MedCrave
Step into the World of Research

MedCrave Online Journal of Public Health

Research Article

Open Access

CrossMark

Healthcare related infection: methods and strategies implemented in Brazilian hospital surveillance from 2018 to 2023

Abstract

Over the last century and a half, there has been a change in the epidemiological profile of causes of mortality in the world, particularly in developed countries. With a decline in infectious and parasitic diseases and an increase in chronic and degenerative diseases. This change in profile, however, has occurred unevenly in other developing countries, such as Brazil. These countries have shown only a slight change in their epidemiological profile. In addition to community-acquired communicable diseases, there is currently a major epidemiological impact of infectious diseases acquired in the hospital environment, known as healthcare associated infections (HAIs). In this scenario, this study seeks to identify epidemiological surveillance strategies for healthcare-related infections in the Brazilian healthcare system between 2018 and 2022. This is an integrative literature review, structured around the following stages: formulation of the research question; search and selection of primary studies; extraction of data from the selected studies; critical evaluation of the studies included in the integrative review; synthesis of the results and presentation of the review. In Brazil, all the studies show that there is a need to improve the operational guidelines and specific activities of the Hospital Infection Control Committees (HICC) in various services. The actions carried out by Hospital Infection Control Programs have varied in the literature, but these have offered suggestions for improvements for health managers in order to reduce the incidence of Healthcare-Related Infections.

Keywords: hospital infection, infection control, epidemiological surveys, epidemiological monitoring

Volume 14 Issue 1 - 2025

Larissa Linhares Santos, Aeriberto Carlos Lindoso de Souza, Ana Carolina Ribeiro de Araujo e Araujo, Ana Luísa Penha Castro Marques, Maria Hilda Araújo Ribeiro, Laura Rosa Carvalho Dias, Everardo de Almeida Nunes, Almir José Guimarães Gouveia, Otto Mauro dos Santos Rosa, Consuelo Penha Castro Marques

Federal University of Maranhão, Medicine Course, Pinheiro, Maranhão, Brazil

Correspondence: Consuelo Penha Castro Marques, Universidade Federal do Maranhão, Brasil, Tel (98) 99100-7752

Received: January 30, 2025 | **Published:** March 12, 2025

Introduction

Health services seek to efficiently and effectively meet the needs of patients, aiming to guarantee safe care and maximum and comprehensive wellbeing in all its dimensions.[1] Therefore, it is necessary to continuously assess the quality of health services in order to guarantee a culture of excellence. In order to promote improvements in the care provided to patient safety. Over the last century and a half, there has been a change in the epidemiological profile of causes of mortality in the world, specifically in developed countries. With a decline in infectious and parasitic diseases and an increase in chronic and degenerative diseases. This change in profile, however, occurred unevenly in other developing countries, such as Brazil. These countries showed only a slight change in their epidemiological profile.[2]

Among the various factors that harm the quality of care and have a negative impact on patient safety, Healthcare-Associated Infections (HAIs) stand out. These infections not only prolong hospital stays, but also increase treatment costs and, in extreme cases, contribute to morbidity and mortality.[3] In this scenario, diagnoses such as pneumonia and bloodstream infections are important causes of hospital morbidity and mortality.[4]

To establish practical measures to control hospital infections (HI), it is extremely important to consider indicators such as the rate of HI, its prevalence, the most frequent types of infections, the pathogens involved and the sensitivity profile of these agents to antimicrobials. These data are extremely relevant in the development of prevention plans.[5] Hospital establishments have benefited from the use of HAI prevention packages, these approaches include continuing education activities with health professionals, use of technology for data recording and action based on the local profile, development of care protocols, among others.[4,6]

The use of surveillance systems for hospital infections, related to healthcare, is increasingly common, constituting an essential prevention and control measure. This literature review aims to show health professionals, an overview of programs and actions, the results that impact the control of HAIs. In Brazil, although there is no public national database where information on nosocomial infections can be obtained, there are several local initiatives that promote the active collection of information that guides combat strategies.[5] Therefore, the objective of this study was to analyze combat measures, the quality of actions and control for the prevention of hospital infections between the years 2018 and 2023.

Methodology

Study design

This is an integrative literature review, structured based on the steps: formulation of the research question; search and selection of primary studies; data extraction from selected studies; critical evaluation of the studies included in the integrative review; synthesis of results and presentation of the review. To prepare the research question, we sought to strengthen practice based on the problem studied. The following guiding question was formulated: "How is the scenario of Hospital Infection Control Programs in terms of actions related to health promotion?"

Database

The searches were carried out in bibliographic databases – MEDLINE, SCIELO and LILACS. Upon completion of searches in each database, duplicate references will be deleted.

Time and language limit

Articles published between 2018 and 2023, written in Portuguese, English, Spanish or French, were selected.

Inclusion and exclusion criteria in analysis strategy

To operationalize the search, the following strategy was used: ("Hospital infection" OR "Infection control") AND ("Epidemiological surveillance" OR "Epidemiological monitoring"). This strategy was adapted for each base considering its specification. The strategy with the variation of terms for the English language was used.

All original articles indexed in the period between January 1, 2018 and November 31, 2023, with an experimental design (clinical trials, randomized or not) or observational (case-control studies and cohort studies), carried out in humans were included, in which the epidemiological surveillance processes implemented to combat infections associated with healthcare were evaluated or described. Documents such as letters, editorials, experience reports, reports, publications already selected in the search in another database and which did not answer the research question were excluded.[7]

After retrieving the references those titles that were of interest to the study were selected for reading in full. The selection of articles was carried out using an evaluation form for eligibility and inclusion of articles, prepared by the Ministry of Health and adapted for this review. Therefore, the criteria used were: (1) identification of the article (author's surname, name of the newspaper, year of publication, volume and number of pages; (2) eligibility criteria, adapted (does the article evaluate the quality requirements applied to the Hospital Infection Control Program?; do the results and conclusions answer the problem question?) and (3) confirmation of eligibility (considering the study design, the intervention and the population involved, the study.

Finally, the articles that were part of the study were selected. The references captured were included in a unique library in the Mendeley program, from which a table was created covering the main items of the methods and results of each selected article (author, year, country of origin of the study, design, outcomes studied and pertinent observations).

Ethical aspects

The study was carried out in accordance with Resolution of the National Health Council (CNS) No. 466, of December 12, 2012, which deals with research with human beings. The databases consulted did not include confidential information, such as name and address, so approval of the study project by a research ethics committee was waived, as it was only a search in scientific literature databases, not requires approval/submission to the Research Ethics Committee.

Results

According to the bibliographic search, the final sample was 13 articles published in the evaluated databases. All articles had the country of publication origin: Brazil. Regarding the field of knowledge, all journals (100%) were in the health area.

As for the years of publication, the period with the most publications was in 2020 (25%). In 2019, 2021, 2022 and 2023 they obtained a percentage of 16.5%. And in 2018 the percentage of articles was 8%. There are no motivations for these results found. According to the objectives, both general and specific, dividing into analysis categories, such as: (1) elements for evaluating prevention measures; (2) control of evaluation processes to combat hospital infections; the articles were selected based on the response and evaluation of these factors.

The results of studies carried out in Brazil demonstrated good performance when prevention measures are adopted and explained to healthcare teams. It was seen that when non-prevention errors are transmitted clearly and through training, in subsequent evaluations the teams demonstrate improvement in the control of HAIs. It was evident from the results that periodic assessments of public or private hospitals are extremely important for the control and prevention of hospital infections. Table 1 exemplifies the results in the bibliographic search.

Table 1 Description of studies included in the integrative literature review

Authors and Year	Article	Country of origin	Data base	Study design	Language	Main highlights
				2018-2021		
Giroti et al.[14]	Hospital Infection Control Programs: evaluation of structure and process indicators.	Brazil	PubMed	Descriptive, cross-sectional study, carried out with hospital committees registered in the National Registry of Health Establishments	English; Portuguese	Built and validated indicators, which address the evaluation indicator of the technical operational structure of the PCIH, operational guidelines for IH prevention and control, IH epidemiological surveillance system.
Da Silva Gama et al.,[10]	Good infection prevention practices in three Brazilian hospitals: Implications for patient safety policies	Brazil	PubMed	Cross-sectional observational Study in three different types of hospitals in Rio Grande do Norte. A total of 19 structure and process indicators were measured based on 7 Patient Safety Practices.	English; Portuguese	Despite the availability of evidence-based recommendations. General adherence was low, but higher in the private hospital, there is ample room for improvement in adherence to safe practices in the hospitals under study.

Table1 Continued....

Authors and Year	Article	Country of origin	Data base	Study design	Language	Main highlights
				2018-2021		
Draeger et al.,[18]	Unhygienic Practices of Health Professionals in Brazilian Public Hospital Restaurants: An Alert to Promote New Policies and Hygiene Practices in the Hospitals	Brazil	MDPI	To evaluate the unhygienic practices of healthcare professionals and the steps to change behavior in Brazilian public hospital restaurants.	English	It is necessary to develop an awareness program focused on HR clients in order to reduce unhygienic practices.
Costa et al.,[22]	Results of a national system-wide quality improvement initiative for the implementation of evidence-based infection prevention practices in Brazilian hospitals	Brazil	PubMed	Analyze the effect of a national system-wide QI initiative aimed at promoting HAI prevention through regulatory interventions in Brazil.	English; Portuguese	The QI cycle approach was useful in guiding system-wide interventions for patient safety. External regulation was viable and effective in promoting internal HAI prevention across the country.
Oliveira et al.[6]	Impact of educational intervention on cleaning and disinfection of an emergency unit	Brazil	PubMed	Interventional, prospective, longitudinal, analytical and comparative study.	English; Portuguese	Taking advantage of feedback to the team is essential in continuing education, being of great importance and effectiveness for the work and function adequately developed by those responsible for surface C&D.
Santos et al.[17]	Performance of infection prevention and control programs in small hospitals	Brazil	PubMed	Evaluates HAI prevention and control activities in various hospital services or sectors.	English; Portuguese	The activities developed for the prevention and control of HAIs were observed to be aimed at the highest risk units, such as the ICU, the sterilization center and the surgical center.
Mello et al.,[23]	Challenges for adherence to bacterial resistance actions in large hospitals	Brazil	SciELO	Cross-sectional study, carried out in 30 large hospitals in Minas Gerais, from 2018 to 2019. The professionals were interviewed and observed the environment and prevention actions.	English; Portuguese; Spanish	Insufficient knowledge of professionals, which is a failure related to the physical structure and personal protective equipment, are factors that make it difficult to adhere to measures to contain bacterial resistance in hospitals.
				2022 - 2025		
Dias et al.,[15]	Good practices in central venous catheter maintenance in time of covid-19: an observational study	Brazil	SciELO	Observational, cross-sectional, quantitative study, with nonparticipant observation. It occurred in the intensive care unit of a university hospital in the city of Rio de Janeiro.	English; Portuguese; Spanish	Good practices for central venous catheter maintenance were partially present in the nursing team's routine during the COVID-19 pandemic. At critical moments, intensifying team training to better adapt to new work processes is a strategy to sustain the patient safety culture.
Mello et al.,[20]	Partnership among hospitals to reduce healthcare associated infections: a quasi- experimental study in Brazilian ICUs	Brazil	SciELO	Interventions and data were collected monthly for 18 months, including all patients admitted to the ICUs. The methodology was using the "Improvement Model".	English; Portuguese	The success of the collaborative project, using improvement cycles. Studies like this are essential for the effective evaluation of the results of public resource investments made in this type of financing. This partnership between public hospitals/HE can be applied to other ICUs.

Table1 Continued....

				2022 - 2025		
Melo et al.,[16]	Success factors of a collaborative project to reduce healthcare associated infections in intensive care units in Northeastern Brazil	Brazil	PubMed	To describe the implementation and results of the PROADI-SUS collaborative project of the Brazilian Ministry of Health to reduce healthcare associated infections	English; Portuguese	The collaborative approach reduced healthcare-associated infections despite partial adherence to bundles. The hypothesis is that success is related to the project methodology and the motivation of multidisciplinary teams, especially nursing teams.
Arns et al.,[8]	Evaluation of the characteristics of infection prevention and control programs and infection control committees in Brazilian hospitals: A countrywide cross-sectional study	Brazil	PubMed	A cross-sectional study was carried out in the ICU of public and private hospitals distributed across all Brazilian regions.	English; Portuguese	Specific structural characteristics of the hospital, it was developed and adapted from ANVISA guidelines to complete the assessment of patient safety practices, most ICC met the minimum requirements for PCI programs. The main limitation regarding the ICCs was the lack of financial support.
Tabah et al.,[28]	Epidemiology and outcomes of hospital acquired bloodstream infections in intensive care unit patients: the EUROBACT-2 international cohort study	Brazil	PubMed	Conducted a prospective international cohort study of adult patients (≥ 18 years of age) with HA-BSI treated in intensive care units (ICU) between June 2019 and February 2021	English; Portuguese	Preventing antimicrobial resistance and focusing on appropriate antimicrobial therapy and source control are important to optimize patient management and outcomes.
Jing shuai et al.,[21]	Central sterile supply department management on hospital-associated infections: a systematic review and meta-analysis	Brazil	SciELO	Systematic review encompassed studies that compared supply center management protocols with standard care to common and conventional infection control and sterilization methods that have been implemented	English	The basic procedure have to be done by the correct disinfections and sterilization of materials, to follow the biosafety standards and avoid hospital-associated infections (HAIs).

Discussion

In Brazil, the creation of the Unified Health System (SUS) directly impacted the incidence and mortality rates of Communicable Diseases (TD); bearing in mind that in the years preceding this system, surveillance, prevention and control actions for STDs were incipient and had a very limited territorial scope, considering the continental extension of the country.[2]

The quality and safety of health services are supervised by ANVISA. This HAI prevention monitoring is made up of the Hospital Infection Control Commission, present at four levels: hospital (HC), municipal (MC), state (SC) and national (ANVISA). According to Arns et al.,[8] they found through a cause and effect diagram in 1,869 hospitals with at least one adult, pediatric or neonatal ICU bed to map the barriers to HAI prevention, they saw that the main limitation was the lack of financial support.

The hospital is also the place where the highest number of infections due to resistant bacteria occur, mainly in Intensive Care Units (ICU), an environment where there is a greater number of fragile patients and undergoing a greater number of invasive procedures.[9] The ICU is responsible for around 5% to 35% of all HAIs, with around 60% of deaths directly related to its presence.[10]

A fundamental strategy aimed at minimizing HAIs (Hospital-associated infections) and promoting the quality of prevention and control measures for these diseases is the implementation of Hospital Infection Control Programs (PCIH).[11,12] As established in Ordinance N°. 2616, of May 12, 1998, the PCIH allows for a set of planned and systematic actions, aimed at maximum reduction in the incidence and severity of infections acquired during health care.[13]

However, it is known that the implementation of strategies related to the PCIH continues to face strong challenges in terms of its effectiveness, especially in developing countries.[11] The biggest challenges address the lack of government stimulus, insufficient financial resources, divergences in team roles, lack of monitoring of actions and training, behavioral aspects and deficiencies in the implementation of patient safety policies.

In Brazil, in all studies we can observe that it is necessary improve the operational guidelines and specific activities of the Hospital Infection Control Committees (CCIH) among the various services supported.[14] It is essential emphasize that the success of infection prevention and control measures depends on the engagement of all professionals, patients and family members.[6,15,16] Therefore, ensuring quality in the healthcare sector demands commitment, dedication,

and adoption of good practices and constant updating of the multidisciplinary team.

In this context, it is worth highlighting the focus of Brazilian studies on structural and process assessment, especially on the collection of continuing education indicators as a quality criterion for HAI prevention.[17,18] Often, the environment of Brazilian hospitals does not favor the success of programs, nor their administrative organization, and obstacles persist in the implementation of recommendations, in addition to too many weaknesses in the execution of patient safety policies.[19]

The development of care and procedural protocols represents a measure with a great impact on reducing costs and minimizing harm to patients, as it standardizes work processes and reduces waste.[17]

According to Melo et al,[20] collaborative project effectiveness is crucial, especially when employing improvement cycles. Research of this type plays a fundamental role in effectively evaluating the results of investments of public resources in this financing model. In this way, data analysis allows us to understand the difficulties faced by each hospital institution in implementing the Patient Safety Level (NSP), as well as the strategies adopted by health professionals to promote a change in the patient safety culture in those who already have adopted the NSP.

The study by Cavalcante et al.,[19] highlighted the difficulties faced in hospitals in implementing all regulated protocols, but it was possible to implement basic protocols through strategies related to patient identification and hand hygiene. This was guaranteed with the participation of HAI control professionals, through monitoring of care professionals and is essential to reduce harm to patients.

A basic procedure to be followed in health centers is hospital protocols of disinfection and sterilization of materials to be used during procedures, since the elimination of contaminating agents prevents hospital infection of patients, as well as avoids contagion of professionals and visitors. According to studies by Jing Shuai et al.,[21] contamination occurs due to incorrect sterilization processes, inefficient equipment, inadequate storage locations of hospital supplies or by opening packaging in violation of biosafety strategies. Therefore, ensuring adequate disinfection and sterilization, through government investment in the basic infrastructure and ongoing education of staff, are essential to reduces cases of infections in hospital environments.

In the findings of this review, questionnaires, monthly meetings, collaborative activities and feedback responses regarding implemented activities were some of the actions promoted to combat HAIs. The questionnaire used in Arns et al,[8] obtained hospital-specific elements, was developed and adapted from ANVISA guidelines to complete the assessment of patient safety practices. A properly structured program has the potential to reduce infection rates, considering at least some recommendations with the aim of reducing the economic and social burden generated by these events.[22–28]

Final considerations

In this way, it was possible to analyze control measures against hospital infections in relation to quality elements, highlighting the need to improve the structure, public and private financial support in the process to guarantee the safety protocols established by ANVISA. Furthermore, there is a clear need to emphasize infectious indicators to staff, as they have been seen to reflect improvements in patient care. In general, the actions carried out by Hospital Infection Control Programs varied in the literature, but they offered suggestions for improvements for health managers with the aim of reducing the incidence of Healthcare-Associated Infections.

Acknowledgments

None.

Conflicts of interest

The authors declare there is no conflict of interest.

Funding

None.

References

1. National Health Surveillance Agency (BR). *Safe assistance: a theoretical reflection applied to practice*. Brasília, DF: Anvisa; 2017.
2. Teixeira MG, Costa MCN, Carmo EH, et al. Health Surveillance in the SUS - development, effects and perspectives. *Cien Saude Colet*. 2018;23(6):1811–1818.
3. Manoukian S, Stewart S, Dancer S, et al. Estimating excessive length of stay due to healthcare associated infections: a systematic review and meta-analysis of statistical methodology. *J Hosp Infect*. 2018;100(2):222–235.
4. Marra AR. Advances in infection control. *Einstein (São Paulo)*. 2016;14(1):108–109.
5. Nogueira JC. *Information systems on healthcare-related infections (HAIs): outlining the reality of the southeast and south regions of Brazil*. Dissertation (Master's) – School of Nursing, University of São Paulo. São Paulo, 2013.
6. Oliveira BADS, Bernardes LDO, Ferreira AM, et al. Impact of educational intervention on cleaning and disinfection of an emergency unit. *Int J Environ Res Public Health*. 2020;17(9):3313.
7. Brazil. Health surveillance. 20. ed. Brasília: Conass, 2007. Carneiro M. Guidelines for the use of antimicrobials based on the epidemiology of hospital microorganisms: the role of infection controllers. *Journal of Epidemiology and Infection Control*. 2012;2(2):75.
8. Arns B, Oluwafoumi Agani CAJ, Sesin GP, et al. Evaluation of the characteristics of infection prevention and control programs and infection control committees in Brazilian hospitals: A countrywide cross-sectional study. *Antimicrob Steward Healthc Epidemiol*. 2023;3(1):e79.
9. World Health Organization. *Health care without avoidable infections: The critical role of infection prevention and control*. 2016.
10. da Silva Gama ZA, Hernández PJS, de Freitas MR, et al. Good infection prevention practices in three Brazilian hospitals: implications for patient safety policies. *J Infect Public Health*. 2019;12(5):619–624.
11. Padoveze MC, Fortaleza CMCB, Kiffer C, et al. Structure for preventing healthcare-related infections in Brazilian hospitals: a national study. *Am J Infect Control*. 2016;44(1):74–79.
12. Menegueti MG, Canini SRMS, Bellissimo-Rodrigues F, et al. Evaluation of nosocomial infection control programs in health services. *Rev Lat Am Enfermagem*. 2015;23(1):98–105.
13. Ministry of Health (BR). Ordinance No. 2616, of May 12, 1998. *Issues, in the form of annexes I, II, III, IV and V, guidelines and standards for the prevention and control of hospital infections*. Brasília, DF; 1998.
14. Giroti ALB, Ferreira AM, Rigotti MA, et al. Hospital infection control programs: assessment of process and structure indicators. *Rev Esc Enferm USP*. 2018:52:e03364.

15. Dias TO, Assad LG, de Paula VG, et al. Good practices in central venous catheter maintenance during covid-19: an observational study. *Rev Bras Enferm*. 2022;75(6):e20210397.

16. de Melo LSW, Estevão TM, Chaves JSC, et al. Success factors of a collaborative project to reduce healthcare-associated infections in intensive care units in Northeastern Brazil. *Rev Bras Ter Intensiva*. 2022;34(3):327–334.

17. Santos PLC, Padoveze MC, Lacerda RA. Performance of infection prevention and control programs in small hospitals. *Rev Esc Enferm USP*. 2020:54:e03617.

18. Draeger CL, de Almeida Akutsu RCC, de Oliveira KES, et al. Unhygienic practices of health professionals in Brazilian public hospital restaurants: an alert to promote new policies and hygiene practices in the hospitals. *Int J Environ Res Public Health*. 2019;16(7):1224.

19. Cavalcante EFO, Pereira IRBO, Figueiredo Leite MJV, et al. Implementation of patient safety centers and healthcare-related infections. *Rev Gaúcha Enferm*. 2019;40(spe):e20180306.

20. de Mello LSW, de Abreu MVM, de Oliveira Santos BR, et al. Partnership between hospitals to reduce healthcare-associated infections: a quasi-experimental study in Brazilian ICUs. *BMC Infect Dis*. 2021;21(1):212.

21. Jing S, Liu M, Hou J, et al. Central sterile supply department management on hospital-associated infections: a systematic review and meta-analysis. *Rev Inst Med Trop S Paulo*. 2025;67:e16.

22. Costa MMM, Santana HT, Saturno Hernandez PJ, et al. Results of a national system-wide quality improvement initiative for the implementation of evidence-based infection prevention practices in Brazilian hospitals. *J Hosp Infect*. 2020;105(1):24–34.

23. de Mello MS, Oliveira AC. Challenges for adherence to bacterial resistance actions in large hospitals. *Rev Bras Enferm*. 2021;74(3):e20200510.

24. de Oliveira HM, Silva CPR, Lacerda RA. Policies for the control and prevention of healthcare-related infections in Brazil: a conceptual analysis. *Rev Esc Enferm USP*. 2016;50(3):505–511.

25. Silva LS, Leite CA, da Silva Azevedo DS, et al. Profile of infections related to healthcare in an intensive care center in Minas Gerais. *Journal of Epidemiology and Infection Control*. 2009;9(4).

26. Official gazette of the union. Resolution-Anvisa/DC No. 48, of June 2, 2000.

27. SVS - Health Surveillance Service. *Report from the Hospital Epidemiology Centers/NHE– Paraná*. 2008.

28. Tabah A, Buetti N, Staiquly Q, et al. Epidemiology and outcomes of hospital-acquired bloodstream infections in intensive care unit patients: the EUROBACT-2 international cohort study. *Intensive Care Med*. 2023;49(2):178–190.