



# APPLICATION OF RAPID APPLICATION DEVELOPMENT METHOD IN MORTALITY DATA PROCESSING INFORMATION SYSTEM

<sup>1</sup>Annisa Senja Risnandar Putri, <sup>2</sup>Yuda Syahidin, <sup>3</sup>Annisa Ulfah

<sup>1</sup>Student, <sup>2</sup>Lecturer, <sup>3</sup>Lecturer

<sup>1</sup>Health Information Management

<sup>1</sup>Politeknik Piksi Ganesha, Bandung, Indonesia

**Abstract:** Technology and digitalization have become important in the healthcare industry worldwide. The Ministry of the Republic of Indonesia requires that electronic medical records be implemented in all health facilities under the Medical Records Unit. The reporting department uses death data as the basis for death reports. Researchers have consistently found that data processing and mortality reporting relies largely on manual methods. Therefore, when data collection is inconsistent, it results in violations of mortality statistics reporting, which in turn negatively impacts the quality of medical record reporting. This work aims to develop an information system that efficiently handles mortality data, thereby increasing ease of use and minimizing associated risks. This data processing information system was built using Visual Studio 2012 and Microsoft Access, which functions as a database and accelerates rapid application development. The result of this research is a Death Data Processing Information System which is designed to assist hospitals in producing high quality death reports and data that is compatible and interoperable. This system ensures the availability of accurate and easily accessible health information.

**IndexTerms - Data Processing, Information Systems, Mortality, Rapid Application Development**

## INTRODUCTION

Digitalization in the Indonesian health sector has become a major highlight, especially since the era of the industrial revolution 4.0 which triggered the digital transformation of health which mapped out pathways for the digitalization of health care services in Indonesia. The Indonesian government strongly supports and encourages the use of digital technology for health. Digital technology for public health in the future (RI, 2021). Indonesia's quest for a healthy nation requires the involvement of several stakeholders, who will use data and technology.

The Indonesian healthcare industry has begun using electronic medical records to adopt technological advances and digitalization. Electronic medical records are digital records created and maintained using electronic technology for the purpose of storing medical information (PERATURAN MENTERI KESEHATAN REPUBLIK INDONESIA NOMOR 24 TAHUN 2022 TENTANG REKAM MEDIS, 2022). Minister of Health Regulation No. 24 of 2022 concerning Medical Records orders every health care institution to maintain electronic medical records.

Hospital leadership will use integrated data processing as the primary method to achieve effective and efficient policies (Budi et al., 2023). The reporting division is under the supervision of the medical records unit. Medical records officers must have the skills to record health care actions that turn data into information, which includes handling mortality statistics (Rahmaliani et al., 2023). Death Reports are carried out with the aim of preventing fatal diseases and evaluating the performance of health institutions (Welhelmina et al., 2022). Death reports produce a variety of information, including hospital death statistics such as hospital mortality data reports, household death index reports, and cause of death certificates (Mustofa et al., 2022). Health data must comply with the following requirements: it must be based on objective measures that can be observed and measured, must reflect data that has been observed, and must also meet quality standards (accurate, complete, consistent and timely) (Permenkes 18, 2022). Unfortunately, some hospitals have not yet adopted electronic medical records, especially with regard to managing mortality data and reporting them manually. This manual approach is flawed, as it is time consuming and prone to inaccuracies caused by human error. As a result, the lack of a computerized system results in a slow process for reporting patient deaths (Syahidin and Trioktafiani 2019)(Rizkita et al., 2021).

From this description, the aim of this research is to develop a mechanism for reporting death data which is used to solve problems in managing death data by increasing service efficiency and developing a computerized system for data processing (Ihromi et al., 2023). This software development uses the Rapid Application Development (RAD) methodology because of its ability to reduce the time required to build information systems compared to conventional approaches (Aini et al., 2019). It is also used to effectively handle patient death data to assist medical records units in generating high-quality death reports.

## RESEARCH METHODOLOGY

Research techniques are systematic approaches used by researchers to collect information and conduct research on the data obtained. The researchers used two approaches: data collection methods and software development methods.

### 2.1 Data Collection Techniques

The qualitative method with a descriptive approach is the data collection technique used in this research.

#### 2.1.1 Field study

Conducted with the aim of collecting first-hand data for reviewers. In this segment, the researchers were actively involved and personally participated in a medical documentation operation at a hospital located in West Java Province, Indonesia.

#### 2.1.2 Interview

This includes collecting information and data by conducting interviews with medical records installation managers, health records staff, and doctors. This allows researchers to obtain data and facts related to a particular language.

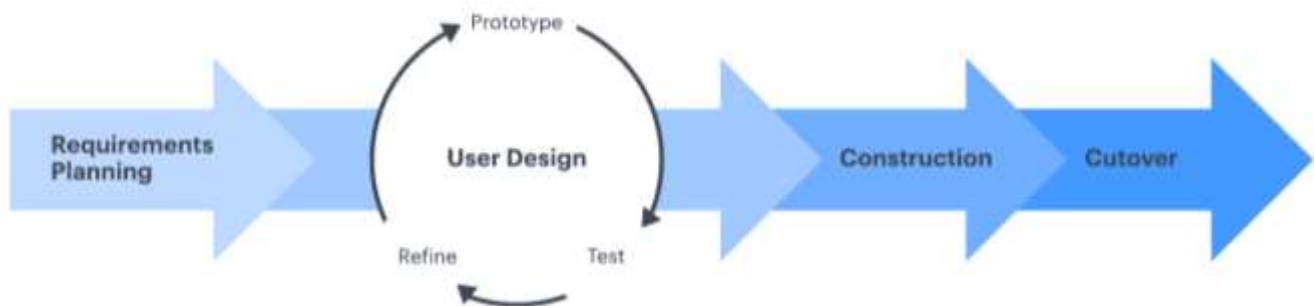
#### 2.1.3 Literature study

Focuses on collecting secondary data by analyzing ideas presented in various literary sources that are relevant to the research problem. This is achieved through a process of searching and analyzing literature, books, journals, and notes, along with previous research that substantiates the topics discussed in this composition.

### 2.2 System Development Model

The researchers used Rapid Application Development (RAD) techniques, a paradigm in the Systems Development Life Cycle (SDLC), to build this program. The reasons for using a Rapid Application Development (RAD) approach are its many benefits, such as reduced development cycles, more flexibility, increased user involvement, and the ability to reduce the occurrence of errors. There are several stages of system development in the Model *Rapid Application Development* (RAD) namely:

**Figure 1: Rapid Application Development (RAD)**



#### 2.2.1 Reqrutments Planning

This stage is the first stage of system development, where the focus is on identifying problems and collecting data from users or user stakeholders. The aim is to determine the goal or ultimate goal of the system, as well as specific information requirements (Iqbal, 2024). Currently, researchers are actively conducting field work to solve ongoing problems and determine the components needed to create application systems (Rizkita et al., 2021).

#### 2.2.2 User Design

Process steps include developing strategies that meet requirements, executing them according to plan, and predicting and dealing with any problems that may arise. This research uses Unified Modeling Language Tools (UML) in system design to increase user understanding.

#### 2.2.3 Construction

This stage serves as the first step in building the system. This process begins with compiling program code, usually called coding, with the aim of turning the system in question into a planned application (Nurman Hidayat & Kusuma Hati, 2021).

#### 2.2.4 Cutover

Prior to implementation, it is critical to submit all integrated system components to comprehensive black box testing to minimize the possibility of system damage.

## RESULTS AND DISCUSSION

This chapter provides an overview of the research strategy and results, which include the development of a medical record information system focused on mortality. This system includes several pages and functions. The researchers developed an information system using Microsoft Visual Studio 2012 and a Microsoft Access database.

### 3.1 Requirments Planning

**Tabel 1: User's Requirements**

No	Username	Description
1	Hospitalization Admin	<i>Login</i> , Managing patient death data, Managing Morbidity Reports, <i>Logout</i>
2	Medical records	<i>Login</i> , Managing Morbidity Reports, <i>Logout</i>

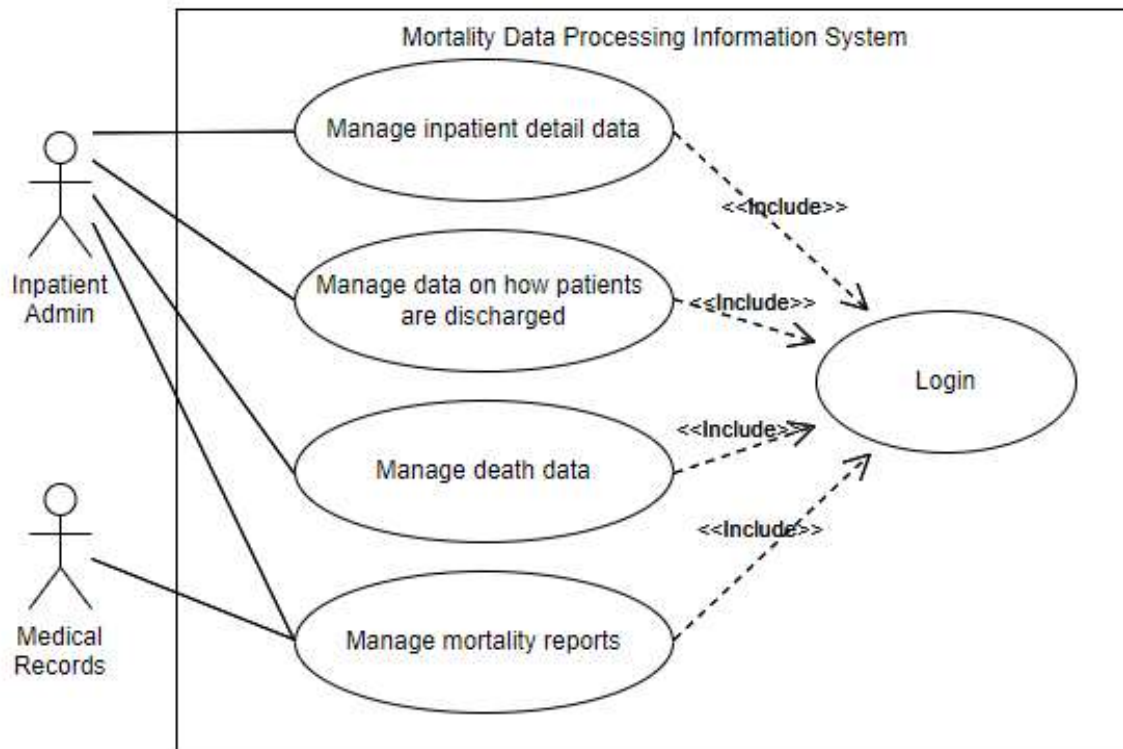
Table 1 displays the user names and descriptions that are intended to have access rights in the system. This stage was carried out by interviewing and analyzing by going directly to one of the hospitals in Bandung Regency, Indonesia. System requirements are mapped based on user categories according to needs (Android, 2023).

### 3.2 User Design

User design refers to the systematic process of creating and improving a proposed application to meet requirements and ensure that it functions as intended, thereby solving existing problems. Preliminary structure for Medical Death Records uses UML to provide use cases and activity diagrams.

#### 3.2.1 Use Case Diagram

**Figure 2: Use case diagram of the Mortality Data Processing Information System**

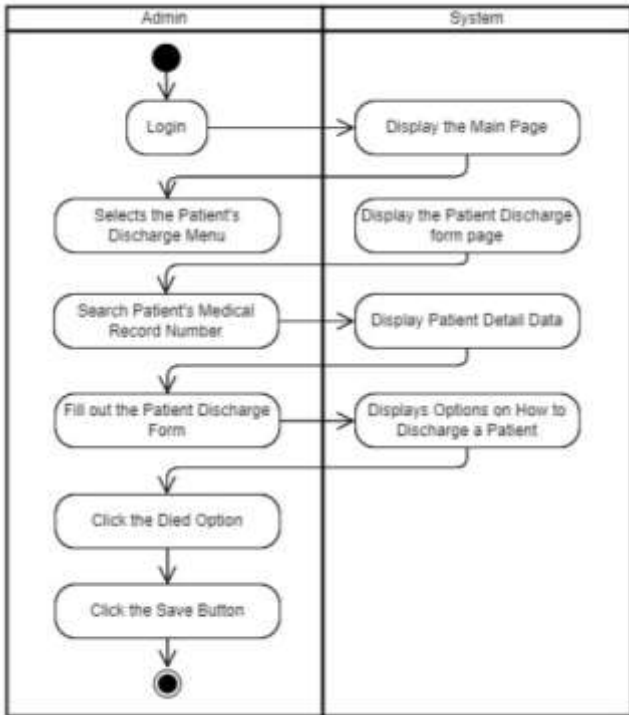


*Use Case Diagram* is a graphical representation in Unified Modeling Language (UML) that depicts interactions between actors and a system, specifically highlighting the actions that actors can perform on the system. A use case diagram depicts a specific task, whereas an actor represents an individual or group of individuals who engage with the system to perform a specific action (Badrul et al., 2020). Figure 2 illustrates this. Each participant in this information system, consisting of hospital managers and medical records workers, has a unique and specific function within the system.

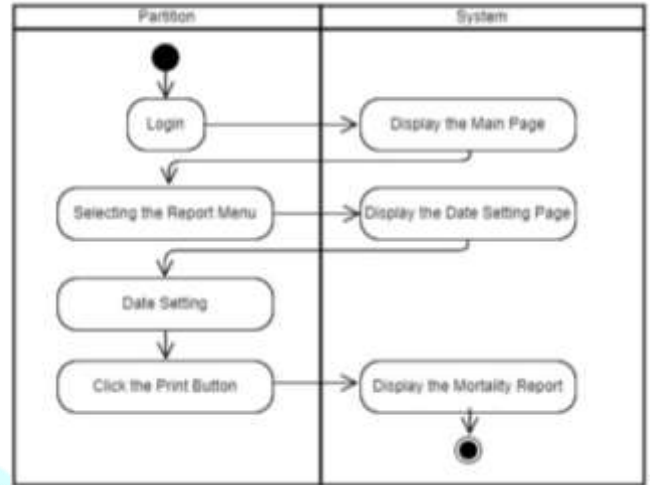
#### 3.2.2 Activity Diagram

*Activity diagram* is one that describes in detail the behavior and internal logic of complex operations within a system (Triana et al., 2021). Figures 3 and 4 illustrate that this system is capable of executing process flows for each individual subsection (object). After that, the database builds connections between these things (Abdillah, 2021).

**Figure 3: Activity Diagram of Deceased Patient Data Management**



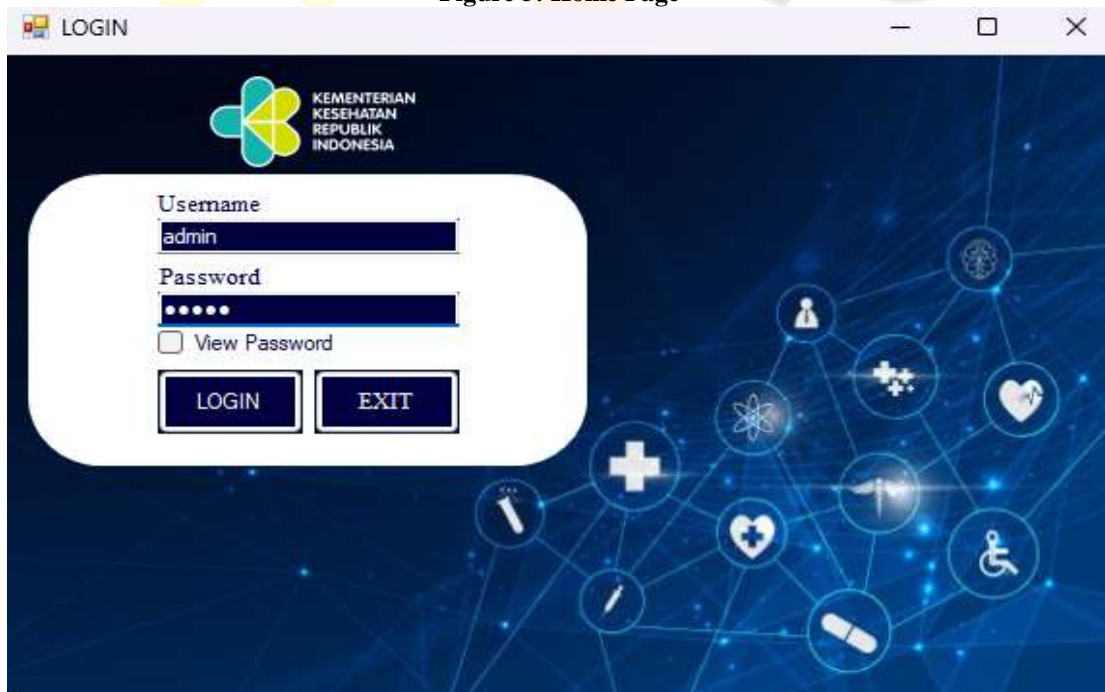
**Figure 4: Activity Diagram of Mortality Report Management**



**3.3. Construction**

During the RAD (Rapid Application Development) process, the construction phase involves direct collaboration between developers and users to produce a definitive concept, build a prototype, and conduct prototype testing. Program-coding, sometimes known as coding, is the process of converting an existing system design into a functional application. SQL is used as a programming language, Microsoft Access for databases, and Visual Studio Basic 2012 as a tool for building information systems.

**Figure 5: Home Page**



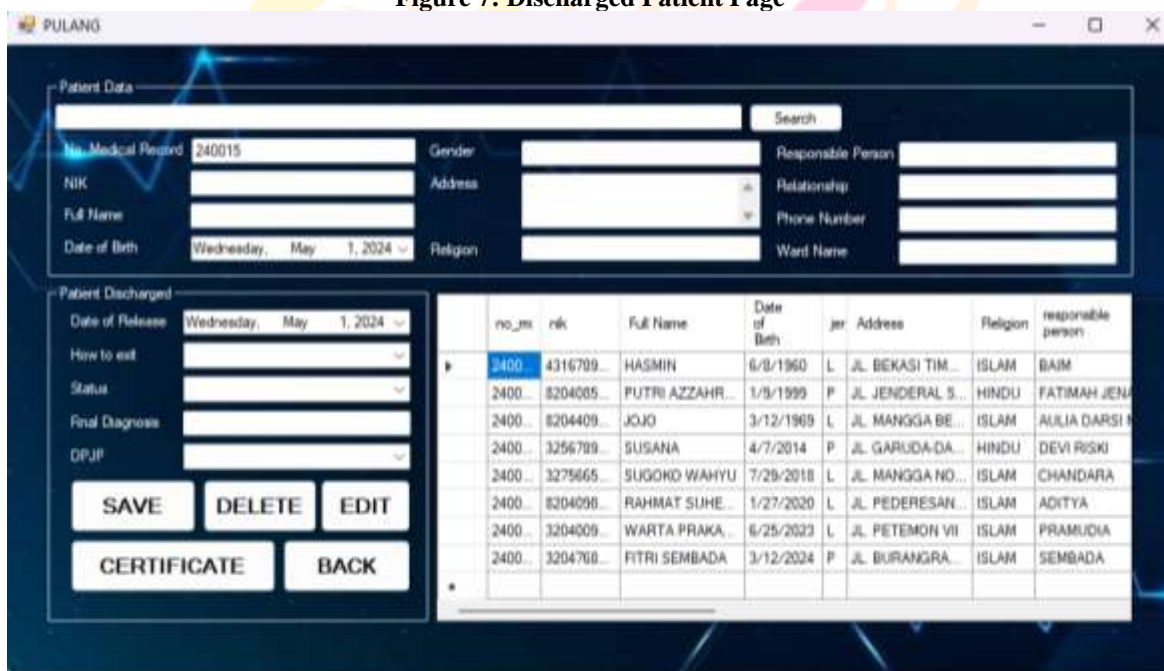
When the system is opened, the first display that appears is the display *login* which describes the form used by *user* to be able to access the Mortality Medical Record Information System, as in Figure 5 To access the Mortality Medical Record Information System you must first do *login* by filling in *username* and *password*. *User* can get into the system that will be run by using *button login* If *user* have filled *username* and *password* correct and registered. If *button exit* then the user will exit the system to be run.

**Figure 6: Main Menu Page**



In figure 6 the display of the Main Menu Page which is the main page after *user* do login. After *User* do login faced with a *main menu* that displays options for the need to carry out mortality reporting, as well as *button* Incoming patients are in the form of data on patients who will enter the inpatient room, Outgoing patients are in the form of data on patients who are already in the inpatient room and display a certificate of how the patient was discharged, Reports are in the form of patient mortality reports.

Figure 7: Discharged Patient Page



*Page Patient Goes Home* which displays *form* how the patient goes home from the patient going home recovered until the patient goes home dead based on a statement from the doctor who treated the patient. Figure 7 shows a patient recovery form which includes a multifunction button. This button allows the user to save, modify, delete, cancel, print the patient return letter, and return to the previous page.

Figure 8: Report Menu Page



Figure 8 is the report page that displays the report form. By setting the date the user then clicks the print button. This form is equipped with a Show button that makes it easy to see the report results. Crystal Report is integrated with Microsoft Visual Studio 2012 to provide reports.

Figure 9: Mortality Report

No. RM	Full Name	Gender	Date of Birth	Date of Release	Status	Doctor	Final Diagnosis	Ward Name
248014	NASRIM	L	09/1968	3/16/2024	Dead-48	dr. DADAH, Sp.PD. FINASIM	PNEUMONIA	R. LAFUJ
248007	FITRI BEHBADA	P	3/4/2006	3/14/2024	Dead-48	dr. BORO, Sp. A.	SIDS	R. MARIY
248008	WANTAPRAKASA	L	02/02/27	2/27/2024	Dead-48	dr. DADAH, Sp.PD. FINASIM	PNEUMONIA	R. LAFUJ
248009	RAHMAT SUHENDAR	L	12/7/2020	3/13/2024	Dead-48	dr. DADAH, Sp.PD. FINASIM	STROKE	R. SONTI
248010	SUGOKO WAHYU	L	7/29/2019	2/27/2024	Dead-48	dr. Denny, Sp.OT	GASTROENTERITIS	R. MARIY
248011	SUSAMA	P	4/7/2014	3/29/2024	Dead-48	dr. Denny, Sp.OT	STROKE	R. MARIY
248012	JOJO	L	3/7/1989	3/14/2024	Dead-48	dr. Butaruddin, Sp.B. PICS	TUBERKULOSIS	R. SONTI
248013	PUTRI AZHARALARA	P	1/9/1998	3/29/2024	Dead-48	dr. Butaruddin, Sp.B. PICS	TUBERKULOSIS	R. MARIY

Display of patient morbidity report results containing data on deceased patients such as Medical Record Number, Full Name, Gender, Date of Birth, Date of Discharge, Discharge Condition, Doctor in charge of the patient, Discharge Diagnosis, Ward Name. Moment *user* set the date on *Reports Page* then the appropriate report results appear.

### 3.2. Cutover

This is the testing phase of the complete system. Each component must undergo comprehensive tests. This research uses a Black Box testing approach, mainly focusing on evaluating the external interface of the application to improve its ease of use. The Black Box technique is a testing approach that specifically examines how the system handles data and its capacity to handle failures (Sultan Aditia, 2023). As in table 2. This is the result of black box testing of the Mortality Data Processing Information System.

Table 2: Test Results

No	Test Case	Output	Description
1	Open App	The login page is displayed	In accordance
2	Input Username & Password	- If the login is correct, the main page will appear - If the login is incorrect, an alert will appear and the login page will appear	In accordance
3	Select Patient discharge menu	Displays a page on how to discharge a patient	In accordance
4	Select the Reports menu	Display the report settings page	In accordance
5	Select <i>button</i> Print on the settings report page	Display report results	In accordance
6	Select <i>button</i> Back	Back to the previous page	In accordance
7	Select <i>logout</i>	Exit the system and display the login page	In accordance

## CONCLUSION AND RECOMMENDATIONS

### 4.1 Conclusion

The end of this study based on the implementation of observations and interviews in the medical records installation of one of the hospitals in West Java Province is that information technology is very important and influential in the world of health. The results of the software design above the author has designed a mortality medical record information system by following the Rapid Application Development (RAD) method system development stages and modeling using the Unified Modeling Language (UML). With this mortality medical record information system, it is hoped that it can be an alternative solution to increase the speed of a clear and accurate mortality report process.

### 4.2 Recommendations

Socialization to system users after system renewal and before the system is used, so that system users can find out how to use, authority, and system access rights according to their respective professions. Documentation and analysis related to patient mortality must continue to be developed as material in mortality audits that are useful in assessing service quality.

## REFERENCES

- [1]. Abdillah, R. (2021). Pemodelan Uml Untuk Sistem Informasi Persewaan Alat Pesta. *Jurnal Fasilkom*, 11(2), 79–86. <https://doi.org/10.37859/jf.v11i2.2673>
- [2]. Aini, N., Wicaksono, S. A., & Arwani, I. (2019). Pembangunan Sistem Informasi Perpustakaan Berbasis Web menggunakan Metode Rapid Application Development (RAD) (Studi pada: SMK Negeri 11 Malang). *Jurnal Pengembangan Teknologi Informasi Dan Ilmu Komputer*, 3(9), 8647–8655. <http://j-ptiik.ub.ac.id>
- [3]. Android, A. (2023). PENGEMBANGAN APLIKASI PELAPORAN KERUSAKAN BERBASIS ANDROID UNTUK. 10, 46–52.
- [4]. Badrul, M., Sari Dewi, N., Nusa Mandiri Ji Damai No, S., & Jati Barat Jakarta Selatan, W. (2020). Penerapan Metode Rapid Application Development untuk Perancangan Sistem Informasi Penagihan Piutang Premi Asuransi. *Jurnal Sains Komputer & Informatika (J-SAKTI)*, 4(2), 319–326.
- [5]. Budi, I. S., Syahidin, Y., & Sari, I. (2023). PERANCANGAN SISTEM INFORMASI MORBIDITAS RAWAT INAP DI RUMAH SAKIT SAKIT X. 09(8), 316–327.
- [6]. Ihromi, A., Syahidin, Y., Gunawan, E., & Yuniarty, N. (2023). E-Mortality using Agile Scrum Method to Improve Information Services Effectiveness. *MATRIK : Jurnal Manajemen, Teknik Informatika Dan Rekayasa Komputer*, 22(3), 567–582. <https://doi.org/10.30812/matrik.v22i3.2830>
- [7]. Iqbal, M. (2024). *Metode Pengembangan RAD (Rapid Application Development)*. Agus Hermanto. [agus-hermanto.com](http://agus-hermanto.com)
- [8]. Mustofa, K., Novitasari, I., Studi Rekam Medik dan Informasi Kesehatan, P., & Ilmu Kesehatan, F. (2022). Rancang Bangun Perangkat Lunak Pengelolaan Data Mortalitas Pasien Rawat Inap. *Infokes: Jurnal Ilmiah Rekam Medis Dan Informatika Kesehatan*, 12(2), 19–24. <http://ojs.udb.ac.id/index.php/infokes/article/view/2050>
- [9]. Nurman Hidayat, & Kusuma Hati. (2021). Penerapan Metode Rapid Application Development (RAD) dalam Rancang Bangun Sistem Informasi Rapor Online (SIRALINE). *Jurnal Sistem Informasi*, 10(1), 8–17. <https://doi.org/10.51998/jsi.v10i1.352>
- [10]. PERATURAN MENTERI KESEHATAN REPUBLIK INDONESIA NOMOR 24 TAHUN 2022 TENTANG REKAM MEDIS, Pub. L. No. 24, 1 (2022). [https://yankes.kemkes.go.id/unduh/fileunduh\\_1662611251\\_882318.pdf](https://yankes.kemkes.go.id/unduh/fileunduh_1662611251_882318.pdf)
- [11]. Permenkes 18. (2022). Permenkes 18. *Peraturan Menteri Kesehatan Republik Indonesia Nomor 18 Tahun 2022 Tentang Penyelenggaraan Satu Data Bidang Kesehatan Melalui Sistem Informasi Kesehatan*, 848, 1–11.
- [12]. Rahmaliani, I., Abdussalaam, F., Gunawan, E., & Soelistijaningrum, M. (2023). Tata Kelola Rekam Medis Berbasis Elektronik Dalam Pelaporan Mortalitas Pasien Rawat Inap Menggunakan Metode Agile Software Development. *INOVTEK Polbeng - Seri Informatika*, 8(2), 343. <https://doi.org/10.35314/isi.v8i2.3532>
- [13]. RI, K. K. (2021). *Cetak Biru Strategi Transformasi Digital Kesehatan 2024* (R. Kurniawan & N. S. Wati (eds.); 1st ed.). Kementerian Kesehatan Republik Indonesia. [https://perpustakaan.kemkes.go.id/inlislite3/uploaded\\_files/dokumen\\_isi/Monograf/CETAK\\_BIRU\\_STRATEGI\\_TRANSFORMASI\\_DIGITAL\\_KESEHATAN\\_2024.pdf](https://perpustakaan.kemkes.go.id/inlislite3/uploaded_files/dokumen_isi/Monograf/CETAK_BIRU_STRATEGI_TRANSFORMASI_DIGITAL_KESEHATAN_2024.pdf)
- [14]. Rizkita, S., Herfiyanti, L., & Abdussalaam, F. (2021). Perancangan Sistem Informasi Keterangan Kematian di Rumah Sakit Bhayangkara Sartika Asih. *Cerdika: Jurnal Ilmiah Indonesia*, 1(10), 1377–1388. <https://doi.org/10.36418/cerdika.v1i10.212>
- [15]. Sultan Aditia, M. N. D. M. A. A. (2023). Implementasi Sistem Kehadiran Praktikum Berbasis Qr\_Code Dengan Whatsapp Gateway Menggunakan Metode Rapid Application Development (Rad). *Jurnal Ilmiah Rekayasa Dan Manajemen Sistem Informasi*, Vol,9, No(e-ISSN 2502-8995 p-ISSN 2460-8181), 82–88.
- [16]. Syahidin, Y., & Trioktafiani, Y. (2019). Perancangan Sistem Informasi Pasien Appointment Rawat Jalan Berbasis Web. *Jurnal Cendikia*, 18, 338–342. <https://jurnal.dcc.ac.id/index.php/JC/article/view/288>
- [17]. Triana, L., Andryani, R., & Kurniawan, K. (2021). Aplikasi Monitoring Data Imunisasi Berkala Untuk Meningkatkan Pelayanan Posyandu Menggunakan Metode RAD Berbasis Android. *Jurnal Sisfokom (Sistem Informasi Dan Komputer)*, 10(1), 106–112. <https://doi.org/10.32736/sisfokom.v10i1.1039>
- [18]. Welhelmina, F., Viatiningsih, W., Widjaja, L., & Yulia, N. (2022). Ketepatan Kode Diagnosis Penyebab Dasar Kematian Di Rumah Sakit Di Indonesia: Literatur Review. *Jurnal Kesehatan Tambusai*, 3(3), 514–520. <https://doi.org/10.31004/jkt.v3i3.7693>