

Implementation of Lean Healthcare for Reducing National Health Insurance Out Patient's Waiting Time using Value Stream Mapping Method

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ABSTRACT

Waiting time is one of quality standard in health services. The waiting time for national health insurance outpatients in Sosodoro Djatikoesoemo Hospital in Bojonegoro obtained an average monthly achievement of around 59.79% less than the standard from ministry of health's regulation (80%). This study aimed to reduce patient waiting time using value stream mapping analysis and purpose the future stream mapping. This was a quantitative descriptive study using a cross-sectional design using Value Stream Mapping analysis. The sample was obtained by purposive sampling of 90 outpatients under national health insurance in Sosodoro Djatikoesoemo Hospital in Bojonegoro. The data was collected by using the observation table. The results found that two waste were found during outpatient flow including waiting and extra processing. In addition, the analysis obtained a Value Added Ratio (VAR) of 23.61% indicating that the service was not efficient compared with the provisions of Process Cycle Efficiency (> 30%). The future Stream Mapping was proposed and indicated a decrease in waiting time which was originally 99.21 minutes to 58.16 minutes. The possible improvement is the development of an electronic patient eligibility certificate of national health insurance where this improvement is useful in reducing patient waiting time by 41.05 minutes or around 41.37%. The management can consider to develop an electronic patient eligibility certificate in order to make the service delivery in out patient more efficient.

Keywords: *lean management, waiting time, value stream mapping, waste.*

INTRODUCTION

Hospital is an integral part of a social and health organization with the function of providing comprehensive services, curative and disease prevention to the community¹. A hospital is a health service institution that provides comprehensive individual health services that provide inpatient, outpatient and emergency services². Based on Law no. 44 of 2009 concerning General Hospitals has a mission to provide quality health services that are affordable to the community in order to improve public health status³.

One of the dimensions of the quality of health services is access to services which is marked by patient waiting time. Patient waiting time is defined as the length of time it takes a patient from registering to being served by a specialist, ideally less than 60 minutes (< 1 hour). This is in accordance with the Decree of the Minister of Health of the Republic of Indonesia Number 129/Menkes/SK/II/2008 concerning Hospital Minimum Service Standards (SPM). For a hospital, service waiting time is one of the dimensions of the quality of health services⁴.

Based on an initial study that was conducted at the Sosodoro Djatikoesoemo Bojonegoro Hospital, it was found that the waiting time for National Health Insurance (NHI) outpatients at the Sosodoro Djatikoesoemo Bojonegoro Hospital under 60 minutes has obtained around 59.79% with the average in 90 minutes per patient. This means that the achievement of waiting time for outpatients at Sosodoro Djatikoesoemo Bojonegoro Hospital has

also not been achieved in accordance with the Decree of the Minister of Health of the Republic of Indonesia Number 129/Menkes/SK/II/2008 Hospital Minimum Service Standards (SPM) regarding waiting time for outpatients under 60 minutes must be achieved $\geq 80\%$.

The factors that affect the waiting time for NHI outpatients have not reached the target, namely the very large number of outpatients visiting/treating, BPJS claims for printing patient eligibility certificate that are still manual, the conditions for providing outpatient medical record files, the performance of technicians in providing outpatient patient services including lack of discipline in starting and ending services to outpatient patients, lack of a sense of cooperation that exists between officers in carrying out outpatient services (medical record officers, polyclinic officers, nurses, doctors) as well as the awareness of the officers about the importance of patient waiting time in outpatient care⁵.

The solution that must be done to increase the achievement of outpatient waiting time at Sosodoro Djatikoesoemo Bojonegoro Hospital is to minimize the waiting time for outpatients. One of the methods used is to apply the principles of lean management⁶. Lean evaluates operations step by step to identify waste and inefficiencies and then creates new solutions to improve operations, increase efficiency and reduce costs⁷. One of the methods in implementing lean management to see value-added activities is Value Stream Mapping⁸. This method

focuses on identifying waste and reducing activities that are not of value to patients⁹.

METHOD

This research is a descriptive study with a quantitative approach, and a cross-sectional design. The population in this study were patients who were treated at the neurological polyclinic at the Sosodoro Djatikoesoemo Bojonegoro Hospital on 1 – 30 May 2023 as many as 1000 patients. The sample technique using accidental sampling obtained a total of 90 patients. Inclusion criteria in this study, patients who were treated at the outpatient unit (neurology polyclinic) at Sosodoro Djatikoemo Bojonegoro General Hospital and were willing to be respondents. The research exclusion criteria were those who

were not willing to be respondents. This research was conducted at the Sosodoro Djatikoesoemo Bojonegoro Hospital with research time on 1 - 30 May 2023.

Data collection techniques in this research is observation. Data collection within instrumentan observation table that contains the identification of all activities along with the time spent getting services from the patient arriving until the patient is examined by a doctor at (Neurosurgery) at Sosodoro Djatikoesoemo Bojonegoro Hospital. The data used in this research is primary data. The primary data from this study is the recording of the flow of outpatient services from the time the patient arrives until the patient is examined by a doctor in the form of an observation table.

RESULT AND DISCUSSION

Table 1. Characteristics of Respondents and Results Waiting Time Achievements

Characteristics	Frequency	Percentage
Gender		
Man	37	41.11%
Woman	53	58.88%
Age		
<30 years	17	18.88%
30-60 years	54	60%
>60 years	19	21.11%
Level of education		
Not pass primary high school	11	12.22%
Primary high school	16	17.77%
Junior high school	25	5.55%
Senior high school	29	32.33%
S1	9	10%
Waiting time		
Below Average (<99.21 min)	47	52.22%
Above Average (>99.21 min)	43	47.78%

According to table 1, the majority of respondents were female, 53 with a percentage of 58.88%. Vulnerable age that most of the respondents aged 30-60 years a number of 54 people with a percentage of 60%. Most of the respondents had high

school education with a total of 29 people with a percentage of 32.33%. The majority of patient waiting times were below average (<99.21 min) with a total of 47 patients with a percentage of 52.22%.

Table 2. Activity Identification on *Current Stream Mapping*

Activity	Category	Results	%
Patients register & print tickets	NNVA	2.03 min	2.04%
Patients waiting for counters to open	NVA	22.59 min	22.76 %
Patients lining up to print patient eligibility certificate	NVA	16.07 min	16.19 %
Printing patient eligibility certificate	NVA	2.39 min	2.40 %
Waiting for the doctor's check-up	NNVA	43.34 min	43.68 %
The patient is checked for TTV	VA	4.1 min	4.13 %
The patient is examined by a doctor	VA	8.69 min	8.75 %
Total		99.21	100%

According to table 2, the results obtained from activity identification on Current Stream Mapping with the acquisition of Value-Added activity groupings include the patient is checked Vital Assessment by the nurse TTV and the patient is examined by a doctor. The grouping of Non-Value-Added activities

includes patients waiting for the counter to open, patients queuing to print out the patient eligibility certificates and patients printing it. The grouping of Non-Necessary Value-Added activities includes patients registering & printing tickets at self-service pavilions and patients waiting in line for a doctor's examination.

Table 3. Activity Identification During Outpatient Service.

No.	Activity	Results
1.	WT (Waiting Time)	82.56 min
2.	LT (Lead Time)	99.21 min
3.	CT (Cycle Time)	18.21 min
4.	VA (Value Added)	15.18 min
5.	NVA (Non Value Added)	41.05 min
6.	NNVA (Non Necessary Value Added)	45.37 min

According to table 3, the Waiting Time value is 82,56 minutes, Lead Time is

99,21 minutes, Cycle Time is 18,21 minutes, Value Added is 15,18 minutes,

Non Value Added is 41,05 minutes, and Non Necessary Value Added is 45,37 minutes.

Current Stream Mapping

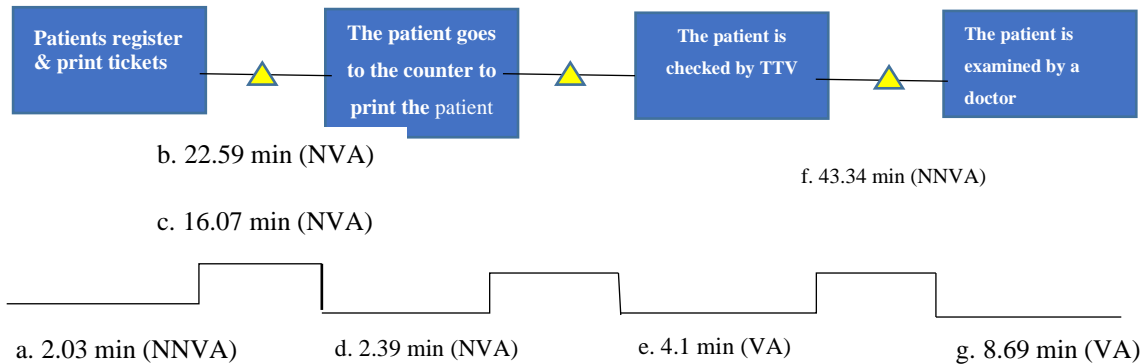


Figure 1. Analysis of Current Stream Mapping Waiting Time for Outpatient Patients at RSUD Sosodoro Djatikoeseomo Bojonegoro

According to Figure 1 it can be seen that the waiting time is calculated from the time the patient registers to the patient

examined by a doctor and obtained an average time of 99.21 minutes from 90 respondents.

Table 4. Activity Recap Value Added, Non Value Added, Non Necessary Value Added, and Value Added Ratio.

Activity	Results	Percentage (%)
a. Value Added (VA)	12.79 min	12.89 %
b. Non Value Added (NVA)	41.05 min	41.37 %
c. Non Necessary Value Added (NNVA)	45.37 min	45.73 %
d. Value Added Ratio (VAR)	23.79 min	23.61 %

According to table 4 the value of Waiting Time is 82.56 minutes, Lead Time is 99.21 minutes, Cycle Time is 18.21 minutes, Value Added is 15.18 minutes, Non Value Added is 41.05 minutes, and Non Necessary Value Added is 45.37 minutes.

$$\text{VAR} = \text{VA} / (\text{NVA} + \text{VA}) \times 100\%$$

$$= 12.79 / (41.37 + 12.79) \times 100\%$$

$$= 12.79 / 54.16 \times 100\%$$

$$= 23.61 \%$$

With the calculation above, it shows that the ratio of activities that have added value in the waiting time for outpatient services at Sosodoro Djatikoeseomo Bojonegoro Hospital is only 23.61% of the total time. After doing the above analysis when compared with the PCE (Process

Cycle Efficiency) standard, namely NVA => 30%. Which means the process can be said to be efficient if the activities that have added value are > 30% of the total time spent. So the waiting time for outpatient services at RSUD Sosodoro Djatikoeseomo Bojonegoro has not yet

reached PCE (Process Cycle Efficiency) or it can be said that the waiting time for outpatient services at RSUD Sosodoro Djatikoeseomo Bojonegoro has not been efficient because the value is still below the PCE (Process Cycle Efficiency) standard, namely > 30%.

Causes of Waste When Waiting for Outpatient Patients

a. Waiting

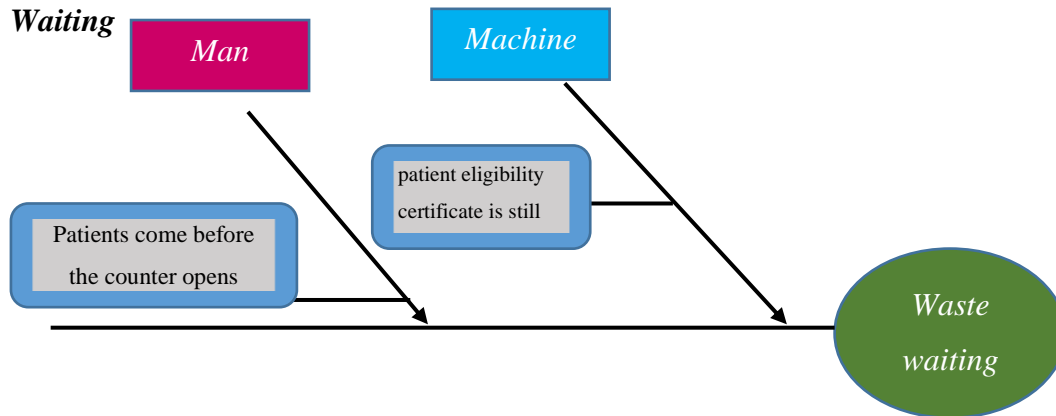


Figure 2. Cause analysis *Waste Waiting Using Fishbone Diagrams*

According to picture 1 *Waste waiting* that is, patients do a lot of waiting activities, namely: Waiting for the counter to open, this is because patients arrive earlier than the counter opening hours to print tickets so they can get the patient

eligibility certificate print line earlier. And waiting for the queue to print patient eligibility certificate, to print patient eligibility certificates they still use manual data input through the BPJS virtual claim system.

b. Extra processing

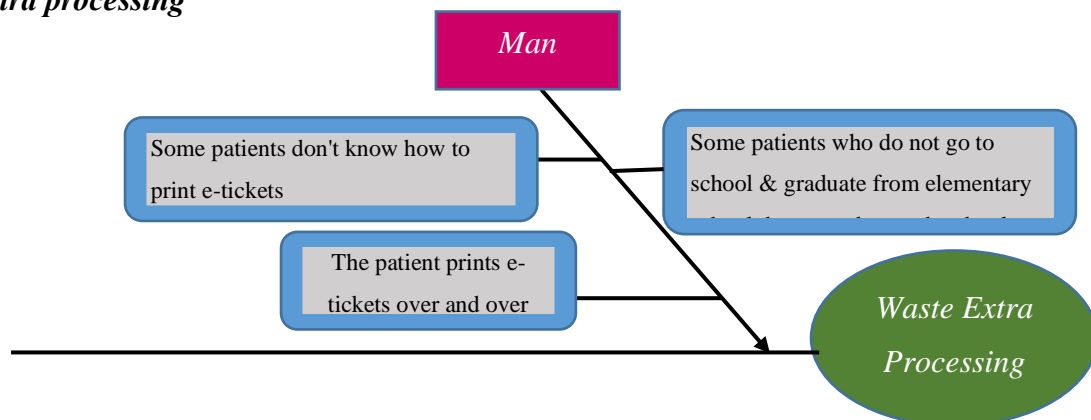


Figure 3. Cause Analysis *Waste Extra Processing Using Fishbone Diagrams*

According to the picture 2 *Waste extra processing* that is, patients who do not attend school and have an elementary education level do not know how to

register and print tickets and patients do not know the procedures and requirements for BPJS patients, such as not carrying a referral letter.

Current Stream Mapping

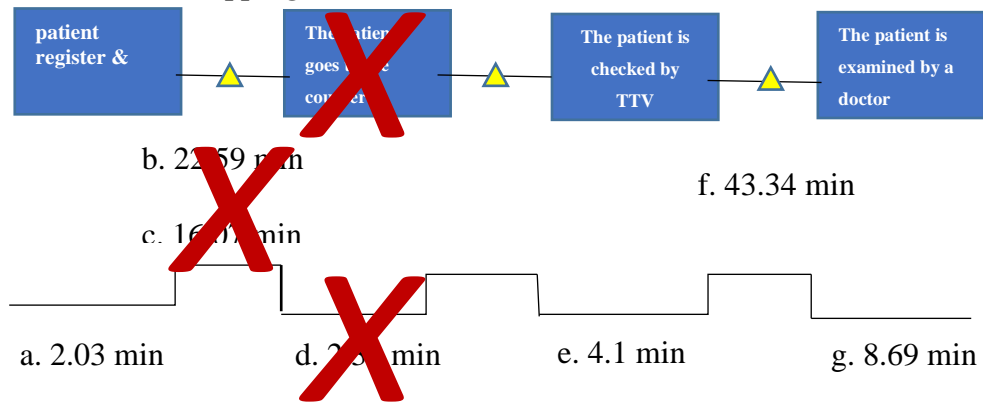


Figure 4. Reduction Waste in Current Stream Mapping

According to picture 3 the waste reduction results in the Current Stream Mapping, the activities that are eliminated are the patient processes waiting for the

counter to open, the patient waiting for the patient eligibility certificate print queue, and the patient printing patient eligibility certificate.

Table 5. Activity Identification On Future Stream Mapping

	Activity	Results	Percentage (%)
a.	Patients register & print tickets at the automatic pavilion machine	2.03 min	3.49 %
e.	Patients waiting in line to see a doctor	43.34 min	75.51 %
f.	The patient is checked for TTV	4.1 min	7.04 %
g.	The patient is examined by a doctor	8.69 min	14.96 %
	Total	58.16 min	100%

According to table 5, after waste reduction is carried out by eliminating non-value added activities on Current Stream Mapping, namely patients waiting for the counter to open, patients waiting for the patient eligibility certificate print queue

and patients printing patient eligibility certificate. The results of waste reduction succeeded in reducing the average waiting time for outpatients from the initial average of 99.21 minutes to 58.16 minute.

Future Stream Mapping

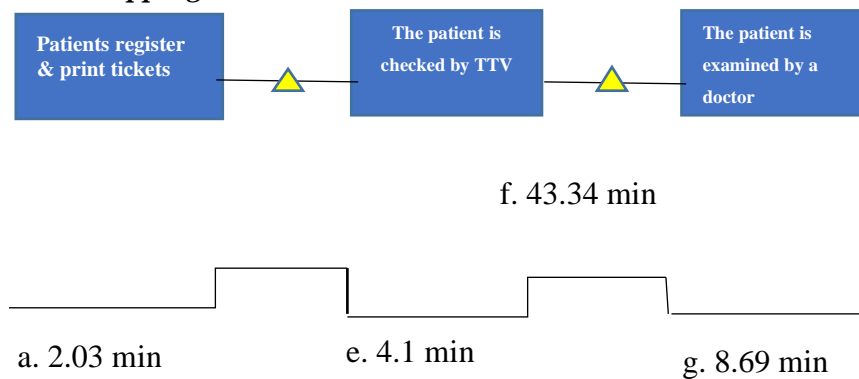


Figure 5. Recommendation of *Future Stream Mapping for Hospitals*

According to Figure 5, namely the Future Stream Mapping proposal, the process flow starts from the patient registering and printing tickets, the patient is checked for vital signs, and the patient is examined by a doctor. The flow has changed from the initial flow, while the

process that has been removed is the patient is waiting for the counter to open, the patient is waiting for the patient eligibility certificate print queue and the patient is printing patient eligibility certificate.

Table 6. Identification Results *Current Stream Mapping After Waste Reduction Is Done.*

Activity	Results	Percentage (%)
Patient registers & prints tickets at the automated teller machine (NNVA)	2.03 min	3.49 %
Patient waiting for queue to see doctor (NNVA)	43.34 min	75.51 %
Patients checked TTV (VA)	4.1 min	7.04 %
Patient examined by doctor (VA)	8.69 min	14.96 %
Total	58.16 min	100%

According to table 6, there are 2 remaining activities, namely Value-Added activities and Non-Necessary Value-Added activities. Value Added activities include patients being checked for vital signs and patients being examined by doctors. Meanwhile, Non-Necessary Value-Added activities include patients registering and printing tickets and patients waiting in line to be examined by a doctor.

Table 7. Results of Activity Identification After Reduction Waste

Activity	Results
WT (Waiting Time)	43.34 min
LT (Lead Time)	58.16 min
CT (Cycle Time)	13.82 min
VA (Value Added)	12.79 min
NNVA (Non Necessary Value Added)	45.37 min

According to table 7, this is the result after waste reduction is carried out, namely

eliminating non-value-added activities in Current Stream Mapping.

DISCUSSION

Value Added Ratio's the percentage of total efficiency in a process or flow. In this study, the number of VAR was 23.61%. Value Added activities as much as 12.89% and Non-Value-Added activities as much as 41.37%. It can be concluded that the waiting time for outpatients at RSUD Sosodoro Djatikoeseomo Bojonegoro has processes with more Non-Value-Added values than processes that have Value Added values, thus making the NVA value higher than VAR. When compared with the PCE (Process Cycle Efficiency) standard, which is $> 30\%$, the waiting time for outpatient services at Sosodoro Djatikoeseomo Hospital Bojonegoro has not yet reached PCE (Process Cycle Efficiency) or it can be said that the waiting time for outpatient services at Sosodoro Djatikoeseomo Hospital Bojonegoro is not efficient because the value is still below PCE standard (Process Cycle Efficiency) is $> 30\%$. The reason is that there are more non-value-added activities than value added activities.

The research was conducted at the Tulip poly RS X Pekanbaru. Based on the value stream mapping analysis, a PCE value of 16.85% was obtained, this means that line efficiency at the Tulip Polyclinic at Hospital X Pekanbaru is still very low. This can affect patient satisfaction because the service process is not efficient and takes a relatively long time. The cause of the inefficient process due more non value added activities than value added activities¹⁰.

In this study the researchers found Waste waiting and waste extra processing Waste waiting is times when no activity is

taking place. This is in line with the research conducted by Setyaningsih, namely research on customer satisfaction with the service process using the lean concept with waste waiting which makes the process inefficient so that it affects patient satisfaction¹¹. Waste waiting such as waiting for the counter to open, waiting for the patient eligibility certificate print queue, and the patient eligibility certificate being used. While, Waste extra processing is carry out an activity or work that does not have added value and takes quite a long time so that the service becomes inefficient. Waste extra processing in this research is not all patients understand how to operate an automatic pavilion machine, often patients repeat the ticket printing process, making the registration and ticket printing process longer. This is in line with research conducted at PKU Muhammadiyah Hospital, Bantul, waste extra processing makes the service process inefficient because the e-ticket printing process is done repeatedly, thus making the service time longer¹².

Waste waiting happened because patients do a lot of waiting activities, such as waiting for the counter to open, this is because patients arrive earlier than the counter opening hours to register and print tickets so they can get in line to print patient eligibility certificate earlier. This is because the patient eligibility certificate is still used manually, so the data input and patient eligibility certificate printing process are also done manually. The cause of this was also due to the fact that most of the patients seeking treatment were elderly between 40-60 years old, some patients had elementary school education and did not attend school and could not access online registration and print tickets at automated pavilions. This is in line with

research conducted at Glam Star Bandung, the process of recording cash receipts and disbursements is still done manually, resulting in a longer time¹³.

Waste extra processing happen when some patients do not know how to register and print stickers, and patients do not know the procedures and requirements for BPJS patients, such as not bringing a referral letter. This is caused by the education background of patients. This makes the process of patient data entry becomes hampered and makes the service longer. This is in line with research conducted at the Sari Mutiara Hospital in Lubuk Pakam showed that outpatient experienced barriers to obtaining services at the registration site. It is stated that the patient forgets to bring the Card along with BPJS Health, Referral Letter, Family Card (KK), Resident Identity Card (KTP) so that it makes the registration process longer¹⁴.

The results of Future Stream Mapping are obtained from pruning activities that do not have added value, namely patients waiting for the counter to open, patients waiting for the SEP print queue and patients printing SEP. The results of the Future Stream Mapping show that changes to the flow of services during outpatient waiting time can increase the efficiency of the outpatient waiting time service process, from what was originally obtained an average of 99.21 minutes to 58.16 minutes. This solution is also proposed by the previous research that stated manually SEP need a longer time than electronically SEP¹⁵.

This proves that changing the flow by eliminating activities that do not have added value can make the service process faster and more efficient. The proposed improvement plan is in the form of

making an electronic patient eligibility certificate or E- patient eligibility certificate where the improvement reduces the waiting time for outpatients at the Sosodoro Djatikoemo Bojonegoro General Hospital by as much as 41.05 minutes or around 41.37%. It is too in accordance with the research conducted at the Tulip poly Hospital X Pekanbaru, namely the existence of a proposed improvement in the form of a new service flow to reduce waiting time for patient services after the Value Stream Mapping Analysis was carried out based on the simulation carried out on the proposals given, the patient waiting time decreased by 19.33% from initial conditions¹⁶.

CONCLUSION

Based on the results of the research and discussion, the conclusions are obtained VAR of outpatient waiting time in Sosodoro Djatikoemo Bojonegoro General Hospital of 23.61%, which is still less than Process Cycle Efficiency (PCE) VAR $\geq 30\%$. Two wastes were found during patient waiting time, namely waiting and extra processing during outpatient waiting time at Sosodoro Djatikoemo Bojonegoro General Hospital. Waste waiting in this study was caused by the patient doing a lot of waiting activities. Waste extra processing is caused by some patients don't know how to print E-tickets and patients don't bring BPJS patient requirements.

The proposed Future Stream Mapping on outpatient waiting times shows a decrease in time from 99.21 minutes to 58.16 minutes. Hospitals should make changes in the health service process by reducing the waiting time for outpatients by using E- patient eligibility

certificate so that patients do not have to queue to print patient eligibility certificate.

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