia, Italy*
[5] *Quality Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*

Annali di Igiene : Medicina Preventiva e di Comunità (Ann Ig)
ISSN (print) 1120-9135 ISSN (online) 3035-5559

https://www.annali-igiene.it

## Background

Italy has a free and universal access healthcare system, known as the Italian National Health Service (I-NHS), and is articulated into 21 different regional healthcare services (1,2). The I-NHS aims to guarantee the health of all the Italian citizen, European Union (EU) citizen, and regular foreign residents, providing all of them with an essential set of services equal on all the national territory (but delivered at regional level), known as "Essential Levels of Assistance" (in Italian *Livelli Essenziali di Assistenza*, hereinafter referred to as LEA). In recent years, monitoring and evaluating effective healthcare performances have become crucial tools for ensuring the quality and sustainability of the I-NHS (1-3). The New Guarantee System (NGS), established in 2019 (4), which replaced the older system in place since 2000, aims to assess the provision of LEA at regional level through a set of 88 indicators based on administrative data. Compared to the old system, thanks to the introduction of information flows on an individual basis and with information at the level of the specific service provided, the NGS aims to develop indicators that are better suited to describing the performance and responsiveness of the regional health services to the health needs of the population (5). These indicators are categorized into three macro-areas: (a) prevention and public health, (b) primary healthcare, and (c) hospital care. Each year, approximately 20 core indicators (24 in 2023) are selected to provide a comparative evaluation of the regional healthcare services (including those of the autonomous Provinces of Trento and Bolzano). Despite the importance of the NGS in shaping the Italian healthcare policies, its scientific and technical validity has not been thoroughly assessed. This paper presents a critical review of the NGS following the publication of the 2025 report (based on 2023 data), analyzing its effectiveness, limitations, and areas for possible improvement (5).

## Methods

Our study critically evaluated the 2023 NGS indicators to determine their validity, reliability, and utility for measuring the quality, appropriateness, and uniformity of healthcare services throughout Italy's regions and autonomous provinces.

Data was searched through the official website of the Italian Ministry of Health (MoH) and extracted (5). Our comments focused primarily on the 24 core indicators, used by the MoH to evaluate regional healthcare services during 2023. The analysis was articulated according to the three macro-areas already quoted and to the different LEA's domains, as shown in Table 1:

- prevention and public health
- primary healthcare
- hospital care

A critical approach was adopted to evaluate the coherence and transparency of the NGS indicators, with particular attention to methodological rigor and alignment with contemporary healthcare needs.

First, we assessed the stability of key indicators over time and their capacity to support interregional comparisons, including an analysis of consistency between the 2022 and 2023 editions.

Second, the indicators were examined under the light of evolving social, economic, and healthcare contexts — such as demographic shifts, workforce constraints, digital transformation, and recent healthcare reforms.

Third, the analysis identified major methodological shortcomings, including the lack of clarity regarding numerator and denominator definitions and the absence of appropriate statistical detail.

Finally, where relevant, NGS methodologies were compared with other national benchmarking tools, such as the National Outcomes Program (in Italian *Programma Nazionale Esiti*, hereinafter referred to as PNE), coordinated by the National Agency for Regional Health Services (in Italian *Agenzia Nazionale per i Servizi Sanitari Regionali*, hereinafter referred to as AGENAS) (6).

## Results

The NGS is designed to verify the provision of LEA services, with a threshold of 60% set as the minimum acceptable target for each region and autonomous provinces (Figure 1). However, the publication of crude numerical values often leads to rankings that may be misleading. Core indicators in 2023 primarily used descriptive statistical methods, leading to fragmented assessments that did not account for the overall healthcare performance. Unlike the PNE, coordinated by the AGENAS (6-9), the NGS neither disclosed numerator and denominator data for each indicator, nor provided details on statistical adjustments. This lack of transparency raises concerns about the reproducibility and reliability of the system. Additionally, between 2022 and 2023, changes

Table 1 - The *New Guarantee System's* core indicators and their descriptions and ID codes by Health Service Area (Prevention, Primary Care, Hospital Care)

| Area | Code | Indicator |
|---|---|---|
| Prevention and public health | P01C | Vaccination coverage in children at 24 months by basic cycle (polio, diphtheria, tetanus, hepatitis B, pertussis, Hib) |
| Prevention and public health | P02C | Vaccination coverage in children at 24 months for the 1st dose of measles, mumps, rubella (MPR) vaccine |
| Prevention and public health | P10Z | Coverage of the main activities related to the control of animal registries, livestock feeding and drug administration for the purpose of food safety guarantees for citizens |
| Prevention and public health | P12Z | Coverage of the main control activities for food contamination, with particular reference to the search for illicit substances, contaminant residues, drugs, pesticides and additives in food of animal and plant origin |
| Prevention and public health | P14C | Composite indicator on lifestyles |
| Prevention and public health | P15C | Proportion of people having had first-level screening tests, in an organised programme, for cervix, breast, colorectum cancers |
| Primary Health Care | D01C | Proportion of Major Adverse Cardiac and Cerebrovascular events or deaths (MACCE) within 12 months of an episode of Acute Myocardial Infarction |
| Primary Health Care | D02C | Proportion of Major Adverse Cardiac and Cerebrovascular events or deaths (MACCE) within 12 months of an ischaemic stroke episode |
| Primary Health Care | D04C | Standardised paediatric (< 18 years) hospitalisation rate for asthma and gastroenteritis |
| Primary Health Care | D09Z | Alarm-Target Interval of Rescue Vehicles |
| Primary Health Care | D10Z | Percentage of services, guaranteed on time, of priority class B in relation to total class B services |
| Primary Health Care | D14C | Sentinel drug/tracer consumption per 1,000 inhabitants. Antibiotics |
| Primary Health Care | D22Z | Rate of patients treated in integrated home care by intensity of care |
| Primary Health Care | D27C | Re-hospitalisation rate between 8 and 30 days in psychiatry |
| Primary Health Care | D30Z | Number of deaths due to cancer assisted by the Palliative Care Network out of the number of deaths due to cancer |
| Primary Health Care | D33Z | Number of dependent elderly in residential social care treatment in relation to the resident population, by type of treatment (intensity of care) |
| Hospital care | H02Z | Proportion of operations for malignant breast cancer performed in wards with an activity volume of more than 150 operations per year (10% tolerance) |
| Hospital care | H03C | Proportion of re-operation for resection within 120 days after conservative surgery for malignant breast cancer |
| Hospital care | H04Z | Ratio of admissions attributed to DRGs at high risk of inappropriateness to admissions attributed to DRGs not at risk of inappropriateness in ordinary regimen |
| Hospital care | H05Z | Proportion of laparoscopic cholecystectomies with a post-operative stay of less than 3 days |
| Hospital care | H08Zb | Transfusion activities (self-sufficiency of blood products immunoglobulins, Factor VIII, Factor IX, albumin) |
| Hospital care | H013C | Proportion of patients (age 65+) diagnosed with femoral neck fracture operated within 2 days in ordinary care |
| Hospital care | H017<br>H018C | Percentage of primary caesarean sections (CS) in level I maternity hospitals or those with <1,000 deliveries and % of primary CS in level II maternity hospitals or those with ≥1,000 deliveries |
| Hospital care | H23C | Mortality at 30 days after first admission for ischaemic stroke |

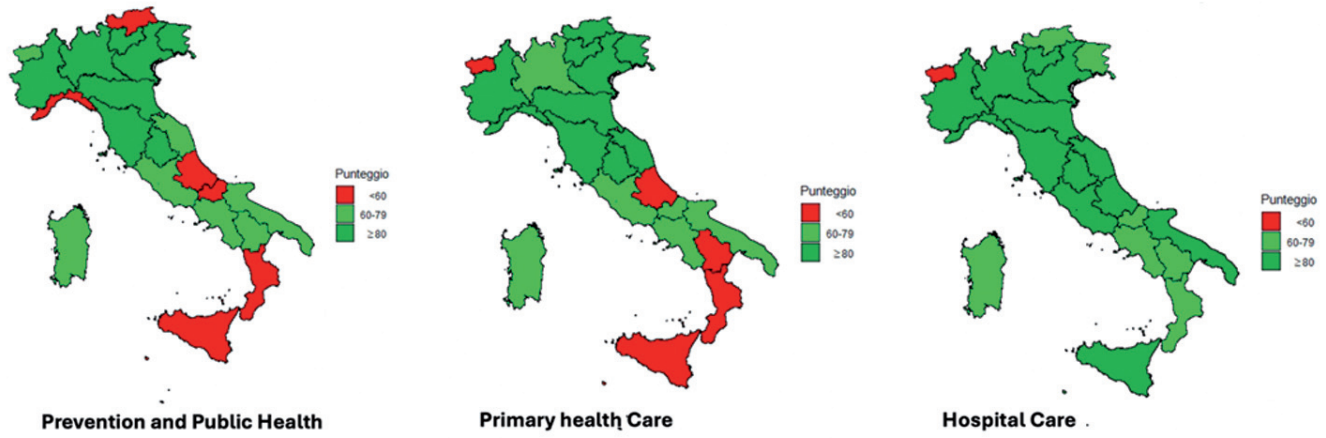


Figure 1 - "Regional LEA Delivery Scores by Health Service Area (Prevention, Primary Care, Hospital Care) – Italy, 2023

were made to various core indicators, including the elimination (two), merging (two), and addition (five) of various metrics, further complicating comparability.

*Prevention and Public Health (6 core indicators in 2023)*

• The NGS assessed only mandatory vaccinations, which measured civic compliance rather than the effectiveness of outreach programs (10-14). It is recommended that the system include also indicators for strategically important recommended vaccines (e.g., HPV for adolescents and influenza for healthcare workers);

• The composite lifestyle indicator lacked clear documentation and epidemiological validation (15,16);

• Animal activities registry, while part of LEA, are not a priority for evaluating human healthcare performance;

• There were no indicators for workplace safety and prevention;

• The combined mass screening adherence indicator did not differentiate between call coverage and actual participation and did not consider opportunistic screening that took place outside of an organized screening program (17,18).

*Primary Healthcare (10 core indicators in 2023)*

• Indicators assessed service provision but did not consider regional disparities in healthcare workforce availability;

• Certain hospitalization rates were standardized based on outdated population data (2001 ISTAT census), which did not reflect current demographics or disease prevalence;

• The indicator for non-self-sufficient elderly individuals lacked quality and appropriateness criteria;

• The outpatient specialty care sector was not covered, despite post-pandemic issues such as longer waiting lists and the identification of the post-COVID syndrome;

• No indicators evaluated the implementation of healthcare reforms (e.g., Ministerial Decree 77/2022) or the role of community pharmacies (19-21);

• Pharmaceutical prescriptions, a key measure of healthcare appropriateness, were not included;

• There was no assessment of patient experiences related to healthcare access and waiting times (22,23).

*Hospital Care (8 core indicators in 2023)*

• The overall picture of the hospital area scores (Figure 1) showed uniformity and positive values that did not correspond to the reality of Italian hospital structures that showed notable heterogeneities and different critical areas as highlighted by other reliable indicators and reports (6,8,21);

• Despite accounting for approximately 50% of healthcare spending, hospital care was assessed using only 8 indicators, 2 of which focused on breast cancer surgery (24,25);

• Major disease networks (e.g., cardiovascular and respiratory diseases) were underrepresented.

• The Caesarean Section rate indicator did not account for maternal preferences (permitted by law), making it an inadequate measure of healthcare quality;

• The NGS did not evaluate hospital equipment modernization, despite its importance in care accessibility (26-29);

• Healthcare-associated infections and antimicrobial resistance, major public health concerns, were not addressed (30-32).

## Discussion

A reliable healthcare indicator should be valid, sensitive to change, and comparable across regions and time (33,34). Indicators that fail to reflect reality risk being dismissed politically, as seen with recent criticisms from the Italian Governors of Lombardy and Campania regarding the 2023 NGS results. Although the MoH emphasizes that NGS scores were not meant to determine rankings, they could influence resource allocation. The case of Lombardy documented NGS's limitations. In 2023, Lombardy ranked only 7th nationwide, contradicting other positive performance indicators such as PNE hospital rankings (35), HPV vaccination coverage (36) and international hospital quality assessments (e.g., Newsweek's Top 250 Hospitals ranking).

## Conclusions

The current NGS - the most significant among the I-NHS tools - was developed in a markedly different era: prior to the COVID-19 pandemic, before the healthcare workforce crisis reached critical levels, and ahead of major systemic reforms. To remain relevant and impactful, the NGS must be updated to reflect today's healthcare landscape. Key priorities include:

• Revising core indicators to align with current healthcare challenges and ensuring consistency over time to enable meaningful longitudinal comparisons;

• Standardizing calculation methods using up-to-date demographic and workforce data (37);

• Expanding the framework to include indicators on community pharmacies, digital health services, telemedicine, and electronic health records (38,39);

• Integrating indicators that address antimicrobial resistance and promote antibiotic stewardship;

• Strengthening transparency in methodology and promoting expert-driven governance of the system.

With these enhancements, the NGS has the potential to evolve into a more robust, transparent, and responsive tool for monitoring and guiding the I-NHS in an increasingly complex and dynamic environment.

**Conflicts of interest:** None declared.
**Acknowledgments:** This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

### Riassunto

***Il Nuovo Sistema di Garanzia per il monitoraggio dell'erogazione dei servizi sanitari in Italia: considerazioni tecniche e raccomandazioni***

**Introduzione.** Negli ultimi 15 anni, il Servizio Sanitario Nazionale italiano è stato oggetto di una crescente attenzione da parte del governo per la necessità di controllare la spesa pubblica, ridurre gli sprechi e mantenere livelli accettabili di qualità, accessibilità e appropriatezza dei servizi sanitari.

**Metodi.** Uno dei meccanismi chiave per raggiungere questo obiettivo è stata l'implementazione di sistemi di valutazione delle prestazioni. Tra questi c'è il Nuovo Sistema di Garanzia, introdotto nel 2019, che utilizza 88 indicatori in tre macro-aree chiave (prevenzione e sanità pubblica, assistenza distrettuale e assistenza ospedaliera) per valutare la qualità e l'equità dei servizi sanitari essenziali.

**Risultati**. Il paper analizza criticamente il rapporto Nuovo Sistema di Garanzia del 2025, identificando punti di forza, limiti e potenziali miglioramenti per un sistema più efficace. I risultati rivelano lacune significative nell'attuale sistema di valutazione delle prestazioni. L'affidamento alle statistiche descrittive limita la capacità di interpretare accuratamente i risultati sanitari. L'assenza di indicatori che affrontino malattie croniche, disuguaglianze sanitarie, impiego di nuove tecnologie ed esperienze qualitative dei pazienti suggerisce la necessità di un approccio di valutazione più completo.

**Conclusioni**. Per migliorare il sistema di valutazione delle prestazioni sanitarie, si raccomanda di incorporare indicatori più rappresentativi che affrontino le lacune identificate. Una migliore integrazione dei dati, valutazioni qualitative e una maggiore attenzione alle malattie croniche e alle disparità sanitarie sono essenziali per fornire una valutazione più accurata dei servizi sanitari.

### References

1. Giulio de Belvis A, Meregaglia M, Morsella A, Adduci A, Perilli A, Cascini F, et al. Italy: Health System Review. Health Syst Transit. 2022 Dec;**24**(4):1-236. PMID: 36951263.
2. Signorelli C, Odone A, Oradini-Alacreu A, Pelissero G. Universal Health Coverage in Italy: lights and shades of the Italian National Health Service which celebrated its 40th anniversary. Health Policy. 2020 Jan;**124**(1):69-74. doi: 10.1016/j.healthpol.2019.11.002. Epub 2019 Nov 12. PMID: 31812325.
3. Cartabellotta A. Standard ospedalieri: uno strumento per garantire uniformità ed equità dell'assistenza. Evidence

2015;**7**(12): e1000125 doi: 10.4470/E1000125.
4. Decreto Ministeriale 12 marzo 2019. Nuovo sistema di garanzia per il monitoraggio dell'assistenza sanitaria. (19A03764). (G.U. Serie Generale , n. 138 del 14 giugno 2019).
5. Ministero della Salute. Il Nuovo Sistema di Garanzia (NSG). Available from https://www.salute.gov.it/new/it/tema/livelli-essenziali-di-assistenza/il-sistema-di-monitoraggio/ [Last accessed: 2025 Mar 5].
6. AGENAS - Agenzia Nazionale per i servizi Sanitari Regionali. PNE - Programma Nazionale Esiti (2024). Available online: http://pne.agenas.it. [Last accessed: 2025 Mar 21].
7. Amato L, Colais P, Davoli M, Ferroni E, Fusco D, Minozzi S, et al. Volumi di attività ed esiti delle cure: prove scientifiche dalla letteratura e dalle valutazioni empiriche in Italia [Volume and health outcomes: evidence from systematic reviews and from evaluation of Italian hospital data]. Epidemiol Prev. 2013 Mar-Jun;**37**(2-3 Suppl 2):1-100. Italian. PMID: 23851286.
8. Colais P, Pinnarelli L, Mataloni F, Giordani B, Duranti G, D'Errigo P, et al; PNE Group. The National Outcomes Evaluation Programme in Italy: The Impact of Publication of Health Indicators. Int J Environ Res Public Health. 2022 Sep 16;**19**(18):11685. doi: 10.3390/ijerph191811685. PMID: 36141957.
9. Basiglini A, Moirano F, Perucci CA. Valutazioni comparative di esito in Italia: ipotesi di utilizzazione e di impatto. Mecosan 2011; **20**:9-35.
10. Pennisi F, Genovese C, Gianfredi V. Lessons from the COVID-19 Pandemic: Promoting Vaccination and Public Health Resilience, a Narrative Review. Vaccines (Basel). 2024 Aug 7;**12**(8):891. doi: 10.3390/vaccines12080891. PMID: 39204017.
11. Lanza TE, Paladini A, Marziali E, Gianfredi V, Blandi L, Signorelli C, et al. Training needs assessment of European frontline health care workers on vaccinology and vaccine acceptance: a systematic review. Eur J Public Health. 2023 Aug 1;**33**(4):591-595. doi: 10.1093/eurpub/ckad101. PMID: 37348861.
12. Ascione F, Cascone D, Napolitano F, Di Giuseppe G. Evaluation of the use of health care services for non-communicable disease and prevention by children and adolescents in south Italy. BMC Health Serv Res. 2017 Aug 4;**17**(1):532. doi: 10.1186/s12913-017-2489-4. PMID: 28778162.
13. Perrone PM, Biganzoli G, Lecce M, Campagnoli EM, Castrofino A, Cinnirella A, et al. Influenza Vaccination Campaign during the COVID-19 Pandemic: The Experience of a Research and Teaching Hospital in Milan. Int J Environ Res Public Health. 2021 May 30;**18**(11):5874. doi: 10.3390/ijerph18115874. PMID: 34070763; PMCID: PMC8198860.
14. Perrone PM, Villa S, Raciti GM, Clementoni L, Vegro V, Scovenna F, et al. Influenza and Covid-19 Vaccination in 2023: a descriptive analysis in two Italian Research and Teaching Hospitals. Is the On-Site strategy effective? Ann Ig. 2024 Jul-Aug;**36**(4):421-431. doi: 10.7416/ai.2024.2606. Epub 2024 Mar 21. PMID: 38525974.
15. Gianfredi V, Ferrara P, Pennisi F, Casu G, Amerio A, Odone A, et al. Association between Daily Pattern of Physical Activity and Depression: A Systematic Review. Int J Environ Res Public Health. 2022 May 26;**19**(11):6505. doi: 10.3390/ijerph19116505. PMID: 35682090.
16. Osservatorio Nazionale Screening. I dati dello screening 2023. Available from: https://www.osservatorionazionalescreening.it/content/i-dati-dello-screening [Last accessed: 2025 Mar 21].
17. Ricciardi GE, Cuciniello R, De Ponti E, Lunetti C, Pennisi F, Signorelli C, et al. Disability and Participation in Colorectal Cancer Screening: A Systematic Review and Meta-Analysis. Curr Oncol. 2024 Nov 10;**31**(11):7023-7039. doi: 10.3390/curroncol31110517. PMID: 39590148.
18. Crosby A, Jennings JK, Mills AT, Silcock J, Bourne RS. Economic evaluations of adult critical care pharmacy services: a scoping review. Int J Pharm Pract. 2023 Dec 19;31(6):574-584. doi: 10.1093/ijpp/riad049. PMID: 37607337.
19. Pennisi F, Mastrangelo M, De Ponti E, Cuciniello R, Mandelli A, Vaia F, et al. The role of pharmacies in the implementation of vaccination coverage in Italy. Insights from the preliminary data of the Lombardy Region. Ann Ig. 2024 May-Jun;**36**(3):363-369. doi: 10.7416/ai.2024.2611. Epub 2024 Feb 22. PMID: 38386026.
20. Endalamaw A, Khatri RB, Erku D, Nigatu F, Zewdie A, Wolka E, et al. Successes and challenges towards improving quality of primary health care services: a scoping review. BMC Health Serv Res. 2023 Aug 23;**23**(1):893. doi: 10.1186/s12913-023-09917-3. PMID: 37612652.
21. Signorelli C, Pennisi F, D'Amelio AC, Conversano M, Cinquetti S, Blandi L, et al. Vaccinating in Different Settings: Best Practices from Italian Regions. Vaccines (Basel). 2024 Dec 28;**13**(1):16. doi: 10.3390/vaccines13010016. PMID: 39852795.
22. Mauro M, Giancotti M. The 2022 primary care reform in Italy: Improving continuity and reducing regional disparities? Health Policy. 2023 Sep;**135**:104862. doi: 10.1016/j.healthpol.2023.104862. Epub 2023 Jun 26. PMID: 37399680.
23. Signorelli C, Pennisi F, Lunetti C, Blandi L, Pellissero G, Fondazione Sanità Futura WG. Quality of hospital care and clinical outcomes: a comparison between the Lombardy Region and the Italian national data. Ann Ig. 2024 Mar-Apr;**36**(2):234-249. doi: 10.7416/ai.2024.2597. Epub 2024 Jan 23. PMID: 38265640.
24. Pennisi F, Ricciardi GE, von Wagner C, Smith L, Kaushal A, Lyratzopoulos G, et al. Impact of Self-Reported Long-Term Mental Health Morbidity on Help-Seeking and Diagnostic Testing for Bowel-Related Cancer Symptoms: A Vignette Study. Cancer Med. 2024 Dec;**13**(23):e70426. doi: 10.1002/cam4.70426. PMID: 39641393.
25. Pennisi F, Odelli S, Borlini S, Morani F, Signorelli C, Renzi C. Impact of the Covid pandemic on timely cancer diagnosis across European healthcare settings: a scoping review. Ann Ig. 2024 Mar-Apr;**36**(2):194-214. doi:10.7416/ai.2024.2596. Epub 2024 Jan 18. PMID: 38240184.

26. Ricciardi W, Pita Barros P, Bourek A, Brouwer W, Kelsey T, Lehtonen L. Expert Panel on Effective Ways of Investing in Health (EXPH). How to govern the digital transformation of health services. Eur J Public Health. 2019 Oct 1;**29**(S3):7-12. doi: 10.1093/eurpub/ckz165. PMID: 31738442.
27. Pennisi F, Pinto A, Ricciardi GE, Signorelli C, Gianfredi V. Artificial intelligence in antimicrobial stewardship: a systematic review and meta-analysis of predictive performance and diagnostic accuracy. Eur J Clin Microbiol Infect Dis. 2025 Mar;**44**(3):463-513. doi: 10.1007/s10096-024-05027-y. Epub 2025 Jan 6. PMID: 39757287.
28. Pennisi F, Pinto A, Ricciardi GE, Signorelli C, Gianfredi V. The Role of Artificial Intelligence and Machine Learning Models in Antimicrobial Stewardship in Public Health: A Narrative Review. Antibiotics (Basel). 2025 Jan **30**;14(2):134. doi: 10.3390/antibiotics14020134. PMID: 40001378.
29. Blandi L, Amorosi A, Leoni O, Clemens T, Brand H, Odone A. The potential of digital health records for public health research, policy, and practice: the case of the Lombardy Region Data Warehouse. Acta Biomed. 2023 Aug 30;**94**(S3):e2023121. doi: 10.23750/abm.v94iS3.14407. PMID: 37695185.
30. European Centre for Disease Prevention and Control (ECDC). Point prevalence survey of healthcareassociated infections and antimicrobial use in European acute care hospitals. Stockholm: ECDC; 2024.
31. Umscheid CA, Mitchell MD, Doshi JA, Agarwal R, Williams K, Brennan PJ. Estimating the proportion of healthcare-associated infections that are reasonably preventable and the related mortality and costs. Infect Control Hosp Epidemiol. 2011 Feb;**32**(2):101-14. doi: 10.1086/657912. PMID: 21460463.
32. Haque M, McKimm J, Sartelli M, Dhingra S, Labricciosa FM, Islam S, et al. Strategies to Prevent Healthcare-Associated Infections: A Narrative Overview. Risk Manag Healthc Policy. 2020 Sep 28;**13**:1765-1780. doi: 10.2147/RMHP.S269315. PMID: 33061710.
33. Sarti S, Vitalini A. The health of Italians before and after the economic crisis of 2008. Health Soc Care Community. 2021 Mar;**29**(2):535-546. doi: 10.1111/hsc.13116. Epub 2020 Aug 5. PMID: 32761744.
34. Buja A, Canavese D, Furlan P, Lago L, Saia M, Baldo V. Are hospital process quality indicators influenced by socio-demographic health determinants. Eur J Public Health. 2015 Oct;**25**(5):759-65. doi: 10.1093/eurpub/cku253. Epub 2015 Feb 9. PMID: 25667156.
35. Signorelli C, De Ponti E, Mastrangelo M, Pennisi F, Cereda D, Corti F, et al. The contribution of the private healthcare sector during the COVID-19 pandemic: the experience of the Lombardy Region in Northern Italy. Ann Ig. 2024 Mar-Apr;**36**(2):250-255. doi: 10.7416/ai.2024.2609. Epub 2024 Feb 1.PMID: 38303641.
36. Ministero della Salute. Vaccinazione contro il papilloma virus (HPV) - Coperture vaccinali. Available from: www.salute.gov.it/portale/documentazione/p6_2_8_1_1.jsp?lingua=italiano&id=39 [Last accessed: 2025 Mar 21].
37. Pennisi F, Minerva M, Dalla Valle Z, Odone A, Signorelli C. Genesis and prospects of the shortage of specialist physicians in Italy and indicators of the 39 schools of hygiene and preventive medicine. Acta Biomed. 2023 Aug 30;**94**(S3):e2023159. doi: 10.23750/abm.v94iS3.14512. PMID: 37695180.
38. Garlasco J, D'Ambrosio A, Vicentini C, Quattrocolo F, Zotti CM. Impact of hospital-related indicators on healthcare-associated infections and appropriateness of antimicrobial use according to a national dataset. Sci Rep. 2024 Dec 28;**14**(1):31259. doi: 10.1038/s41598-024-82663-6. PMID: 39732902.
39. Colais P, Pinnarelli L, Mataloni F, Giordani B, Duranti G, D'Errigo P, et al. The National Outcomes Evaluation Programme in Italy: The Impact of Publication of Health Indicators. Int J Environ Res Public Health. 2022 Sep 16;**19**(18):11685. doi: 10.3390/ijerph191811685. PMID: 36141957.

Corresponding author: Lorenzo Blandi, School of Public Health, Vita-Salute San Raffaele University, Via Olgettina 58, 20132 Milan, Italy
e-mail: blandi.lorenzo@hsr.it