

Reducing Outpatient Waiting Time through Lean Healthcare Implementation at Dumai City Regional Public Hospital

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Article History:

Received: 14-08-2026

Revised: 14-08-2026

Accepted: 19-08-2026

Keywords: Lean Healthcare;
Waste Waiting; Value Stream
Mapping; Outpatient Services;
Waiting Time

Abstract: This study aims to analyze Value Added (VA), Non Value Added (NVA), and Necessary But Non Value Added (NNVA) activities, identify waste waiting, and analyze the Current State and Future State Value Stream Mapping in outpatient services at Dumai Regional General Hospital using the Lean Healthcare approach. This study employed a qualitative descriptive design involving 15 participants consisting of the head of the outpatient installation, doctors, nurses, registration officers, and outpatients. Data were collected through in-depth interviews and direct observation. Data analysis was conducted thematically using NVivo 12 Pro through coding, node analysis, and matrix coding. The results showed that Value Added activities included doctor examinations, medical consultations, medical procedures, health education, and therapy. Non Value Added activities were predominantly waiting activities, including registration queues, waiting for doctors, medical record distribution, and pharmacy services. Necessary But Non Value Added activities include BPJS verification, data validation, medical record management, and service administration. The Current State Value Stream Mapping indicated that outpatient services were still dominated by waiting activities. The Future State Value Stream Mapping proposed several improvements, including electronic queue systems, digital medical records, integrated hospital information systems, simplified patient administration, pharmacy service optimization, and additional human resources. The study concludes that Lean Healthcare can serve as a managerial approach to reduce waste waiting and improve the efficiency and quality of outpatient services.

Commented [n1]: Abstrak sudah terstruktur baik dan substansinya informatif, tetapi perlu perbaikan pada konsistensi nama rumah sakit dengan judul, penggunaan istilah Lean yang idiomatik, tata bahasa dan tense, serta penyederhanaan beberapa kalimat agar lebih sesuai standar jurnal internasional.

How to Cite: Juwaidah, Syaodih, E., & Handayani, N. (2026). Reducing outpatient waiting time through Lean Healthcare implementation at Dumai City Regional Public Hospital. *Escalate : Economics and Business Journal*. 4(03). pp. <https://doi.org/10.61536/escalate.v4i3.700>



<https://doi.org/10.61536/escalate.v4i3.700>

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Introduction

Outpatient care is a crucial component of hospital services due to its high patient volume and multi-step process. The outpatient care process typically begins with registration, administrative verification, medical record management, medical examination, necessary support services, and pharmaceutical services. The complexity of these steps can potentially lead to activities that don't add value and lead to long patient wait times.

The issue of waiting times has become increasingly important at Dumai City Hospital as the number of outpatient visits has increased year over year. Data from Dumai City Hospital shows that outpatient visits increased from 99,680 in 2020 to 112,930 in 2023.

Table 1. Number of Outpatient Visits at Dumai City Regional Hospital 2020–2023

Year	Number of Visits
2020	99,680
2021	103,222
2022	107,109
2023	112,930

Source: Dumai City Hospital.

The increase in the number of visits has not been accompanied by optimal service waiting times. Research data shows that actual waiting times at all observed polyclinics are still above the standard of ≤ 60 minutes used in this thesis based on Minister of Health Regulation No. 129 of 2008. The highest waiting time was found in the Obstetrics and Gynecology Polyclinic at 145 minutes and the lowest in the Internal Medicine Polyclinic at 100 minutes.

Table 2. Waiting Time for Outpatient Services

Polyclinic	Current	Standard
Surgery	120 minutes	≤ 60 minutes
Child	140 minutes	≤ 60 minutes
Orthopedics	110 minutes	≤ 60 minutes
Internal disease	100 minutes	≤ 60 minutes
Heart	120 minutes	≤ 60 minutes
Nerve	130 minutes	≤ 60 minutes
Obgyn	145 minutes	≤ 60 minutes
Eye	130 minutes	≤ 60 minutes
Lungs	125 minutes	≤ 60 minutes
ENT	120 minutes	≤ 60 minutes
Skin	110 minutes	≤ 60 minutes

Source: Dumai City Hospital.

This situation indicates a gap between service needs and the efficiency of available processes. Initial observations also showed that the average total outpatient service time reached 145 minutes, while the wait time before a doctor's examination was approximately 50 minutes.

One approach that can be used to address these issues is Lean Healthcare. Lean Healthcare is a management approach oriented towards increasing patient value through waste identification and

Escalate: Economics and Business Journal

<https://doi.org/10.61536/escalate.v4i3.700>

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elimination, process simplification, standardization, and continuous improvement. This concept evolved from Lean and the Toyota Production System and was then applied in healthcare to improve efficiency and quality of care.

From a Lean Healthcare perspective, service activities can be classified into Value Added (VA), Non-Value Added (NVA), and Necessary But Non-Value Added (NNVA). VA activities provide direct benefits to patients, NVA activities are activities that do not add value and are a source of waste, while NNVA activities do not provide added value directly but are still necessary to support the service process.

Lean also recognizes seven types of waste: waiting, motion, transportation, overprocessing, inventory, defects, and overproduction. In this study, attention is focused on waiting because it represents wasteful time when patients or staff have to wait for the next process.

To view the overall service flow, the study employed Value Stream Mapping (VSM). VSM is used to map the current state and design improvements (Future State) by identifying value-added activities and waste. The research's theoretical framework positions Lean Healthcare as the foundation for identifying VA, NVA, NNVA, waste waiting, and developing the Future State VSM.

Previous research has shown that implementing Lean Healthcare can improve efficiency and reduce waiting times. However, a comprehensive analysis of the outpatient service flow through VA, NVA, and NNVA classification, waiting waste identification, and mapping of current and future states remains necessary.

Based on these conditions, this study aims to analyze the waiting time optimization model for outpatient services using the Lean Healthcare method at Dumai City Hospital, through the identification of VA, NVA, NNVA, waste waiting, Current State Value Stream Mapping, and Future State Value Stream Mapping.

Research methods

This study used a qualitative approach with a descriptive design. This approach was used to describe in-depth the actual conditions of outpatient services and formulate improvements based on the Lean Healthcare approach.

The research was conducted at the Outpatient Unit of Dumai City Regional Hospital, located at Jalan Tanjung Jati No. 4, Buluh Kasap, Dumai Timur District, Dumai City, Riau. The research period for this thesis is planned for April–May 2026.

Participants were selected using purposive sampling based on their involvement and knowledge of the outpatient care process. Participants included one head of the outpatient unit, two outpatient clinic doctors, two nurses, two registration officers, and eight outpatients, for a total of 15 participants.

Data was collected through in-depth interviews and direct observation. Interviews were conducted to obtain information on service flow, waiting times, and any issues encountered. Observations included patient flow, processing times, and wait times for outpatient services.

Data analysis was conducted thematically using NVivo 12 Pro. The analysis stages included transcribing interviews, entering data into NVivo, coding, grouping codes into themes/nodes, and then interpreting the themes to draw conclusions.

Lean Healthcare analysis is conducted through the classification of VA, NVA, and NNVA activities, identification of waste waiting, mapping the Current State Value Stream, and compiling a Future State Value Stream Map. Thus, the results of the qualitative analysis not only describe the problem but also serve as a basis for formulating service improvement proposals.

Results and Discussion

Participant Characteristics and Actual Service Conditions The study involved 15 participants, consisting of management, healthcare workers, administrative staff, and patients. This composition allowed the study to obtain diverse perspectives on the service process and the causes of waiting times.

Observations showed that the average total outpatient service time reached 145 minutes, with the longest wait time before a doctor's examination being approximately 50 minutes. This situation was influenced by, among other factors, the doctor's arrival time not matching the service schedule and the high number of patients, which caused long queues.



These findings indicate that the waiting time issue is not only related to one service activity, but is a consequence of the relationship between stages in the entire service flow.

Identify Value Added, Non Value Added, and Necessary But Non Value Added

The NVivo 12 Pro coding chart results show that non-value-added (NVA) activities are the dominant category in the outpatient care process. This indicates waste related to waiting times and repetitive service processes.

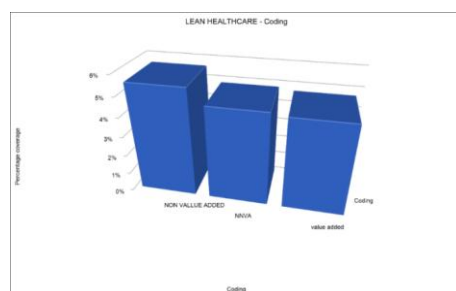


Figure 1. Coding Chart of Lean Healthcare Analysis Results

Source: NVivo 12 Pro analysis results

The results of the study indicate that the outpatient service process at Dumai City Regional Hospital consists of three activity categories: Value Added (VA), Non-Value Added (NVA), and Necessary But Non-Value Added (NNVA). Coding results using NVivo 12 Pro indicate that NVA activities remain the dominant activity in the service process. This condition indicates the persistence of waste that has the potential to hinder service efficiency, especially those related to waiting times and repetitive service processes.

VA activities include medical examinations, consultations, medical procedures, education, and therapy. These activities provide direct benefits to patients and therefore need to be maintained and optimized. Interviews revealed that medical examinations are viewed as a crucial part of service delivery because they are directly related to diagnosis and therapy determination. This finding aligns with Ardanti et al. (2024), who explained that activities that provide direct benefits to patients fall into the VA category and need to be maintained in the implementation of Lean Healthcare.

Non-Valuable (NVA) activities include waiting time, queues, waiting for services at the clinic, waiting for medication at the pharmacy, and repeated administration. These activities provide no direct benefit to patients but waste time and resources. The predominance of NVA activities indicates that service efficiency issues lie not only in clinical activities but also in the processes connecting one stage of care to the next. This finding aligns with Wibowo et al. (2024) who stated that waiting time is a major form of waste in the healthcare delivery process.

Meanwhile, NNVA activities consist of BPJS verification, data validation, medical record management and recording, and data input. These activities do not provide direct added value to patients, but are still necessary to support administrative completeness and service continuity. Therefore, NNVA activities do not need to be eliminated, but they need to be simplified to avoid lengthening service times. This finding aligns with Hidayat et al. (2024) who stated that NNVA activities are still necessary but can be simplified to reduce wasted time.

Theoretically, these results align with the Lean Healthcare principle, which positions VA as an activity that must be maintained, NVA as an activity that needs to be reduced or eliminated, and NNVA as an activity that remains necessary but needs to be simplified. Thus, the identification of VA, NVA, and NNVA serves as the basis for determining priority activities in optimizing outpatient services.

Waste Waiting Identification

The research results showed that the most dominant waste was waiting. Waiting occurred from registration, administrative verification, medical record distribution, doctor's examination, and pharmacy services. The longest wait time was for the doctor's examination at approximately 50 minutes,

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<https://doi.org/10.61536/escalate.v4i3.700>

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followed by medical record distribution at approximately 25 minutes, and pharmacy services at approximately 30 minutes.

Table 4. Identification of Waste Waiting

Stages	Waste Waiting Form
Registration	Patient queue
Administrative verification	Waiting for administrative process
Medical records	Distribution delays
Doctor's examination	Inspection queue
Pharmacy	Prescription queue and drug service

Source: Results of observations and interviews.

The research results identified several factors causing waiting, namely:

1. high number of patients
2. limited service human resources
3. lengthy administrative process
4. computer network disruption
5. delay in distribution of medical records
6. the queue system is not yet optimal.

These findings demonstrate that waiting is a result of a combination of factors. High patient numbers can increase queues, while limited human resources mean that service capacity is not always commensurate with the patient load. Administrative processes and network disruptions can also lengthen the time before patients can proceed to the next stage of care.

These findings align with research by Jayanti et al. (2025), which showed that service inefficiencies can be related to administrative processes and resource limitations. However, this study also demonstrated that the causes of waiting are multidimensional, requiring improvements across the entire process flow.

Current State Value Stream Mapping Outpatient Services

The Current State Value Stream Mapping results show the current state of the outpatient service flow, from patient registration to pharmacy services. The mapping reveals that there are still activities that do not add value, particularly during registration wait times, medical record distribution, doctor's examination queues, and pharmacy services. The average total outpatient service time is 145 minutes, indicating that the service flow still has room for improvement.



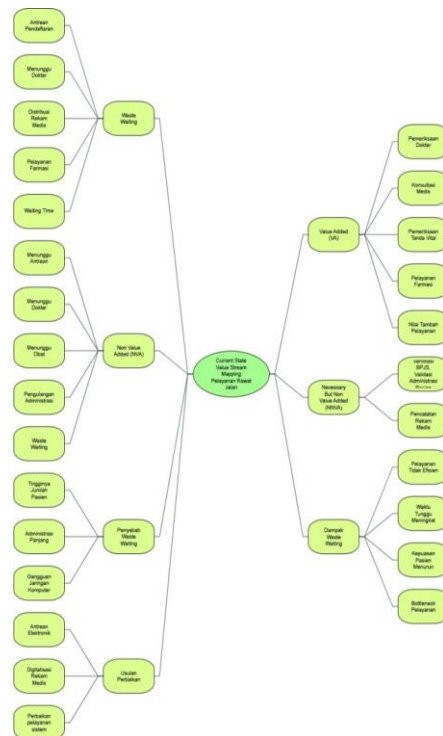


Figure 2. Mind Map Results of Current State Value Stream Mapping Analysis of Outpatient Services

The NVivo 12 Pro Mind Map results demonstrate the relationship between wasteful waiting, service activities, causal factors, impacts, and improvement needs. In actual conditions, waiting occurs at several service points, resulting in suboptimal patient flow. NVA activities such as waiting in line, waiting for a doctor, waiting for medication, and repeated administration are wasteful areas that need to be minimized.

These results align with the Value Stream Mapping concept, which is used to map the entire process flow and identify value-added and wasteful activities. Munaa et al. (2023) stated that Current State Value Stream Mapping can be used to map service flows and identify value-added and wasteful activities. However, Talero-Sarmiento et al. (2024) emphasized that identifying the root causes of waste in healthcare may require a combination of several Lean methods, so VSM should be combined with observation and other qualitative analyses.

In this study, the use of VSM, supported by interviews, observations, and NVivo 12 Pro coding, demonstrated that waiting is the primary source of waste in actual conditions. This finding differs from Ben-Tovim et al. (2021), who found that motion and transportation can be the dominant sources of waste due to service layout. This difference indicates that the type of waste can vary depending on the process characteristics and conditions of each healthcare facility.

Based on these results, the Current State VSM serves as the basis for determining improvement priorities, particularly in administrative activities, medical record distribution, doctor's appointment queues, and pharmacy services. Improvements are aimed at reducing non-current assets (NVA), simplifying non-current assets (NNVA), and maintaining VA activities.



Future State Value Stream Mapping Analysis

Based on the issues identified in the current situation, a Future State Value Stream Mapping was designed to reduce wasteful waiting and improve the flow of outpatient services. The NVivo 12 Pro Hierarchy Chart analysis yielded three main strategies: electronic queuing, digital medical records, and an integrated service system.



Figure 3. Hierarchy Chart of Future State Value Stream Mapping Analysis Results for Outpatient Services

Electronic queues are designed to manage patient arrivals and service sequences, thereby reducing queues. Digital medical records are designed to expedite patient data retrieval and management, and reduce delays in record distribution. Meanwhile, integrated service systems are designed to improve coordination between units, allowing for faster patient information availability and a more coordinated service process.

The Future State design embodies the principles of Lean Healthcare, namely reducing non-current assets (NVA), simplifying non-current assets (NNVA), and maintaining non-current assets (VA). The use of information technology in the service process is also expected to reduce repetitive administrative activities and streamline patient flow. Thus, improvements focus not only on reducing waiting times but also on streamlining processes and improving coordination between units.

These findings support the research of Reza and Fahira (2024), which showed that implementing Lean can identify bottlenecks in registration, doctor consultations, and pharmacy. Furthermore, research by Jayanti et al. (2025) showed that wasteful waiting is a dominant source of waste in outpatient pharmacy services.

Thus, the Future State Value Stream Mapping design in this study positions digitalization and process integration as key strategies to reduce waiting times. The implementation of electronic queues, digital medical records, and an integrated service system is expected to accelerate patient flow, reduce non-value-added activities, and improve the efficiency of outpatient services. However, it should be emphasized that this study has not yet reached the implementation and effectiveness measurement stage of the Future State design, so the success of this strategy still needs to be tested through further research or implementation evaluation.

Conclusion

Based on the research results, outpatient service activities at Dumai City Hospital consist of Value Added (VA), Non-Value Added (NVA), and Necessary But Non-Value Added (NNVA). VA activities such as doctor examinations, medical consultations, medical procedures, education, and therapy need to be maintained. NVA activities, especially waiting and queuing, are the main wasteful activities, while NNVA activities such as BPJS verification, data validation, medical records, data input, and administration need to be simplified.

WasteThe most dominant issue is waiting, particularly for doctor examinations, medical record distribution, and pharmacy services. Current State Value Stream Mapping shows an average service time of 145 minutes, with several points of waste in the service flow.

Future State Value Stream MappingThis resulted in a design for improvements through the implementation of electronic queues, digitization of medical records, integration of hospital information



systems, simplification of administration, optimization of pharmaceutical services, and increased coordination between units. The design aimed to reduce wasteful waiting, simplify NNVA, and maintain and optimize VA, thus making outpatient services more effective and efficient.

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