




# Use of a maturity model to improve the quality of medium-complexity hospitals

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## ABSTRACT

Hospital Quality Management is a relevant aspect for improving healthcare services to the population, considering that hospitals play a crucial role in both public and private healthcare systems. In this regard, the use of maturity models has proven to be an important tool for assessing the level of quality practiced by hospitals and providing insights for improvement actions in these organizations. Therefore, the objective of this study was to apply a quality management maturity model in two public hospitals in the state of São Paulo. Two case studies were conducted for this purpose. Primary data was collected through an online questionnaire sent to the employees of both hospitals. The response rate was 5.7% for Hospital H1 and 7.1% for Hospital H2, respectively. The results indicated that the hospitals are at different levels of maturity, with one of them being at a level where quality improvement activities are informal or ad hoc, and the other at a level where improvement activities are formalized. Therefore, each hospital requires distinct actions to build a culture of quality improvement. The applicability of the maturity model to the Brazilian reality was also verified, showing promising potential for assessing quality in public hospitals and proposing strategic actions for management and improvement of healthcare services quality in the Brazilian context.

**Keywords:** Quality management, Maturity models, Hospital management.

## INTRODUCTION

Population growth, scientific advances and technological resources applied to medicine, combined with demands for efficiency and effectiveness, have made the management of healthcare organizations more complex. Since the 1960s, studies have been conducted to propose parameters to evaluate the quality of health services<sup>1-4</sup>. In these services, the importance of quality assessment is due to several factors: development of medicine with intense incorporation of technologies, risks of iatrogenesis and medical errors, the need for health systems to develop methods and instruments for evaluation and control to guarantee the integrity of users, risk control

and biosafety for the patient and healthcare professional (clinical protocols for the patient and healthcare professional). Thus, since the 20th century, the health sector has been incorporating quality management concepts and methods developed by industrial and service companies<sup>3, 5, 6</sup>.

According to Otero Puime, Saturno Hernandez and Marquet Palomer<sup>3</sup>, the concern with improving the quality of care for patients began to be considered at the initiative of the American College of Surgeons in 1917, which published an evaluation of care in American hospitals. Anchored in this initiative, in 1918, the Hospital Standardization Program was created, which gave rise to the Joint Commission on Accreditation of Health Care

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Organizations (JCAHCO), whose objective was to ensure good care for patients, both in hospitals and clinics.

Several quality models with different concepts and dimensions have emerged, as can be seen in Table 1.

Table 1 - Quality models and their dimensions

<b>H. Vuori (1932)</b>	<b>R. H Palmer (1983)</b>	<b>Maxwell (1986)</b>	<b>Nutting et al. (1987)</b>	<b>J Caho (1987)</b>	<b>Programa Ibérico (1990)</b>
<b>Component</b>	<b>Dimensions</b>	<b>Dimensions</b>	<b>Attributes</b>	<b>Component- ts</b>	<b>Dimensions</b>
Technical-Scientific Quality	Professional Competence		Professional Competence		Technical-Scientific Quality
	Accessibility	Accessibility	Assistance Distribution/Integrity	Accessibility	Accessibility
	Acceptability/Satisfaction	Acceptability		Acceptability	
Effectiveness	Effectiveness	Effectiveness	Effectiveness	Effectiveness	Satisfaction
Efficiency	Efficiency	Efficiency	Efficiency		
Adequacy		Adequacy	Continuity/Coordination Efficiency		

Source: Otero Puime, Saturno Hernandez and Marquet Palomer (p.401)<sup>3</sup>

Of the various approaches adopted in health assessment, one that has become a reference is that of Donabedian<sup>7</sup>, who establishes the “structure–process–result” triad, with a) structure denoting the attributes of the environments in which care takes place; b) Process denotes what is actually done when giving and receiving care; and c) result denotes the effects of care on the health status of patients and the population.

Donabedian<sup>7</sup> clarifies that this three-part approach to quality assessment is only possible because a good structure increases the likelihood of a good process, and a good process increases the likelihood of a

good outcome. Thus, in Donabedian’s<sup>7</sup> view it is necessary to have established such a relationship before any particular component of the structure, process or result can be used to evaluate quality.

For Botega, Andrade and Guedes<sup>8</sup>, hospitals are characterized as multi-producing units of diagnosis and treatment services, which require specialized infrastructure and intensive use of technologies and human resources. In Brazil, and in almost all countries, they are central elements in health systems and are responsible for a significant part of total health spending. Therefore, managing the quality of its processes is necessary and essential for

hospitals to fulfill their role in the context of health systems, and, therefore, hospitals have been the focus of several quality improvement programs<sup>5,9</sup>.

In relation to quality, hospitals were central elements, where the principles of standardization, accreditation and quality certification were developed, and from which they were disseminated to other links in the health systems. One of the first initiatives aimed at quality in healthcare was the Hospital Standardization Program. In the 1950s, the Joint Commission of Accreditation of Hospitals (JCAH), currently Joint Commission International (JCI), was created with the aim of disseminating an accreditation methodology among hospitals.

Accreditation is one of the most widespread strategies for improving hospital quality<sup>(10, 11)</sup>. In Brazil, according to Treib et al<sup>11</sup>, there is still low adherence by hospitals to the accreditation strategy.

Other initiatives are the implementation of total quality management tools, such as the PDCA Cycle<sup>12</sup>, Six Sigma Program<sup>13</sup>, Program 5S<sup>5</sup>. Among the reported results achieved are the reduction of errors, costs, service times, as well as increased employee satisfaction, improved quality of services, improved hospital image<sup>12,14,15,16</sup>. Studies also report the importance of top management leadership so that effective results in quality can be achieved<sup>15,16</sup>.

In this context, the use of quality indicators is a key element for monitoring the care process as a whole. Several quality indicators can be concentrated in just one gauge: maturity, which is an important metric for evaluating the stage of quality management in hospitals<sup>17</sup>. The maturity

of hospital management is a concept already widespread in large medical centers abroad<sup>18</sup>; In Brazil, however, its use is still restricted<sup>19</sup>. However, using maturity levels to evaluate Quality Management constitutes a strategic action of modernization and adaptation to trends in the provision of health services<sup>20</sup>.

Therefore, the objective of this work was to identify and analyze the level of maturity in quality improvement in two Brazilian public hospitals, using the instrument developed by Gearin et al.<sup>18</sup>.

To achieve its intended objective, this work is structured into five sections, this Introduction being the first of them. The second section discusses the materials and methods used to carry out this work, in addition to presenting a brief characterization of the hospitals studied. The third section presents the research results and the fourth section the discussions. Finally, in the fifth and final section, conclusions are presented.

## MATERIALS AND METHODS

This research is quantitative in nature. It involved an intentional sample of hospitals that had quality improvement programs, seeking to understand the phenomena according to the participants' perspective. The study aimed to characterize the level of maturity in improving the quality of these hospitals after the introduction of quality programs. Regarding the use of the results, it is applied research, as it contributes to practical purposes and to solving quality management problems in health-care organizations.

The research stages consisted of:

Phase 1- literature review: deals with the evolution, concepts and application of quality management and continuous improvement tools, maturity models applicable to healthcare organizations.

Phase 2- Definition of the maturity assessment model: based on the analysis of the maturity models carried out in Phase 1, it was decided to apply the model by Gearin et al.<sup>18</sup>, due to its simplicity and applicability in a significant number of hospitals, as well as the effective results achieved with the use of the model in American hospitals.

Phase 3- Translation and adaptation of the questionnaire by Gearin et al.<sup>18</sup>, with 10 questions, into Portuguese considering the terminological specificities typical of the area of quality management. For the 10 evaluation questions, five-point Likert scale response options were used: 5 for Completely Agree, 4 for Agree, 3 for Neither Agree nor Disagree, 2 for Disagree and 1 for Completely Disagree, for the domains relating to Organizational Culture, Capacity and Competence in management and quality improvement, Alignment and Diffusion.

Phase 4- Submission of the project to the HCFMRP Research Ethics Committee: approved under number 39461920.8.0000.5440.

Phase 5- Selection of cases: to carry out the study, two hospitals were selected within the Hospital das Clínicas de Ribeirão Preto complex. The choice of

these two health establishments is justified because they present similarities and also because of some specificities that distinguish them in certain aspects with the potential to generate evidence of interest for research. The study proposal and scope of work were presented to the Board of Directors of the two selected hospitals, both of which provided the letter of consent for approval by the HCFMRP Ethics Committee.

Phase 6- Data collection: for greater involvement of respondents with the research, the hospital Board itself was asked to invite employees to participate in the research. The questionnaires were administered virtually, using Google Forms, given the current circumstances of social isolation due to the Covid-19 pandemic. Prior to sending the questionnaires online, and as duly expressed in the Informed Consent Form, it was agreed that there would be no form of identification of respondents, guaranteeing their anonymity. The questionnaire was kept open from March 22, 2021 to May 23, 2021. Two rounds of invitations were carried out by the hospital Boards to motivate and increase employee participation in the research. It was also agreed with the respective Boards that the names of the hospitals will not be identified when presenting the results obtained.

Phase 7- Compilation and processing of data: the results obtained were organized in an MS-Excel spreadsheet, followed by calculations of frequencies and maturity levels, according to the calculation method developed by Gearin et al.<sup>18</sup>

(Equation 1).

Where:

$$E = \left[ \left( \sum_{i=1}^n Qi \right) / 10 \right] / n \quad (1)$$

E = score

Q = Likert scale rating x number of responses

$\sum Qi$  is the sum of scores per respondent

10 is the number of questions

n is the number of respondents

### Research instrument: quality management maturity model by Gea-rin et al.<sup>18</sup>

A maturity model can be defined as “a structured set of elements that describe the characteristics of a process at different stages of development. It also suggests points of demarcation between stages as well as methods for going from one stage to another”<sup>21</sup>. They are a simple and effective way to measure the quality of organizational processes<sup>22</sup>, as well as helping to improve them<sup>23</sup>. Although maturity models emerged in the software industry in the 1970s, they are applied in several areas. Regarding quality management, one of the first maturity models was the Quality Management Maturity Grid, developed by Philippe Crosby<sup>24</sup>, which defined five maturity levels, and influenced the development of maturity models for application in several areas.

In the healthcare sector, some models have been developed. Grooten et al.<sup>25</sup>, for example, developed a tool (SCIROC-CO) to facilitate knowledge, transfer and learning about the implementation and expansion of integrated health care in Euro-

pean regions. This model is dedicated to evaluating the maturity requirements of a given integrated care practice. However, the practice has a complex and specific use and does not address the management aspects of the healthcare organization.

Storm et al.<sup>26</sup> developed a maturity model to evaluate health management software. Ramadan and Arafeh<sup>17</sup>, developed a model that proposes five levels of maturity focusing on the management of people, processes and organizational culture. However, the scope of the model is focused on the patient and not on the healthcare organization.

Jussli-Melchers et al.<sup>27</sup> present a maturity model focused on the hospital quality system. The model is complex, involving a large number of variables. Because of this, it is costly and difficult to apply.

Joly et al.<sup>28</sup> proposed an instrument called “Level of Maturity in Quality Improvement”, consisting of 29 items, grouped into four domains, or dimensions, derived from the literature, namely: (a) organizational culture: how the hospital interacts with its employees and stakeholders; (b) capa-

city and competence: measures the skills, functions and approach used within an organization to assess and improve quality; (c) practice: evaluates the number, type and duration of formal quality improvement efforts; and (d) alignment and dissemination: assesses the extent to which quality improvement supports (and is supported by) the organization, as well as the dissemination of quality improvement within the Hospital. However, the questionnaire was long and application was restricted to the

highest hierarchical levels of hospitals.

Gearin et al.<sup>18</sup> started from the model by Joly et al.<sup>28</sup> and developed a reduced version of the questionnaire, which was easy to apply and could also be applied to other functional levels of hospitals. The authors proposed a questionnaire with 10 questions, grouped into 3 domains: organizational culture, capacity and competence and alignment and propagation and established three categories of maturity assessment scores, which are presented in Table 2.

Table 2- Maturity degree assessment scores according to Gearin et al.<sup>18</sup>.

Score	Meaning
$1,0 \leq S \leq 2,9$	No knowledge of quality improvement or lack of involvement in quality improvement
$3,0 \leq S \leq 3,9$	Informal or ad hoc quality improvement
$S \geq 4,0$	Formalized quality improvement

Source: GEARIN et al.<sup>18</sup>

Gearin et al.<sup>18</sup> used the QI Roadmap (Roadmap to a Culture of Quality Improvement), endorsed by the National Association of County and City Health Officials (NACCHO)<sup>29</sup>, aiming to offer a general guide for the subsequent formulation of strategies and resources to build a quality improvement culture.

As it is an easy-to-apply model, which can be widely used in hospitals, and associated with a roadmap for formulating strategies to improve quality, the model by Gearin et al.<sup>18</sup> was used in this work.

## QI Roadmap

According to the QI Roadmap (NACCHO)<sup>29</sup> guidelines, at any time, a hospital may encounter transition characteristics or strategies at various stages of building a

culture for quality improvement. The elements to be considered in this work are:

- Leadership Commitment: vital for the development and maintenance of a quality culture. Top and middle management must initiate and lead the transformation of organizational culture, establish a vision of quality improvement, provide organizational resources, support employees, establish the structure, processes and systems necessary to improve quality.
- Continuous quality improvement: it is an incessant and systematic search to improve processes and results, identifying the root causes of problems, through the successive use of the Plan-Do-Check-Act (PDCA) cycle.



- Infrastructure for quality improvement: must contain a Performance Management System, to evaluate and review the quality improvement plan; support individual improvement projects; review performance data and report progress, recommending next steps. It must also contain an appropriate organizational structure for quality (department, councils, etc.).
  - Empowerment of employees: management must empower the team to improve quality in their daily work, ensuring that employees have the necessary awareness, knowledge, skills, resources and support.
  - Focus on the user: understanding and meeting the health needs of the community assisted by the health system.
  - Teamwork and collaboration: Teams should have clearly defined performance expectations and meet routinely to brainstorm, resolve problems, implement quality improvement projects, and share lessons learned.
- Based on these elements, the QI Roadmap (NACCHO)<sup>29</sup> establishes six phases of a quality-oriented culture (Table 3)

Table 3 - The phases of a quality culture

<p><b>Phase 1: No knowledge of quality improvement</b></p> <p>Executives, senior leaders and employees are not aware of performance management and quality improvement and its value to the hospital. Processes are undefined, complex, redundant and varied. Problems tend to be ignored and remain unresolved for long periods of time. Products, processes and services can be ineffective and inefficient.</p>
<p><b>Phase 2: Not involved in quality improvement activities</b></p> <p>While some executives and senior leaders have experience with quality improvement, solutions to problems are often based on opinions or hunches, resulting in reactive, temporary fixes.</p>
<p><b>Phase 3: Informal or ad hoc quality improvement activities</b></p> <p>Executives and senior leaders may value quality improvement, but expectations are not consistently communicated to employees. Some employees have the knowledge, skills, resources, and support to lead small quality improvement projects. Employees meet informally to solve problems and innovate, but opportunities for sharing are limited. Employees may view quality improvement as a fad or added responsibility.</p>
<p><b>Phase 4: Formal quality improvement activities implemented in specific areas</b></p> <p>Executives encourage employees to engage in quality improvement. Most teams have employees capable of leading formal quality improvement projects because quality improvement is included in workforce development plans and training and resources are made available as needed. Teams are commonly formed to solve problems and innovate using basic quality improvement techniques. Efforts are made to link organizational performance measures to the organization's strategic plan, and team performance is measured, monitored, and reported in some parts of the organization. It is possible that a formal governance body meets regularly and a quality improvement plan has been created. However, the results of quality improvement projects are not always documented and improvements do not always spread throughout the organization due to limited opportunities for peer-to-peer sharing.</p>

### Phase 5: Formal quality improvement

Executives and senior leaders provide sufficient financial and human resources for training, infrastructure and support to collect, monitor, report and improve individual, team and organizational performance. Most employees value quality improvement as a strategy for improving their work. Quality improvement is incorporated into job descriptions, employee orientation, and the performance review process. Formal quality improvement teams are formed regularly and the results of these efforts are reported consistently. As a result, processes are becoming clearly defined, efficient, effective and standardized across the organization. There is a formal process for implementing, monitoring and evaluating the quality improvement plan.

### Phase 6: Formal quality improvement +

Executives and senior leaders fully embrace quality and ensure the sustainability of the culture for quality while maintaining the necessary resources. Performance management and quality improvement are fully embedded in the way business is done at the individual, team and organizational levels. Performance data drives all decision making across the organization. The organization is considered innovative and quality-oriented. Employees are empowered to fulfill their quality improvement responsibilities. Employees understand how they contribute to the organization's mission, vision, and overall strategic plan.

Source: Own preparation based on QI Roadmap (NACCHO)<sup>29</sup>

Gearin et al.<sup>18</sup> suggest that the values of the scores obtained by applying the questionnaire correspond to the phases of the quality improvement culture established by the QI Roadmap. With this, it is possible to have a diagnosis of the current situation of the hospital, when the culture of quality improvement, the guidelines for establishing change strategies, towards improving hospital quality. Therefore, it appears that scores between 1.0 and 2.9 indicate that the organization is in phase 1 to 2; scores 3.0 to 3.9 indicate that the organization is in phase 3 to 4, and scores > 4.0 indicate the organization is in phase 5 to 6.

## Characterization of the hospitals studied

Both health establishments studied are public hospitals, linked to the State Department of Health, and managed by the same institution, namely, the Foundation for Support to Teaching, Research and Assistance of the Hospital das Clínicas of the Faculty of Medicine of Ribeirão Preto

(FAEPA). They are classified, according to the National Classification of Health Establishments (CNES)<sup>30</sup>, as general hospitals.

Furthermore, they present similarities regarding the level of health care in which they provide their services, that is, medium complexity or secondary level. They also present similarities regarding the types of care provided, namely, outpatient, inpatient and auxiliary diagnostic and therapy services (SADT) solely by the Unified Health System (SUS) in the region of the Regional Department of Health (DRS) XIII of the State of São Paulo, with the flow of users occurring exclusively through meeting referenced demand. Both establishments also have similarities in terms of the number of professionals with employment contracts, as H1 has 349 employees and H2 has 354.<sup>30</sup>

Even more relevant to the present study is the fact that both health establishments have programs, actions and practices aimed at planning, managing and improving the quality of the health services they provide. More recent evidence of this effort



towards quality can be found in the Activity Report of the Foundation for Support to Teaching, Research and Assistance of the Hospital das Clínicas of the Faculty of Medicine of Ribeirão Preto of the University of São Paulo, for the year 2019<sup>31</sup>.

Regarding the differences between the two health establishments, it is worth mentioning the size of the establishments and the areas of activity. H1 has a total of 54 beds in the Medical/Surgical Ward, it does not have an Intensive Care Unit (ICU)

or a psychiatric ward. H2 has 10 ICU beds, 62 beds in the Medical/Surgical Ward and 12 beds in the Psychiatry Ward.

A second difference between both health establishments refers to the time they have been in operation. H1 came into operation in 2008, therefore, around 15 years ago, while H2 began its activities, gradually, during 2019, that is, it came into operation around four years ago.

RESULTS

Table 1 shows the number of questionnaires sent, number of questionnaires answered and return rate.

Table 1 - Number of questionnaires sent, number of questionnaires answered and return rate

Hospital	Questionnaires sent	Answered questionnaires	Return rate
H1	334	19	5.7%
H2	451	32	7.1%

Source: Own preparation

The profile of respondents according to level of education and training for each hospital is presented in Table 2.

Table 2 - Profile of respondents according to level of education and training

Aspect	Answers	H1	H2
Occupation area	Biological and Health Sciences	10	32
	Humanities and Social Sciences	7	0
	None of the options	2	0
Education Level	Complete high school	2	4
	Incomplete college	5	1
	Graduated	0	9
	Master's or Doctorate	5	5
	Specialization	7	13

Source: Own preparation

Table 3 presents the results obtained for hospital H1 and H2 in the domains organizational culture, capacity and competence in quality improvement and alignment and propagation.

Table 3 - Questionnaire to measure maturity levels in management and quality improvement according to Gearin et al.<sup>18</sup>

Domains	Questions	Likert scale responses									
		H1					H2				
		5	4	3	2	1	5	4	3	2	1
Organizational culture	1- Your team members are routinely asked to contribute to decision-making about management and quality improvement in their area.	2	9	2	5	1	8	14	3	7	0
	2- Leaders in my sector/area are trained in basic quality management and improvement methods, such as the PDCA cycle: Plan; Do; Check; Act.	1	5	5	5	3	7	11	7	5	2
Capacity and competence in quality improvement	3- The Hospital has a quality management and improvement plan.	6	6	5	0	2	14	16	2	0	0
	4- The formal job description of professionals responsible for quality programs at the Hospital includes the role related to quality management and improvement.	6	5	4	2	2	8	14	8	1	1
	5- User/patient satisfaction information is used systematically and routinely for quality management and improvement.	6	10	2	1	0	16	13	2	1	0
Alignment and Propagation	6- In order to facilitate the achievement of objectives and goals related to quality, the team of professionals is free to work on various quality management and improvement initiatives or programs, when they believe they can contribute.	2	9	3	4	1	6	16	9	1	0
	7- The Hospital's Senior Management believes that quality management and improvement is important.	8	6	4	1	0	18	11	3	0	0
	8- The Hospital has a widespread and widespread culture of management and quality improvement.	3	10	4	2	0	10	16	4	2	0
	9- The Hospital has currently aligned its commitment to quality with most of its efforts, policies and plans	3	10	5	1	0	8	18	4	2	0
	10- The Hospital currently has a high level of capacity to engage in quality management and improvement efforts	4	8	5	2	0	9	18	3	1	1

Legend: 5 - I completely agree; 4- I agree; 3- I neither agree nor disagree; 2- I disagree; 1- I totally disagree or I don't know.

Source: Own elaboration based on Gearin et al.<sup>18</sup>

To calculate the scores for H1 and H2, Equation 1 was applied, with n = 19 and n = 32, respectively.

$$E_{H1} = \left[ \left( \sum_1^{19} 689 \right) / 10 \right] / 19 = 3,62$$

$$E_{H2} = \left[ \left( \sum_1^{32} 1.287 \right) / 10 \right] / 32 = 4,02$$

Table 4 presents the scores for each of the three domains of the model by Gearin et al.<sup>18</sup> for H1 and H2

Table 4 - Stages of evolution of continuous improvement and maturity according to Gearin et al.<sup>18</sup> for H1

Domains	Score	
	H1	H2
Organizational culture	3.05	3.60
Capacity and competence in quality improvement	3.80	4.20
Alignment and propagation	3.70	4.08

Source: Own preparation

DISCUSSION

The H1 maturity level score (3.62), according to Gearin et al.<sup>18</sup> indicates that the hospital presented a maturity level in informal or ad hoc quality improvement – which corresponds to Level 3 of the QI Roadmap (cf. Table 3). According to the QI Roadmap<sup>29</sup> parameters, this means that some financial and human resources are dedicated to improving quality, that is, some employees have the knowledge, skills, resources and support to lead small improvement projects. Typically, one or two employees are responsible for quality improvement and performance manage-

ment activities. Although some performance data is collected, monitored, and shared, it is not used consistently for decision making. There is a perception that quality is a fad that causes employees to work extra<sup>29</sup>.

Observing each domain separately (cf. Table 4), it appears that the Organizational Culture domain has the lowest score (3.05). The literature on quality states that the existence of a culture focused on continuous improvement is essential. To achieve this, strong leadership is needed from the organization’s management, in order to implement and sustain quality actions<sup>(15, 16, 32)</sup>. This result indicates the need for actions

to develop a quality culture that allows the H1 hospital to reach a higher level of maturity. In this sense, based on the parameters of the QI Roadmap<sup>29</sup>, it is possible to suggest the following leadership actions:

- Improve and expand communication with hospital employees;
- Expand the dissemination of training programs that the hospital offers;
- Facilitate employee participation in training and improvement projects;
- Visual management with critical indicators;
- Create incentives for employees to participate in improvement projects;
- Value the results obtained by improvement teams.

These actions would be a first step towards creating a learning environment in which employees have greater autonomy and confidence to act on processes<sup>32</sup>, as well as increasing employee satisfaction, which is an important aspect of quality culture<sup>14</sup>.

As for the Capacity and Competence domain (score 3.80), H1 is also at an intermediate level of maturity, according to Gearin et al.<sup>18</sup>. This indicates the need for actions to consolidate improvement processes. Therefore, a possible action, as recommended by the QI Roadmap NACCHO<sup>29</sup>, would be to include, when possible, in the job description the knowledge acquired in the improvement programs promoted by the organization, through human resources.

Regarding the Alignment and Propagation domain (score 3.70), the hospital is

also at an intermediate level of maturity, according to the model by Gearin et al.<sup>18</sup>. Possible actions to be implemented for a transition to higher levels of maturity would be:

- Institute programs that encourage employees to participate in internal and external quality improvement learning communities;
- Senior management could offer the team the opportunity to share the results achieved through events within the organization itself.
- Top management promotes the engagement of mid-level managers in quality improvement programs.
- Develop processes to monitor and report customer satisfaction data and incorporate it into the hospital management process.

Regarding H2, its maturity level score was 4.02. According to Gearin et al.<sup>18</sup>, this level means that quality improvement is formalized in the organization, therefore corresponding to Level 4 of the IQ Roadmap<sup>29</sup>. It is assumed that the hospital's top management is playing a strong leadership role, necessary for the hospitals' quality performance<sup>(15, 16)</sup>. Training in quality improvement techniques and tools is an integral part of professional development activities. Efforts are expected to be made to link quality performance measures to the organization's strategic plan.

At this level of maturity, as recommended by the QI Roadmap<sup>29</sup>, it is expected that there will be a formal governance body that meets regularly to create and monitor a quality improvement plan. However, at this level of maturity, the impact of

actions is still limited, as improvements are not always documented and are restricted to certain sectors.

In short, the H2 score, according to Gearin et al.<sup>18</sup>, indicates the existence of a culture for quality improvement being consolidated. Thus, based on the guidelines established by the QI Roadmap<sup>29</sup>, for the evolution of the maturity level, the following actions can be suggested:

- Implement a program to monitor the satisfaction of users of hospital services, in order to establish guidelines for improving the hospital's critical processes.
- Empower employees to take appropriate corrective action on user issues across the organization.
- Develop and implement action plans to continually improve programs/services offered
- Establish department performance management, if the hospital does not already have one, and draw up improvement plans.
- Maintain previously achieved improvement gains through quality management strategies such as: documenting and training staff on revised processes, continuing to measure improvements, creating checklists and reminders, and conducting audits.
- Carry out benchmarking with hospitals or health promotion centers considered references and excellence in care.

Finally, there are some considerations regarding the return rate of the questionnaires. This aspect is one of the main sources of bias in this type of research carried out using questionnaires sent by email<sup>33</sup>. However, it is necessary to consider that the present research took place during the Covid-19 health crisis and, therefore, in an unfavorable context. Therefore, the viable alternative was to carry out the survey via email.

## CONCLUSION

The objective of this work was to identify and analyze the maturity level of quality improvement in two public hospitals, using the model developed by Gearin et al.<sup>18</sup>. The results showed that hospitals are at different levels of maturity and, therefore, require different specific actions.

The maturity model applied has been used to monitor the evolution of quality management in hospitals in several North American states and promote improvement actions. This model proved to be applicable and promising for the context of public hospitals in Brazil, as verified in the present work.

The results obtained here must be interpreted with caution, since the results from the application of the data collection instrument may not represent the reality of these hospitals. In any case, the results obtained can be considered representative of the respondents' view regarding the quality management practices of their respective hospitals at that given moment. Further research is needed to better characterize the degree of maturity in quality management practices in the hospitals studied over a



broader temporal spectrum. Furthermore, other aspects that are interesting to investigate and that may have influenced the results obtained concern the training and professional category of the respondents, as well as the operating time of the hospitals. However, to answer these questions another research strategy would be necessary in order to shed light on these aspects, such as conducting in-depth interviews with managers and employees, document analysis, observation, etc. Therefore, these questions can be addressed in future researches.

However, the results obtained here can help hospitals to define strategies and/or improve their quality management practices, with a focus on improving their services, especially public ones, delivered to a society, in the context of universal access to healthcare services, increased complexity of these services and scarcity of resources. They can help improve the structure and processes, increasing the probability of good results, according to what Donabedian<sup>7</sup> advocates.

Finally, it is recommended that further work be carried out using the maturity model by Gearin et al.<sup>18</sup> in public and/or private hospitals of various levels of complexity, also considering what the Ministry of Health recommends in relation to accreditation guidelines locations.

It is believed, therefore, that the systematic use of management maturity and quality improvement models can provide support for public policies to improve hospital care over time, thus fulfilling what PAHO and WHO recommend.

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- **SCMC:** Compliance with being responsible for the accuracy or integrity of any part of the study, substantial contribution to the study design or interpretation of data, and participation in the review and approval of the final version
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