

Evaluation of Electronic Medical Record Downtime at MRCCC Siloam Semanggi Cancer Hospital Using Emram and ISO 22301 Framework

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ABSTRACT

Keywords: EMRAM, ISO 22301 Framework, electronic medical records, MRCCC

Downtime is a term to describe a condition in which a computer or information system is offline or not operating, a process that must occur in an information system, either on schedule or at an unwanted time. The electronic medical record system at MRCCC Siloam Semanggi Hospital experienced unplanned downtime more than twice in a relatively long period of time, disrupting patient health services and declining business revenue. The quality of electronic medical records at MRCCC Siloam Semanggi Hospital and the readiness of services when system downtime occurs, is known using the standard method of Electronic Medical Record Adoption Model (EMRAM) and the ISO 22301 Framework. The purpose of this study is to assess the readiness of hospitals in handling EMR downtime and improving their operational resilience. A mixed-method approach was used, which included direct observation and distribution of questionnaires to general practitioners. The ISO 22301 framework is used to evaluate hospital downtime management practices, while the EMRAM model is used to measure the maturity level of EMR adoption. The results show that the readiness of hospitals to deal with EMR downtime, according to the ISO 22301 standard, reaches 83%. The results of the EMRAM questionnaire show that although the EMR system is mostly available, some users experience inconsistencies when downtime occurs. This study concluded that MRCCC Siloam Semanggi Cancer Hospital is well prepared for EMR downtime, but improvements in training, simulation, and system upgrades are still needed. The study has significant implications for hospital management, with recommendations to implement stronger downtime protocols and regular training programs to minimize disruptions caused by EMR failures.



Introduction

On August 31, 2022, the Regulation of the Minister of Health of the Republic of Indonesia number 24 of 2022 concerning Medical Records was passed. The regulation regulates the standards of medical records held by health care facilities. This regulation replaces the medical record regulation, which is standardized by a paper manual with handwriting, with an electronic standard. (Lukitasari et al., 2023) In their research,

Masarat Ayat and Mohammad Sharifi explain that the Hospital Information System is considered a means of data transportation, decision facilitation, and service quality improvement, so it is necessary for all health care authorities, especially hospital managers, to focus on improving it.

A safe and continuously functioning electronic medical record indicates a good and compliant Electronic Medical Record System. (Hermawan et al., 2024; Rizqulloh & Putra, 2024; Sylvia Anjani & Maulana Tomy Abiyasa, 2023). The standard used in electronic medical records issued by the Healthcare Information and Management Systems Society (HIMSS) is The Electronic Medical Record Adoption Model (EMRAM) (Ayat & Sharifi, 2016). One of the methods of information technology security management is to use the ISO 22301 Framework. (Setiawan et al., 2019; Sonobe & Kusriani, 2022). The ISO 22301 Framework can provide an overview of the needs of a business, in this case, health care facilities, to provide information technology security. (Bakhtiar, 2024).

RS. MRCCC Siloam Semanggi Cancer is a private hospital in Indonesia in the type A special hospital category. MRCCC Siloam Semanggi Cancer began to use electronic medical records since 2019, gradually (Pamungkas et al., 2023). The first stage started from the module of inputting the doctor's notes for outpatients. At the same time, the module of requesting laboratory and radiology examinations and recording patient prescriptions was developed to meet the standards of health services in hospitals. In 2021, RS. Specifically for MRCCC Siloam Semanggi Cancer, it also develops electronic services.

The use of electronic medical records in hospitals. MRCCC Siloam Semanggi Cancer especially experiences many obstacles, including the presence of care professionals such as doctors, nurses, and other health workers who are not used to using computers to serve patients. In addition to these obstacles, some must be considered, such as the downtime of electronic medical records when serving patients. According to Suse in a web page, downtime is a term in the computer world to describe a condition where computers or IT systems are unavailable, offline, or not operating—the impact of downtime of electronic medical records in hospitals. Especially for MRCCC Siloam Semanggi Cancer, health services to patients are more at risk because they do not know their previous service history. From January to November 2022, five incidents of downtime of electronic medical records disrupted health services and decreased hospital revenue. Specifically MRCCC Siloam Semanggi Cancer. Table I displays a recapitulation of the downtime of electronic medical records in hospitals, specifically MRCCC Siloam Semanggi Cancer.

Table 1. Downtime Recapitulation of Electronic Medical Records

No	Date	Hour	Length of Downtime
1	19-04-2022	8:54	6 hours, 11 minutes
2	03-08-2022	12:00	12 minutes
3	25-09-2022	21:00	2 hours, 30 minutes
4	26-09-2022	22:00	30 minutes
5	27-09-2022	11:46	11 minutes

Source: Data processed

Based on Table I, electronic medical records are down for more than 10 minutes, and there were three incidents during public service hours between 08.00 and 20.00. This indicates that health services to patients will pose risks, so there is a need for standards that can improve health services in electronic medical records used by hospitals, specifically MRCCC Siloam Semanggi Cancer.

In a study conducted by Ito Setiawan and his team in 2019, through his journal entitled *Designing a Business continuity plan and Disaster Recovery Plan Technology and Information Systems Using ISO 22301*, the results showed that the application of a business continuity plan to the object of research has not implemented a business continuity plan as a whole and is also not aware of the importance of a business continuity plan in information technology. (Setiawan et al., 2019) This study used a questionnaire based on the PDCA (Plan, Do, Check, and Act) concept, focusing on the ISO 22301 Framework. (Nasution & Chairunnisa, 2023).

For the research discussed by Masarat Ayat and Mohammad Sharifi in the journal entitled *Maturity Assessment of Hospital Information Systems Based on Electronic Medical Record Adoption Model (EMRAM)*, Pr4ate Hospital Cases in Iran explained that the maturity of hospital information systems can be assessed using the EMRAM Model which has stages 0 to 7. The method used to collect data in this study used interviews with the makers of the hospital information system. The results achieved in this study illustrate that the maturity level of hospital information systems in Iran has not yet reached stage 6 to 7.

The research, which is published in the journal *Validity and Reliability Test of the Political Participation Level of the Padang City Community*, was conducted by L4ia Amanda and her team. It explained that questionnaires are one of the data collection techniques used to analyze the attitudes, beliefs, knowledge, and characteristics of several people in an environment that affects an existing system. (Ayat & Sharifi, 2016). This study explains that the instrument or question item in the questionnaire is valid if the calculation > the table, and the questionnaire is reliable if it has a Cronbach's alpha (α) value of 0.6. This study used a questionnaire method to prove that the questionnaire distributed to the respondents was valid and trustworthy for measuring the research object.

The last related research was conducted by Anom Suseno and Aqwam Rosadi Kardian in 2021, with a journal entitled *Application of Prototype Models for Electronic-*

Based Medical Record Applications at MRCCC Siloam Semanggi Cancer Special Hospital. This produced a Prototype of a medical record application that had been tested using black box testing. (Suseno & Kardian, 2021). The method used in this study uses the prototype model, which starts with collecting information related to the needs of users or users and continues until the implementation stage. All test scenarios are successful in application testing using blackbox testing and can respond according to success indicators.

This study aims to investigate the factors influencing the adoption of smart home technology in Indonesia and assess the role of government policy, trust, and technology acceptance. Specifically, this study will examine how these factors contribute to consumers' intention to adopt and pay for smart home solutions. In addition, the study aims to identify practical recommendations for businesses and policymakers to create an environment that is more supportive of adopting smart home technology in Indonesia.

This research's results will benefit various stakeholders, including policymakers, technology developers, and consumers. Policymakers can use the results of this research to design policies that support the adoption of smart home technology. At the same time, businesses can tailor their offerings to match consumer expectations and local conditions better. Meanwhile, consumers will gain a deeper understanding of the factors driving the development and deployment of smart home technology to make wiser decisions regarding adopting these technologies.

Method

The steps that will be taken in this study start from identifying the downtime risk of electronic medical records by providing questionnaires to users. After getting the risk from electronic medical records, it is continued with the measurement of EMRAM standards and the ISO 22301 Framework used in electronic medical records in hospitals, specifically MRCCC Siloam Semanggi Cancer. Observations were made on the standard operating procedures that the hospital has implemented, especially MRCCC Siloam Semanggi Cancer, when there is downtime of electronic medical records. After observing the standard operating procedure, a questionnaire was distributed to users of electronic medical records, especially in the medical profession. Questionnaire questions test reliability and validity to become an appropriate and accurate questionnaire. The observation and dissemination of the questionnaire will result in an evaluation of the readiness of the risk of downtime of electronic medical records in hospitals, specifically MRCCC Siloam Semanggi Cancer. The research procedure to be carried out can be explained through Figure 1.

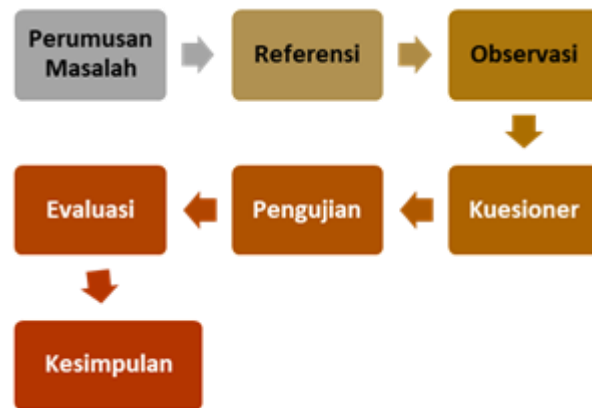


Figure 1. Research Procedure

From Figure 1, it can be seen that there are seven stages in researching and evaluating electronic medical records used in hospitals. Specifically MRCCC Siloam Semanggi Cancer. The explanation of each procedure in this study is as follows:

1. Problem Formulation

Research is necessary to find the basis of thinking to achieve specific goals. This study focuses on the risk of downtime of electronic medical records in hospitals, specifically MRCCC Siloam Semanggi Cancer. Electronic medical records are used to prepare for downtime using the EMRAM standard and the ISO 22301 Framework.

2. Reference

The research previously described about electronic medical records is a reference for the literature review used in this writing. The collection of references related to the EMRAM Standard and the ISO 22301 Framework is also the focus of the literature review as a deepening of electronic medical record material.

3. Observation

The observation step cited by Hasyim Hasanah is a systematic observation of human activity and physical regulation, where the activity continuously occurs from the focus of natural activity to produce facts (Hasanah, 2016). In making observations in this study, we will focus on the downtime of electronic medical records in hospitals—specifically MRCCC Siloam Cancer. In the event of electronic medical record downtime, the activities that will be carried out are to observe regulations or standard operational procedures for activities that can be carried out to continue to provide health services to patients, then what systems can be used when electronic medical record downtime occurs in hospitals, specifically MRCCC Siloam Cancer.

4. Questionnaire

This study will use a questionnaire, a data collection technique, to analyze several people's attitudes, beliefs, knowledge, and characteristics in an environment that affects an existing system. (Amanda et al., 2019) The questionnaire that will be submitted focuses on the risk of downtime of electronic medical records in hospitals, specifically for MRCCC Siloam Cancer, using the EMRAM Standard and ISO 22301 Framework

references. The questionnaire was distributed digitally to approximately 40 respondents who are general practitioners who use electronic medical records.

The respondents or samples to be taken are from the general practitioner population who have used electronic medical records. The population quoted by Ali Anwar is a generalization consisting of objects/subjects with specific qualities and characteristics determined by the researcher to be studied and then concluded. (Nuraeni & Inthaud, 2024; Wibowo et al., 2024).

The researcher will study the preexisting literature in the measurement step of the EMRAM standard and the ISO 22301 Framework. According to Amelia and Nurliana, a literature study describes theories, findings, and other research materials obtained from reference materials to be used as the basis for research activities. (Siregar & Harahap, 2019) The literature presented comes from the Healthcare Information and Management Systems Society (HIMSS), a model maker that is a reference in electronic medical record standards by all countries. The model that will be a reference is the Electronic Medical Record Adoption Model (EMRAM). From the EMRAM model, the researcher will focus on the downtime stage of electronic medical records by pulling the stages in the model description that have been determined and proven by the suitability of electronic medical records in hospitals, specifically MRCCC Siloam Cancer.

5. Testing

After completing the questionnaire, the next step was to use validity and reliability tests. The Reliability and Validity test uses Statistical Product and Service Solutions (SPSS) software. This test is expected to be reliable according to the predetermined size. The test results will be used to evaluate the downtime of electronic medical records in hospitals, specifically MRCCC Siloam Cancer.

6. Evaluation

In this step, a comparison is made between the observation results plus the results of the questionnaire with the EMRAM standard and the ISO 22301 Framework. Different or different results will be obtained and used as a conclusion in this study. The larger the difference

that occurs, the it indicates that the electronic medical record system in the hospital. Especially for Cancer, MRCCC Siloam does not have reasonable standards when there is downtime for electronic medical records.

Furthermore, the conformity that has been proven in the previous step will be taken with the availability of standard operating procedures enforced in the hospital. In this step, standard operating procedures will be obtained for each activity carried out to overcome the downtime of electronic medical records set by hospital leaders. By comparing the evidence made with the availability of applicable standard operating procedures, the process of handling downtime of electronic medical records can be a standard that every user or user of electronic medical records must carry out.

7. Conclusion

The results of the evaluation carried out at the evaluation stage will be the conclusion of this study. This step will focus on the conclusion, which will answer the

problem formulation that has been designed. At this stage, the design of improvement steps that can be done to improve the ability of electronic medical records in hospitals, specifically MRCCC Siloam Cancer, will also be discussed.


Results and Discussion

In the results and discussion section, we explain the activities that start from the hospital profile. Specifically, for MRCCC Siloam Semanggi Cancer as the object of research, the distribution of questionnaires also conducts observations, calculations for testing, and the evaluation of test results.

Hospital Profile. MRCCC Siloam Cancer Specialty

Hospital Profile. MRCCC Siloam Clover Cancer in general can be seen through table 2.

Table 2. Hospital Profile. MRCCC Siloam Clover Cancer Special

Heading	Fill
Company Name	RS. MRCCC Siloam Clover Cancer Special
Type of Service	Hospital
Address	Jl. Garnisun Dalam No. 2-3 Karet Semanggi, South Jakarta 12930
Motto	<i>The Building of Hope</i>
Vision	a. International <i>Quality</i> b. Reach c. Has a Wide Network (<i>Scale</i>) d. Serving with Godly <i>Compassion</i>
Mission	To be a trusted choice to get holistic health services, research, especially cancer, and international standards. (<i>The trusted destination of choice for "holistic world class Healthcare, Health education and research</i>)
Values	a. <i>Stewardship</i> b. <i>Integrity</i> c. <i>Compassion</i> d. <i>Respect</i> e. <i>Innovation</i>
Phone number	021 – 2996 2888
Website	www.siloamhospitals.com
Logo	
Superior Facilities	a. Pet-CT b. <i>Radiotherapy</i> c. <i>Mammography</i> d. CT Scan MRI (<i>Magnetic Resonance Imaging</i>) e. <i>Gamma Camera SPECT</i> f. <i>Medical Ozone Therapy</i>

Heading	Fill
Superior Service	<ul style="list-style-type: none"> a. <i>Breast Cancer Care Alliance (BCCA)</i> b. <i>Gastrointestinal Cancer Center (GCC)</i> c. <i>Gynaecology Oncology Clinic</i> d. <i>Palliat4e Clinic</i> e. <i>Wound and Stoma Clinic</i> f. <i>Radiation Oncology</i> g. <i>Nuclear Medicine dan Anatomical Pathology & Mollecular Diagnostic Center (MDC)</i>

Source: Data processed

RS. MRCCC Siloam Semanggi Cancer has also partnered with Digestive Surgery Consultants, Pulmonary Oncology Consultants, Gynaecological Oncology Consultants, ENT-KL Consultants, Oncology Surgery Consultants, Oncology Hematology Consultants, Paediatric Oncology Consultants, Radiation Oncology Consultants, Orthopaedic Oncology Consultants, Neuro-Oncology Consultants, Gastro Enterohepatology Consultants, Urology Surgery Consultants, Anatomical Pathology Laboratory Specialists, Clinical Pathology Laboratory Specialists, doctors Nuclear Medicine specialists and Radiologists (including Interventional Radiologists).

Hospital Information Management System

RS. MRCCC Siloam Semanggi Cancer in 2019 began to use a Medical Record Information Management System called Electronic Medical Record (EMR) in outpatient services. The discussion of the hospital information management system prioritizes the service policy of the information, communication, and technology (ICT) department, which is the basis of information and communication technology services in hospitals. MRCCC Siloam Cancer Specialty

Clover is of high quality and meets international standards. The room used by ICT for operations has two rooms: the server room on the 22nd floor and the ICT staff room on the 20th floor of the hospital building. This is specifically for MRCCC Cancer Siloam Semanggi Jakarta. Table 3 displays the standard needs of facilities in the ICT room.

Table 3. ICT Room Facilities

Room	Function	Space area	Facility Needs
Data Center/ Server Room	Server room to store information and process data, as well as a <i>network center</i>	10 m2	- <i>Server</i> - <i>Switch</i> - <i>Core</i> - UPS - Rak server - Modem
Ruang Staff ICT	ICT operational staff workspace, <i>network computer</i> remote control room	38 m2	- PC Computer - <i>Switch</i> - Printer - Telephone - Meja, kursi - Cabinets/Shelves

Health services at the hospital. MRCCC Siloam Semanggi Cancer, which has a towering building structure, relies heavily on technology to provide patients health services, which is a challenge in itself, so that each service can be integrated. In addition, electronic medical records used since 2019, which are still under development to achieve national and international standards, are a challenge today.

Electronic Medical Record Downtime Observation

Downtime observation of electronic medical records at the hospital. MRCCC Siloam Semanggi Cancer Special, using the basis of understanding from the ISO 22301 Framework. Observation begins by listing conditions to be observed, then grouping against the ISO 22301 Framework. The conditions obtained based on the ISO 22301 Framework continue with the suitability of the observation results, so it is expected to provide information on readiness to face the downtime of electronic medical records in hospitals. Specifically for MRCCC Siloam Semanggi Cancer, which has achieved the ISO 22301 Framework standard.

Table 4 shows a list of observation conditions that will be used to observe downtime of electronic medical records in hospitals. MRCCC Siloam Clover Cancer-Specific, which refers to the ISO 22301 Framework, is shown.

Table 4. List of Observation Conditions

No	Observation Conditions	ISO 22301 Framework Clauses
1	Whether the structure of electronic medical record activities is contained in the hospital organization and its context	4
2	Is there Leadership and Commitment to the use of EMR	5
3	Is there a policy for the implementation of electronic medical records	5
4	Does the hospital leadership define the roles, responsibilities, and authority for Implementation	5

No	Observation Conditions	ISO 22301 Framework Clauses
5	Is there a plan before using electronic medical records to reduce the impact or risk of <i>downtime</i>	6
6	Is there a downtime simulation of electronic medical records	6
7	Does it have competent human resources	7
8	Is there a line of communication for the use of electronic medical records?	7
9	Is there planning and control when starting the implementation of electronic medical records	8
10	Do you have a plan and solution when there is <i>downtime</i> of electronic medical records	8
11	Is there a regular training program for the use of electronic medical records?	8
12	Whether the use of electronic medical records is evaluated and monitored	9
13	Whether internal audits are carried out regularly using electronic medical records.	9
14	Is there a periodic improvement of the electronic medical record feature?	10
15	Whether improvements are made from the results of internal evaluations and audits	10

Source: Data processed

Each condition determined in Table 4 is assessed by giving a score. For conditions that are entirely by the observation conditions, 10 points will be given and for conditions that are only partially in conformity, only 5 points will be provided. However, no points will be given if there is no conformity with the observation conditions. The points obtained will be calculated on an average basis of achieving the ISO 22301 Framework standard.

The results of downtime observation of electronic medical records at the hospital. MRCCC Siloam Clover Cancer is as follows:

1. Is The Structure of Electronic Medical Record Activities Contained in The Hospital Organization And Its Context?

The structure of electronic medical record activities derived from the electronic medical record policy is not explicitly mentioned in the hospital's organizational structure. However, it is stated that the person who manages the electronic medical record system is in the hospital's Information Communication and Technology department. Especially MRCCC Siloam Semanggi Cancer and in the assistance of the Medical Records Department as a user who is a liaison with manual medical record rules. From observing the condition, it was found that only some were suitable, so they got 5 points for this condition.

2. Is There Leadership and Commitment to The Use of Electronic Medical Records?

As the leader, the hospital director issues the decision through an internal hospital memo. Specifically, for MRCCC Siloam Semanggi Cancer number 073/M.Dir/X/19 concerning Go L4e EMR contains instructions for all employees, including all health service providers, to use electronic medical records when filling out medical records. The results of the observation of this condition get 10 points because it was found that in this condition, the leader decided to commit to using electronic medical records.

3. Is There a Policy for the Implementation of Electronic Medical Records?

RS. Specifically for MRCCC Siloam Semanggi Cancer, part of the Siloam Hospitals Group, issues policies or regulations that conflict with Siloam Hospitals Central. The policy issued by the Central Siloam Hospitals is made and circulated to the Siloam Hospitals Group for the policy of electronic medical records. MRCCC Siloam Semanggi Cancer Special is enacted two years after electronic medical records are used due to the current policy of electronic medical records at hospitals. Especially for MRCCC Siloam Semanggi Cancer, which has been used, the results of the observation of this condition get 10 points, because there is a policy for implementing electronic medical records.

4. Whether The Hospital Leadership Determines The Roles, Responsibilities, and Authority for Implementation

Before issuing the internal memorandum of commitment of the leadership to use electronic medical records, the hospital director attended a meeting attended by the head of the health services section, to be given the duties and responsibilities and the authority to initiate the change to electronic medical records. The head of the medical records section ensures the preparation of media transfer from paper manual medical records to images. Then the medical department is given the authority to ensure that each doctor agrees to switch to electronic medical records. The head of the Information Communication and Technology section was also given the main task: ensuring that the preparation of electronic medical records has exceeded the minimum limit needed for operations. The results of the observation of this condition get 10 points,

Because every part related to electronic medical records has been determined its duties and responsibilities.

5. Is There Any Planning Before Using Electronic Medical Records to Reduce the Impact or Risk of Downtime?

Before the change from manual medical records to electronic, it has been agreed by the head of the medical records section to start the media transfer process by scanning the medical record file and storing it in .pdf filetype so that it can be accessed by health service providers when there is a need to see the patient's service history without using

manual medical records. This is supported by hospital leaders and also heads of other sections. In addition, another plan is to invite health service providers to conduct a trial of the available features. After receiving feedback from health service providers, users are socialized thoroughly. Another plan is to add hardware that can provide backups when a switch occurs. Another thing that is done in other planning is to ensure that the condition of the WiFi internet network and intranet runs above the minimum required specifications. The most crucial planning before the enactment of electronic medical records is to replace all health service devices, such as computers, laptops, monitors, speakers, and printers, that are standard for electronic medical records to be used. The planning condition before using electronic medical records gets 10 points, because there have been changes in all the needs of electronic medical records before health care providers use them.

6. Is There a Downtime Simulation of Electronic Medical Records?

Since using electronic medical records, the simulation of the occurrence of downtime of electronic medical records has only been carried out once since it was used. Meanwhile, the standard in dealing with disaster events is that it is needed at least once a year to simulate the downtime of electronic medical records. When observing the downtime history of electronic medical records, the scheduling of electronic medical record downtime simulations is constrained by the many requests from health service providers for complaints that occur. However, with the assessment at the time of hospital accreditation, the downtime simulation of electronic medical records was conducted only with a few users or users. This makes the conditions for conducting electronic medical record simulations inconsistent in dealing with disasters, so the points obtained in this condition get 5 points.

7. Whether it Has Competent Human Resources

Human resources at the hospital. Specifically for MRCCC Siloam Semanggi Cancer, there is a selection by government regulations set for hospitals. Electronic medical records require a diverse workforce, ranging from creators with an information system software background, a liaison between users and creators, some with a background in doctors and

pharmacy. In addition, at the time of socialization, it is accompanied by competent people in the profession by the electronic medical record module. To ensure competent human resources, each profession must have a certificate in mastery in information systems. Observation in this condition gets 10 points, because the person involved in electronic medical records has a certificate and background according to the profession.

8. Whether There is a Communication Line for Using Electronic Medical Records

In the phase of determining tasks and responsibilities, it has been determined that the person with the responsibility and authority can receive directions from the user and forward them to the creator so that the electronic medical record feature can be improved.

Apart from the person the hospital leadership has appointed, there are communication channels through e-mail and social media groups. This makes the expected communication line easy to use so that users can provide responsive directions.

9. Whether There is Planning and Control when Implementing Electronic Medical Records

After the planning before the use of the electronic medical record is fulfilled and completed by each section, then at the time of starting the use of the electronic medical record, a periodic evaluation schedule is made, which is carried out through a meeting with the person in charge, whom the hospital leadership has determined. In electronic medical records, user compliance is monitored, and evaluations are carried out to ensure the sustainability of electronic medical records. How to do monitoring by taking from the recapitulation of electronic medical records and displaying the completeness of the filling. The evaluation is done by providing users with personal information regarding the improvement. The result of this condition gets 10 points because it met the control conditions when starting the implementation.

10. Do You Have Plans and Solutions when Electronic Medical Records are Down?

Downtime incidents of electronic medical records have occurred several times, which has led to a temporary return to manual medical records, namely handwritten records. The downtime solution for electronic medical records by restoring health services to manual is currently still an alternative to use. The planning that the electronic medical record team will socialize is the electronic medical record BCP system, which is a replacement system used when the electronic medical records are down. The electronic medical record (BCP) system currently being developed can record the history of previous health services until one day ago. Recording done manually with a handwritten note will be used as a media transfer or scanned into a .pdf file and stored in the patient's electronic record. The current solution is still inefficient and can cause health services to take longer. So, when electronic medical records are down, it is difficult for all users to provide health services to patients. Although there is still a need to improve features for solutions when electronic medical record downtime occurs, because there are plans and solutions that have been prepared, the points obtained are as many as 10 points.

11. Is There a Regular Training Program for Using Electronic Medical Records?

Electronic medical records are socialized before users get access to them. However, there is no periodic scheduling for the electronic medical record training program, so users still do not know thoroughly. This is known based on the number of questions asked to the person in charge of electronic medical records. The observations in this condition show that the electronic medical record training program is only given at the beginning, and no training schedule is given periodically, so it gives 5 points.

12. Whether The Use of Electronic Medical Records is Evaluated and Monitored

After 4 years of use, electronic medical records continue to be developed because there are still many features that health care providers cannot use. Monitoring the use of electronic medical records is carried out every month by making electronic medical record reports. In addition, the evaluation that needs improvement is the user's habit of using electronic medical records in full and with sentences that have a clear meaning. This is expected because, in the future, electronic medical records will be integrated with government-owned health platforms, so that all incomplete and unclear records can cause a misunderstanding of information retrieval nationally. However, this does not reduce the results of observations on this condition, which makes the points obtained as many as 10 points.

13. Whether Internal Audits are Carried out Using Electronic Medical Records Regularly

The addition of features is carried out by receiving directions from health service providers according to their needs. The supervision or audit is carried out only when there is a malfunction in the function of the electronic medical record module. The schedule for updating or improving features is improved within three months, and this is expected to be adjusted for the users of electronic medical records. There is an absence of officers who specialize in conducting periodic internal audits. However, audits are still carried out by each user of electronic medical records, acquiring points in this condition as many as 5 points.

14. Is There A Periodic Improvement of The Electronic Medical Record Feature?

All electronic medical record modules in the hospital. Especially for MRCCC Siloam Semanggi Cancer, not all health services can use the electronic medical record feature. Emergency services, hemodialysis, chemotherapy, radiotherapy and nuclear medicine still use manual medical records. As for the maker part

Electronic medical records continue to improve the features that health service providers will use. Feature improvements continue to be evaluated every three months to improve the electronic medical record feature to be completed on December 31, 2023. The existence of a process of enhancing the electronic medical record feature and determining the completion time gives this condition as many as 10 points.

15. Whether Improvements Were Made from The Evaluation and Internal Audit Results

The results of the evaluation and feature improvement requests from electronic medical record users are processed and a priority list for developing electronic medical record features is made. However, every request for improvement of electronic medical record features cannot be determined by the completion time, so many requests for electronic medical record features are held back and have not been improved as expected. Electronic medical record features that have been enhanced include outpatient services,

surgery schedules, and hospitalizations. Many electronic medical record features still cannot be used in health services, assessing with this condition gets as many as 5 points.

The results of the discussion of observations using the ISO 22301 Framework in the hospital. Specifically, MRCCC Siloam Semanggi Cancer has a standard level of readiness for electronic medical record downtime of 83%, per the standard.

Questionnaire for Doctors Using Electronic Medical Records

In the discussion of observation, it is explained using the basis of the ISO 22301 Framework, while for the questionnaire of electronic medical record users using the Electronic Medical Record Adoption Model (EMRAM). The questions from the questionnaire asked of general practitioners, who are users of electronic medical records, will describe part of each stage or level contained in the formulation of the Electronic Medical Record Adoption Model (EMRAM). Fifteen questions were asked of doctors working at the hospital through a questionnaire—specifically MRCCC Siloam Semanggi Cancer. The questionnaire was circulated using doctors' social media, targeting 23 general practitioners using electronic medical records. There are 21 answers to the questionnaire results collected. Table V displays all questions and stages or levels in the Electronic Medical Record Adoption Model (EMRAM) standard.

Table 5. Kuesioner Electronic Medical Record Adoption Model (EMRAM)

It	Question	Stage EMRAM
1	To see laboratory and radiology results, have you used electronic medical records?	0
2	If the electronic medical records <i>are down</i> , are the laboratory and radiology results still accessible?	0
3	With the supporting results of electronic medical records, can it provide you with analysis to make patient service decisions?	1
4	During the downtime of electronic medical records, can manual support results in paper give you value when making patient service decisions?	2
5	In the patient's medication delivery record, has the drug administration history appeared in the electronic medical record?	3
6	Is there a backup system used during <i>downtime</i> of electronic medical records to view the history of medications administered?	3
7	Can you view the patient's visit history on the electronic medical record?	4
8	When electronic medical records <i>are down</i> , are you given an alternative to view the patient's visit history?	4
9	Can electronic medical records automatically monitor patients' conditions?	5
10	Do you have a manual record for monitoring the patient's condition used when the electronic medical record cannot be used?	5
11	Can patients assess the health services you provide to patients through a system or application?	6
12	Can electronic medical records analyze every side effect or medical error?	6
13	Can recording errors in electronic medical records be changed?	6
14	Can you find out the medical records of patients handled by other doctors?	7

It	Question	Stage EMRAM
15	Have you ever felt like you have lost a patient's medical records stored in an electronic medical record?	7

Source: Data processed

Based on table V, the respondents were asked questions. They produced answers in the form of data as standard assessment material for the Electronic Medical Record Adoption Model (EMRAM) in dealing with the downtime condition of electronic medical records in hospitals, specifically MRCCC Siloam Semanggi Cancer. The results of the questionnaire filled out by the respondents can be seen in Figure 2.

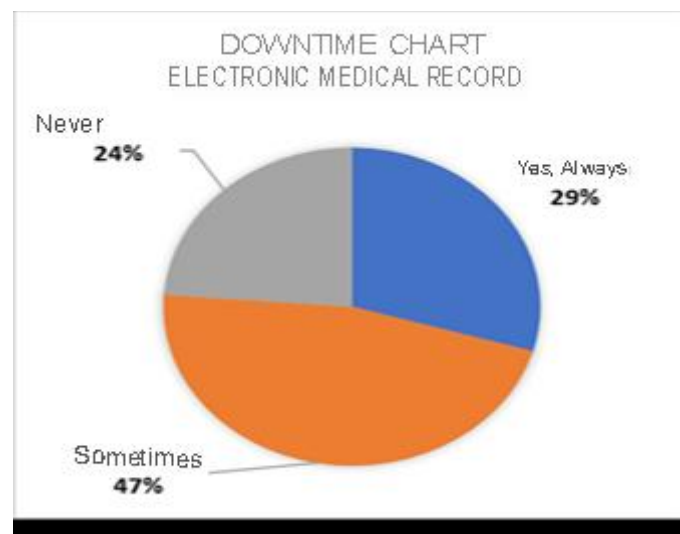


Figure 2. Electronic Medical Record Downtime Graph

Electronic medical records are always described as fully available in a questionnaire with a "yes" answer. Then, questionnaires with "sometimes" answers describe the availability of electronic medical records but are inconsistent in their use. Meanwhile, the questionnaire with the answer "never" describes the unavailability or non-use of electronic medical records in hospitals, specifically MRCCC Siloam Semanggi Cancer.

Validity and Reliability Test on Questionnaire

Discussion of validity and reliability tests on questionnaires circulated and answered by general practitioners at the hospital. MRCCC Siloam Semanggi Cancer uses Statistical Product and Service Solutions (SPSS) software. The criterion or limit of a valid test score is that the calculated correlation value is greater than the table correlation. The correlation value of the table with a significance of 5% for the number of 21 respondents is 0.4438, so that for questionnaire questions with a significant value of < 0.05 and with a correlation of $>$ results of 0.4438 can be declared valid. Figure 3 displays the calculation

results using SPSS to express the correlation value on the questionnaire distributed to the hospital's general practitioner, specifically MRCCC Siloam Semanggi Cancer.

The 15 questions in the questionnaire about the downtime of electronic medical records distributed to hospital general practitioners were all valid. Specifically, the validity test results showed 15 valid questions for MRCCC Siloam Semanggi Cancer.

Figure 4 shows that the Cronbach's Alpha value calculation results are 0.872. The criterion for the value of Cronbach's Alpha that is declared reliable is > 0.6 . The reliability calculation results in the hospital's electronic medical record downtime questionnaire. MRCCC Siloam Semanggi Cancer is $0.872 > 0.6$, so it has met the criteria and is declared Reliable.

Evaluation

Based on the results of observations using the ISO 23301 Framework standard, it is known that electronic medical records are ready to deal with the downtime condition of electronic medical records, which reaches a percentage of 83%. Then based on the results of the questionnaire that refers to the basis of the Electronic Medical Record Adoption Model (EMRAM) standard, validity and reliability tests have been carried out with the achievement of routine use of electronic medical records with a yes answer of always 29.5%, then for the use of inconsistent electronic medical records by 46.7%, and also for unused electronic medical records by 23.8%.

Conclusion

RS. Specifically for MRCCC Cancer, Siloam Semanggi has implemented electronic medical records since 2019, starting from health services for outpatient and supporting services. The development of three years has made handling downtime of electronic medical records one of the priorities. Downtime of electronic medical records is also included in the Hospital Information Management System policy, which needs to be done 2 times a year, with a duration of 60 minutes—evaluation of the readiness of downtime of electronic medical records in hospitals. Specifically, MRCCC Siloam Semanggi Cancer uses two methods, the ISO 22301 Framework method using observation and the Electronic Medical Record Adoption Model (EMRAM) method by providing questionnaires to users or general practitioners as users of electronic medical records. The observation results show that the use of electronic medical records is ready to deal with the downtime of electronic medical records, reaching a percentage of 83%. The questionnaire's validity and reliability test results have met the correlation and significance criteria. They are considered valid for all questions and have met Cronbach's Alpha value criteria, which states they are reliable. The standards applied when there is a risk of downtime of electronic medical records, already have readiness starting from the leadership to the users or users of electronic medical records in health services in hospitals, specifically MRCCC Siloam Semanggi Cancer.

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