REVIEW
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Safe Hospital: contributions to the Resolution nº 50, February 21, 2002 of the Collegiate Board of Directors, Brazilian Health Surveillance Agency

Hospital Seguro: contribuições à Resolução da Diretoria Colegiada nº 50, de 21 de fevereiro de 2002, da Agência Nacional de Vigilância Sanitária

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ABSTRACT

Introduction: Health Care Facilities (EAS) provide the population with comprehensive, curative and preventative medical care. They are vital for disaster recovery. A study carried out by the Pan American Health Organization (PAHO) has shown that damaged EAS causes significant damage to the infrastructure and service delivery of the public health system, disrupting health care to the population. The WHO/PAHO Safe Hospital Initiative aims to build more secure EAS, and to recover the existing infrastructure, keeping its services running at full capacity, and the same infrastructure, immediately after a disaster strikes. **Objective:** To evaluate RDC nº 50/02 and Resolutions that update it, considering the Safe Hospital initiative. **Method:** Documental research on the resolutions of the National Agency of Sanitary Surveillance (Anvisa) and the initiatives of Safe Hospital. **Results:** In the "Health Legis" database of the Ministry of Health, four resolutions were found. In the WHOLIS database (WHO/PAHO), 45 publications were found. **Conclusions:** None official documents were found in the WHOLIS and Health Legis databases that discussed the Safe Hospital initiative. The framework of the Brazilian sanitary regulation developed by Anvisa (Brazilian Health Surveillance Agency) does not yet consider aspects related to this Initiative. It is important to create a safety culture, sensitizing and qualifying managers, aiming to establish specific risk management programs for each EAS.

KEYWORDS: Safe Hospital; Disaster; Technical Regulation; Resolution; Hospitals

RESUMO

Introdução: Os Estabelecimentos Assistenciais de Saúde (EAS) proporcionam à população assistência médica integral, curativa e preventiva. São vitais para a recuperação após desastre. Estudo realizado pela Organização Pan-Americana da Saúde (OPAS), demonstrou que EAS danificados provocam danos significativos na infraestrutura e prestação de serviços do sistema de saúde pública, desarticulando o atendimento à população. A iniciativa Hospital Seguro da OMS/OPAS objetiva construir EAS mais seguros e recuperar a infraestrutura dos existentes, mantendo seus serviços funcionando na capacidade máxima e mesma infraestrutura, imediatamente após a ocorrência de um desastre. **Objetivo:** Avaliar a RDC nº 50/02 e as Resoluções que a atualizam, considerando a iniciativa Hospital Seguro. **Método:** Foi realizada pesquisa documental sobre as resoluções da Agência Nacional de Vigilância Sanitária (Anvisa) e as iniciativas de Hospital Seguro. **Resultados:** Na base de dados SAÚDE LEGIS, do Ministério da Saúde, foram encontradas quatro Resoluções. Na base WHOLIS (OMS/OPAS), foram encontradas 45 publicações. **Conclusões:** Não foi encontrado nas bases WHOLIS e SAÚDE LEGIS documento oficial que discutisse a iniciativa Hospital Seguro. O arcabouço da regulação sanitária brasileira desenvolvida pela Anvisa não considera, ainda, aspectos relativos a esta Iniciativa. É importante criar cultura de segurança, sensibilizando e qualificando gestores, objetivando estabelecer programas de gerenciamento de riscos específicos para cada EAS.

PALAVRAS-CHAVE: Hospital Seguro; Desastres; Regulamento Técnico; Hospitais

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INTRODUCTION

Health Care Facilities (HCFs), especially hospitals, play the basic role of providing the population with comprehensive, curative and preventative medical care. These structures are also critical for the response to emergencies and subsequent recovery from any type of disaster. It is essential that these buildings maintain their operations during and after disasters in order to care for and preserve the safety and health of the population. The destruction or interruption of a hospital's operations due to damage to its infrastructure causes not only loss of investment but also an impact on the well-being and social and economic development of the population and of the country; in addition to possibly overloading other health care facilities, due to the migration of people in search of assistance.

A study by the Pan American Health Organization (PAHO) published in 2004[1] on the vulnerability of HCFs in Latin America and the Caribbean showed that 93 hospitals and 538 health centers were significantly damaged by natural disasters from 1981 to 1996. Some have collapsed or have had significant damage to their structures, which places the health unit in vulnerable conditions and requires its shutdown, thereby causing significant damage to the public health system and the provision of services, disrupting health care actions for the population.

According to a 2010 estimate, 73% of the inhabitants and 67% of the basic health units and hospitals in 19 Latin American and Caribbean countries were located in areas at high risk of disasters. Many were unable to operate after the occurrence of this type of event, preventing more than 60 million people from receiving medical attention. It should be noted that many of these countries do not have disaster mitigation programs, emergency plans or adequate infrastructure for any natural phenomena[2,3].

Table 1 shows the consequences of the major disasters to the HCFs in Latin America and the Caribbean, from 2000 to 2010.

In 2014, a PAHO/WHO publication[11], in partnership with the Brazilian Ministry of Health, called "Natural Disasters and Health in Brazil," offered a synthesis of natural disasters in Brazil from 1991 to 2012, reporting the occurrence of 31,909 disasters, which affected more than 96 million people and displaced more than 6 million. Although restricted to the immediate post-disaster period (first few days) and not accounting for the medium- and long-term impact on mortality and morbidity, almost 3,500 deaths and almost 490,000 sick or injured people were recorded.

In Brazil, in 2008, in the Itajaí Valley, state of Santa Catarina, 177 HCFs were affected by floods. In 2010, the states of Alagoas and Pernambuco had 122 HCFs affected[12,13,14].

One of the most important natural disasters in Brazil was caused by landslides due to the large volume of rainfall in seven municipalities in the highlands of the state of Rio de Janeiro, in January 2011[16]. There were approximately 900 people dead and 300,000 people affected. World Bank estimates pointed to total costs of losses and damages at about BRL 4.78 billion. Among these costs, approximately BRL 3.15 billion correspond to the public sector and BRL 1.62 billion correspond to the private

Table 1. Consequences of disasters on health care facilities, from 2000 to 2010.

Year	Disaster	Location	Consequences
2001	Earthquake of 6.9 on the Richter scale	Peru	87 hospitals and health services damaged or destroyed
2001	Earthquake of 7.6 on the Richter scale	El Salvador	Loss of 39.1% of hospital beds in the country, 5 hospitals damaged or destroyed
2002	Torrential rain and hail storm	Bolivia	1 hospital damaged
2003	Flood	Argentina	2 hospitals and 63 health services severely damaged, loss of 13% of available beds
2004	Category 3 Hurricane Ivan	Grenada	87 hospitals and health services damaged or destroyed
	Category 3 Hurricane Frances	The Bahamas	5 hospitals and health services damaged or destroyed
	Category 1 Hurricane Jeanne	The Bahamas	5 hospitals and health services damaged or destroyed
		Haiti	1 flooded hospital
2005	Flood	Guiana	18 hospitals and health services damaged or destroyed
2006	Flood	Suriname	4 hospitals and health services damaged or destroyed
2007	Earthquake of 8.0 on the Richter scale	Peru (Pisco)	97.0% of hospital beds lost, 595 dead, 1,295 evacuated patients
2009	Floods and landslides	Peru	30 dead, 139,000 people affected and 1 health center damaged
2010	Hurricane Ida (storm)	El Salvador	192 dead, 75,000 people evacuated, 25 affected health services
		Guatemala	158 killed, 144,355 people evacuated, 193,111 affected and 22 affected health services
	Earthquake of 6.9 on the Richter scale	Chile	421 dead, 61,117 homeless, 758,044 affected, 40 hospitals damaged (17 definitively)
	Earthquake of 7.0 on the Richter scale	Haiti	220,000 dead, 300,000 injured, 30 hospitals damaged
2012	Hurricane Tomas	Saint Lucia	20,000 people affected, 1 hospital destroyed

sector[8]. In addition to disruption of basic municipal services, causing shortage of medical supplies and increased risk of disease transmission, this disaster affected 43 HCFs[15].

This scenario demonstrates the importance of establishing mechanisms that seek to reduce the vulnerability of hospitals to natural disasters. Thus, in 2004, this concern motivated WHO member countries' approval of a resolution called "Hospitals Safe from Disasters", as a measure to mitigate the risk of disasters in health care facilities[16].

The following year, 2005, in Kobe, Japan, during the 2nd World Conference on Disaster Risk Reduction, WHO and PAHO requested that their Member States adopt as a priority the Safe Hospitals initiative as a global indicator for disaster reduction[17]. Their goal for 2015 was for all new HCFs to be built with the levels of security, reinforcement and recovery of existing HCFs, to keep health facilities and their services accessible and functioning at maximum capacity, and in the same infrastructure, immediately after the occurrence of a natural disaster[16].

The use of the term "Safe Hospital" by WHO/PAHO refers to all HCFs, regardless of their level of complexity. These facilities are essential and intended to provide health care to the population. They should have the maximum possible protection against events of natural origin. Access routes to these facilities and critical utilities (supply of drinking water, electric power, medical gases, telecommunications and others) should continue to work in order to ensure continued operation, as well as to absorb the additional demand for health care, if necessary[17].

In addition to this Initiative, in 2008, WHO published the "Hospital Safety Index" (HSI). It is a guideline for managers to keep HCFs operational during and after an adverse emergency event[18].

The HSI presents a checklist with indicators grouped as follows: a) components related to geographic location; (b) structural and non-structural safety components; c) functional components and the organizational network between the different sectors of the HCF. After reviewing the form and the assessment guide, the results are entered into a mathematical model, which results in an index, the HSI. This result is classified into categories, which indicate the level of safety and the likelihood of the health facility to keep running when faced with an adverse event[18].

In Brazil, in order for a health care facility to be built, it must comply with the federal sanitary technical regulation for HCF construction. This regulation is the responsibility of the National Health Surveillance Agency (Anvisa).

Anvisa is an autonomous government agency of special regime, linked to the Brazilian Ministry of Health. It was created by Law n. 9.782 of January 26, 1999, and its mission is to oversee, protect and promote the health of the population, guaranteeing the sanitary safety of goods and products, as well as the provision of services related directly or indirectly to health[19]. This regulation includes setting standards, proposing, monitoring and executing health surveillance policies, guidelines and actions that cover the products and services subject to health surveillance, including environments, processes, supplies and related technologies.

Carmo[20] highlighted the broad concept of health surveillance established in national legislation, that is, a set of actions aimed at preventing health risks arising from the production and consumption of goods and services, as regards interventions on health problems in order to improve the quality of life of the population. In this way, health surveillance actions are complex and pose a challenge to the society, since they need the articulation of competences and abilities from several fields of knowledge. In the development of these actions, health surveillance bodies can use different instruments. One of the main instruments is sanitary requirements that establish parameters and standards to be complied with.

In 1994, the Ministry of Health published Ordinance n. 1.884, of November 11, approving the Standards for Physical Projects of Health Care Facilities[21], destined to the examination and approval of the physical projects of HCFs. On February 21, 2002, considering the need for updates, Anvisa replaced the existing regulations and approved the Resolution of the Collegiate Board of Directors (RDC) n. 50/2002[22]. This ruling was considered an important milestone in the regulation of health buildings. Its priorities are the planning, programming, elaboration, evaluation and approval of physical projects of HCFs.

RDC n. 50/2002[22] provides further information on the minimum requirements for physical projects of hospital units, describing the criteria related to the areas of internal and external circulation; environmental and comfort conditions; buildings; medical equipment and equipment used in HCF infrastructure[22]. These procedures guide managers and certify the decisions to be made at the various stages of the project. It is the regulatory instrument of state and municipal departments for the creation and evaluation of physical projects of HCFs that are adequate to the new technologies in the health area. However, the occurrence of natural disasters involving health units has demonstrated that the scope of these Technical Regulations does not contain the elements related to architecture and engineering that support the risk mitigation that is necessary for HCFs in the face of disasters. The objective of this study was to evaluate RDC n. 50/2002[22] and the Resolutions that update it, in order to verify the presence of aspects related to the reduction of vulnerability in situations of risk of natural disasters, related to the construction, facilities and equipment, considering the practices advocated by the WHO Safe Hospitals Initiative[18].

METHOD

For this study, we conducted documentary research in two stages, with the purpose of surveying documents. According to Gil[23], documentary research uses materials that have not yet received analytical treatment, requiring a more careful analysis. It can also be re-elaborated according to the research objectives. Flores[24] emphasized that documents are raw data sources for the researcher and their analysis implies changes and interpretations

with the purpose of assigning a relevant meaning in relation to a research question.

This research occurred in two stages and was based on primary sources, like official documents, newspaper reports, letters, contracts, journals, films, photographs, recordings and testimonials.

1st stage

The research was based on Anvisa's RDC, since Anvisa is the agency responsible for establishing norms, proposing, monitoring and executing health surveillance policies, guidelines and actions, which cover products and services subject to health surveillance, including environments, processes, supplies and related technologies. Among the scope of action of Anvisa are the HCFs and, among them, the hospitals[19].

The primary sources were the Resolutions that updated RDC n. 50/2002[22]. For the identification of these Resolutions, we carried out a retrospective survey, from 2002 to 2016, through electronic search in the Virtual Health Library database, using the Health Legislation System (HEALTH LEGIS)[25]. The choice of the initial period of the survey was determined by the approval of RDC n. 50/2002[22] in the year 2002.

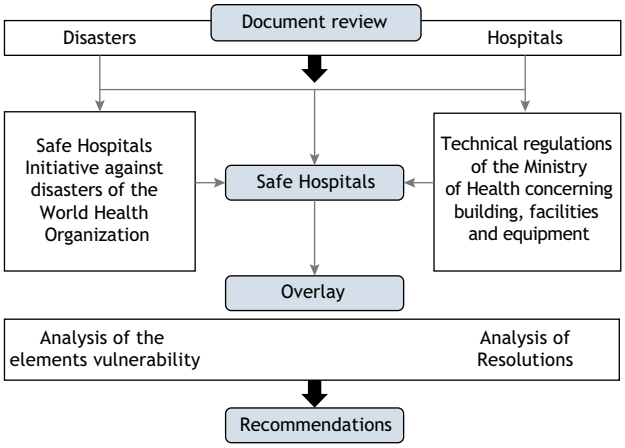
We used as locator words: "Technical Regulation", "Resolution" and "Hospitals".

The inclusion criterion was: RDCs that discuss the planning, programming, elaboration and evaluation of HCF physical projects in a comprehensive manner, not specific to any environment.

2nd stage

For the comparative study of Anvisa's resolutions and the Safe Hospitals initiative, it was necessary to carry out further documentary research on the strategies developed by WHO and PAHO. The purpose of this search was to identify aspects related to buildings, facilities and equipment, aiming at reducing vulnerability in situations of risk of natural disasters. The official WHO database, *World Health Organization Library & Information Networks for Knowledge* (WHOLIS[26]), available at www.who.int/library, was chosen because it contains the collective electronic memory of all WHO documentation related to safe hospitals and natural disasters. For this purpose, the search words we used were: "*Safe Hospital*" and "*Disaster*". The time delimitation comprised the period from 2004 to 2016. The beginning of the research was determined by the reflective proposal of this study, embodied in the issues discussed in 2004, during the 45th Meeting of the Directing Council/56th Session of the PAHO/WHO Regional Committee[27]. At this meeting, Resolution CD45.R8 was approved by the Member States of PAHO/WHO in order to encourage the strengthening of disaster preparedness and response through the adoption of the "Safe Hospital in the Face of Disasters" topic as a risk reduction policy[27].

We included all documents that addressed the Safe Hospitals initiative in the face of natural disasters and excluded documents related to aspects other than those related to buildings, facilities and hospital equipment; in addition to the documents not applicable to the disasters that occur more frequently in Brazil.



Source: Prepared by the authors.

Figure. Methodological framework used in the study.

The methodological framework used in this study is illustrated in the Figure.

RESULTS AND DISCUSSION

In the first stage, Anvisa's RDCs related to the infrastructure were found as described in Table 2.

The content of each of the RDCs that dealt with the infrastructure of the health network was surveyed. Based on the eligibility criteria for inclusion in the study, we retrieved the following RDCs: 171, of September 4, 2006[30]; 36, June 3, 2008[31] and 38, June 4, 2008[32]. The following stayed for analysis:

- RDC 50/2002 - the result of several political-administrative developments that sought to comply with the principle of decentralization provided for in the Federal Constitution and Law n. 8.080, of September 19, 1990. This RDC gave Brazil a guide for new constructions, renovations and extensions, facilities and functioning of HCFs so that they comply with the principles of the Unified Health System[22].
- RDC n. 307, of November 14, 2002 - republished Resolution RDC n. 50/2002, amending its wording[28].
- RDC n. 189, of July 18, 2003 - complements RDC n. 50/2002 and establishes that the HCF architectural projects should be evaluated and approved by the local Health Surveillance bodies (members of the SNVS), prior to the start of the work[29].
- RDC n. 51, of October 6, 2011 - partially repeals RDC n. 50/2002 and RDC n. 189/2003 and is now applied to the physical projects of all HCFs, whether public, private, civil or military; including those engaged in teaching and research;

Table 2. Resolutions of the Collegiate Board of Directors of the National Health Surveillance Agency.

Resolution of the Collegiate Board of Directors (RDC)		Objective
Number	Year	
50	2002	Provides on the Technical Regulation for planning, programming, elaboration and evaluation of physical projects of health care facilities
307	2002	Amends RDC n. 50 that provides on the Technical Regulation for planning, programming, elaboration and evaluation of physical projects of health care facilities
189	2003	Provides for the regulation of procedures for the analysis, evaluation and approval of physical projects of health facilities in the National Health Surveillance System, amends the Technical Regulation approved by RDC n. 50 and provides other measures
171	2006	Provides for the Technical Regulation for the Operation of Human Milk Banks
36	2008	Provides on The Technical Regulation for the Operation of Obstetric and Neonatal Care Services
38	2008	Provides for the installation and operation of Nuclear Medicine Services *in vivo*
51	2011	Provides for the minimum requirements for the analysis, evaluation and approval of the physical projects of health facilities in the SNVS and other measures. It partially revokes RDC n. 50 and RDC n. 189

RDC: Resolution of the Collegiate Board of Directors; SNVS: National Health Surveillance System.

Table 3. Resolutions of the Pan American Health Organization on Safe Hospitals.

Document Type	Year	Objective
50th Board of Directors	2010	Plan of Action on Safe Hospitals
49th Board of Directors	2009	Background document for the Roundtable on Safe Hospitals
27th Pan American Sanitary Conference	2007	Report on Safe Hospitals: A Regional Initiative on Resilient Disaster Health Facilities
45th Board of Directors	2004	Report on the reduction of the impact of disasters on health facilities

comprising: new constructions, areas to be expanded, renovations and upgrading of buildings previously not intended for HCF activities[33].

In the search carried out in the WHOLIS database[26], 45 publications on Safe Hospitals were found, of which 36 publications were directed to Safe Hospitals in specific countries of the Americas, three on the Hospital Safety Index, two presented guidelines for disaster mitigation in health facilities and four were PAHO resolutions on the matter. The countries that presented the most reference documents were: Mexico (16) and Peru (6). The PAHO Resolutions are presented in Table 3.

In the analysis of RDC n. 50/2002[22], we verified that this is a comprehensive technical regulation that broadly meets the basic needs for the elaboration, planning and design of health buildings. HCF projects must be done in accordance with the provisions of this legislation, as well as comply with other guidelines related to the purpose of the standard, established in federal, state and municipal codes, laws, decrees, ordinances and standards, including norms for utility concessionaires. It should be noted that the planning, design and evaluation of HCF projects should be guided by the needs of care actions and issues related to risk mitigation and reduction of the vulnerability of buildings to natural disasters. However, these initiatives are still incipient.

The assessment and reduction of vulnerability take into account the importance of having the assistance infrastructure available during and after a disaster, so it is important to prepare studies to assess the vulnerability of the building. PAHO recommends that HCF vulnerability studies should consider three aspects that provide security for users and professionals and ensure the continuity of HCF activities. They are[1]:

- Structural vulnerability - related to the structures of the support building, such as: foundations, slabs, pillars, beams and walls, concrete composition, iron armor and ceilings.
- Non-structural vulnerability - refers to architectural elements such as: walls, window frames, glass panels, roofs, linings, electrical, hydraulic, sanitary, gas and air-conditioning piping; medical equipment and furniture.
- Administrative-organizational vulnerability - refers to the distribution and relationship between architectural spaces and medical and support functions in HCFs, as well as administrative processes and functional relationships between different HCF sectors.

In the analysis of the structural and non-structural safety elements of the Safe Hospitals initiative, compared with RDC n. 50/2002[22] and the Resolutions updating it, it is clear that these issues are not yet included in the Brazilian legislation, so that they can be used as a basis for HCF planning in the face of natural disasters.

It is important to emphasize that elements of structural vulnerability must be added to the elements that make up the physical structure of the building, the materials used in construction, the location of the building, the year of construction, proximity to

Table 4. Elements of structural and non-structural vulnerability to be verified.

Elements of structural and non-structural vulnerability	Aspect to be verified
Doors or accesses	Resistance and anchorage
Windows	Resistance, thickness and type of glass
Closing elements (external walls, facades etc.)	Anchorage and deformation
Roofs and coverages	Waterproofing, drainage and anchoring
Parapets (locks or guardrails installed to avoid falls on walkways, stairs, roofing etc.)	Anchorage and deformation
Materials, coatings and finishes	Grip and stability
Fences and perimeter locks	Integrity of boundaries of the architectural set
Attached elements (cornice, ornaments etc.)	Anchoring
Internal partitions	Anchorage and deformation
False or recessed ceilings	Anchoring
Internal and external lighting system	Anchorage, proper operation, spare parts and insulated structure
Fire protection and fire-fighting system	Proper operation and accessibility
Lifts	Proper operation
Stairs	Gas resistance and insulation
Floor coatings	Anchorage, settlement, installation, integrality, monolithic and drainage of rainwater
Routes of access to the Health Care Facility	Collection and drainage of rainwater
Other architectural features, including safety signs	Resistance, anchorage, installation, integrality and monolithicity, proper functioning and deformation
External circulation areas	Collection and drainage of rainwater and sewage
Internal circulation areas (corridors, walkways, elevators, stairs, emergency exits etc.)	Sizing and signaling
Medical gases and fuels	Storage, anchorage
Medical equipment and other equipment that is part of the building	Safety regulations, preventive and corrective maintenance
Heating, ventilation and cooling systems	Type of anchorage, installation standards and preventive and corrective maintenance
Office furniture and equipment	Anchorage and mobility

Source: WHO/PAHO[18].

other buildings, elements that make up its foundations and other elements of structural resilience to natural phenomena.

In the analysis of RDC n. 50/2002[22] regarding the non-structural vulnerability elements of the building, no aspects were found regarding risk mitigation and reduction in electrical, water/sewage and telecommunications installations.

Regarding water supply, both RDC n. 50/2002[22] and the criteria for Safe Hospitals recommend that the HCF should have a minimum autonomy of 48 hours. The same applies to electrical installations for which it is recommended that the lighting and its safety power supplies operate at least 24 hours.

Furthermore, the Resolutions identified other elements related to the two types of vulnerability, presented in Table 4, that need to be verified regarding their safety level. The objective is to reduce the vulnerability of hospitals at risk of natural disasters.

It is important to highlight that all elements of vulnerability that make up the building must be designed taking into account the typical disasters of each Brazilian region.

CONCLUSIONS

WHO recommendations for safe hospital construction in the face of natural disasters are the result of global concerns about the unpredictability of climate phenomena and the vulnerability of health facilities if they are not safe. Disasters and their consequences occur from the interaction of the forces of nature with social systems. In case of disasters, hospitals can influence the response, magnitude and intensity of their impact.

HCFs are essential for the reduction of risks and an effective response to the effects of harmful natural events, mainly in the immediate care to the population after its occurrence.

It is essential that the health care of the population is done with quality and capacity suitable to the severity of the situation. This becomes more pressing in the face of the country's epidemiological complexity, associated with natural phenomena that regularly plague vulnerable populations, inhabitants of areas with low investment in general infrastructure and health services.

In the search carried out in this study in the WHOLIS[26] WHO/PAHO database and in the HEALTH LEGIS[25] database, no Brazilian official document was found addressing the Safe Hospitals initiative.

The framework of the Brazilian sanitary regulation developed by Anvisa does not yet consider the specific aspects regarding the Safe Hospitals initiative, more specifically, the aspects related to the reduction of structural and non-structural vulnerability related to buildings, facilities and equipment, during their project design and evaluation processes. These should be designed and considered to be resistant to destructive events, providing security to their occupants and ensuring continuity of hospital operation. The lack of incorporation of this matter into health regulatory policies may be due to the lack of understanding that the most frequent natural events in Brazil, like floods, storms, landslides and droughts, are in fact disasters.

It is important to identify the level of safety of hospitals before the occurrence of any destructive natural event, and this action is part of the disaster risk reduction policy. The vulnerability assessment of health facilities identifies the elements that need to be improved and also prioritizes the interventions to be implemented, according to their nature, location or importance.

Prospective, corrective and reactive risk management implies control and risk reduction actions. This strengthens the Safe Hospitals policy. This management encompasses the location, construction and safe operation of the HCF to support the prospective management, prioritizes corrective management and implies an efficient HCF response to support reactive management.

Within this context, it is important to ensure that the construction of new hospitals and the renovation of existing hospitals meet the safety requirements. Incorporating disaster mitigation measures into health facilities is a matter of political rather than budgetary awareness. In order to do so, it is necessary to create a safety culture in Brazilian HCFs/hospitals, through the awareness and qualification of managers, so that risk management programs are established during the occurrence of natural disasters, since they are fully feasible and cost-effective measures. The consequences of natural disasters without the contribution of health facilities are much more costly. The importance of complying with this stands out in the face of the latest disasters in Brazil, such as the floods that occurred in 2008, in the Itajaí Valley, in the state of Santa Catarina, where 195 health clinics and two hospitals were destroyed, and floods and landslides in January 2011, in the highlands of the state of Rio de Janeiro, where 43 HCFs were affected.

Since 2010, the Ministry of Health has been discussing, through Anvisa, the physical infrastructure of health services within the WHO concept of Safe Hospitals, in order to implement safety strategies in the country's health services. These included the preparation of a manual on vulnerability reduction of buildings and the inclusion of a specific chapter on this subject in RDC n. 50/2002[22], which provides for the technical regulation for planning, programming, elaboration and evaluation of physical projects of health care facilities. This review should address building conditions to face natural disasters and resume the HCF's proper operations.

The construction of the proposed model advocates that quality in health services and risk management are inseparable and proposes a discussion to create a new approach to understanding hospital physical spaces.

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Conflict of Interest

Authors have no potential conflict of interest to declare, related to this study's political or financial peers and institutions.

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