Analysis of Results of Proposal to Improve Medical Care in The Emergency Unit. Case Study: Hospital Regional Emilio Sánchez Piedras

Karen Margarita Herrera Cruz • Jorge Luis Castañeda Gutiérrez • José Adrián Trevera Juárez

Division of Graduate Studies and Research in Administrative Engineering, National Institute of Technology of Mexico, Technological Institute of Apizaco, Tlaxcala, Mexico
karen.herrera@ilab.net

Abstract: Nowadays, the health sector in Mexico qualifies as unsatisfactory, with questionable and deficient attention in public hospitals and specifically in the medical emergency area waiting process. The term Lean Thinking (no waste mentality) has been used in the health area, presenting itself with the term Lean Healthcare, implementing logistics tools to detect improvements and provide a better service to patients. This research seeks to plan and execute actions in sequence, facilitating the supply chain of the attention logistics processes, therefore, it creates value in the user (patient), reduces medical attention time and increases the user lifetime value in the critical processes of the service. This non-experimental, cross-sectional and descriptive research specifies the characteristics of the process that take place in the Emergency Unit of the Regional Hospital of Apizaco in the state of Tlaxcala, Mexico, with the purpose of being based on the perception of a representative sample. The users who evaluated the quality in the service provided by the said institution through the Diagnostic Tools, validated by the Health Secretary in the country, are processed statistically through Minitab software, they are analyzed to identify areas of opportunity. The present research focused on the total fulfillment of specific objectives, based on the knowledge established in a case study, linked to an exhaustive review of bibliography focused on the time of attention, lean tools and in the demanded peak of Lean-Healthcare in Health services. This research based on DMAIC makes reference to specify the current state of the processes, to observe and measure the lead time of routes and key processes of the area, with this they make that this inquiry based on data and depending on the variables complies with the general objective of the investigation. Ending with continuous strategies of internal focus, where the user's practical and personal needs satisfaction are primordial, as well as the importance of establishing a quality system in the service provision, with the purpose of satisficing to the users.

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Keywords: *Public hospital; Lean Healthcare; health services; emergency area, service time.*

1. Introduction:

In spite of health is a good and a fundamental right of people (Acuña, 2010), in Mexico quality absence lies and manifests itself in different ways: ineffective and inefficient services, limited access to health services, costs increasing, medical complaints, dissatisfaction of users and health professionals, impairment of the credibility of health services by users and the worst, human losses (Salud, 2012), mainly in the emergency area, these factors influence directly in the times of medical attention, this determines the area of opportunity found for the development of this research, designing a response medical system in the emergency unit, improving the patients satisfaction who attend the public hospital service using Lean-Healthcare tools.

The methodological steps are described below, as well as the development and implementation of the improvement model, for this each of its stages are specified and the obtained results are presented based on the implementation of improvements for the optimization of response time of attention in the emergency department, these improvements were implemented starting from March 2018, and are annexed to the Triage Manual of the Apizaco Regional Hospital. After one year of its implementation, an evaluation is generated based on established parameters, the results that are thrown promote the detection of new opportunity areas and the reinforcement of those already made.

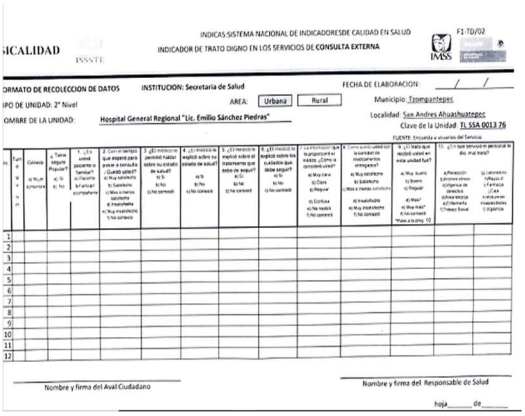
2. Methodology:

The study was carried out in a second level health care institution in the Regional Hospital of Apizaco "Emilio Sánchez Piedras" in the emergency area, located in the municipality of Tzompantepec, Tlaxcala. For this study, we used a data collection instrument called "Users of the Service for Indicators of Decent Treatment of Emergency Services Survey", created by the Health Secretary, in a specific period of time (February - August

2018) according to the maximum number of registered patients, in relation to the care.

Later these data were compared with previous years data (2015, 2016, 2017), which were provided by Apizaco Regional Hospital Quality Area, this in order to know the behavior during these years and to know if there has been any improvement in the medical service. in the morning shift (UTM) by its initials in Spanish, afternoon shift (UTV), night shift (UTN) and weekend also called accumulated (UAC), taking as a reference data from later years (2015-2017) to generate inference and a deep analysis of variations in service, in other words, locate deficiencies on it.

The execution of the study in the emergency unit of the Regional Hospital of Apizaco presents the 4 initial stages based on the DMAIC (Define, Measure, Analyze, Improve, Control) methodology, which refers to specify the current processes state; observe and measure the lead time of the routes and key processes of the area. When they are captured in their respective VSM, allow us to visualize the processes with greater accuracy; to analyze the activities taking as a starting point the request of the emergency service and as an end the entrance to consultation and finally the proposal of improvement to the area.


INDICAS-SISTEMA NACIONAL DE INDICADORESDE CALIDAD EN SALUD

INDICADOR DE TRATO DIGNO EN LOS SERVICIOS DE CONSULTA EXTERNA

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FORMATO DE RECOLECCION DE DATOS — INSTITUCION: Secretaria de Salud — FECHA DE ELABORACION: — AREA: Urbana Rural — Municipio: Tromgantepec

TIPO DE UNIDAD: 2° Nivel — Localidad: San Andres Ahuashuatepec

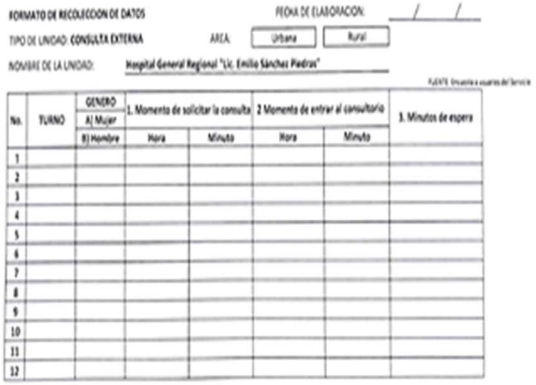
NOMBRE DE LA UNIDAD: Hospital General Regional "Lic. Emilio Sánchez Piedras" — Clave de la Unidad: TL SSA 0013 76

FUENTE: Encuesta a usuarios del Servicio

Nombre y firma del Aval Ciudadano — Nombre y firma del Responsable de Salud

hoja ____ de ____

Figure 1. Format "Survey to Users of the Service for Indicators of Decent Treatment of Emergency Services".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TIPO DE UNIDAD: CONSULTA EXTERNA — AREA: Urbana Rural

NOMBRE DE LA UNIDAD: Hospital General Regional "Lic. Emilio Sánchez Piedras"

FUENTE: Encuesta a usuarios del Servicio

No.	TURNO	GENERO A) Mujer B) Hombre	1. Momento de solicitar la consulta Hora	1. Momento de solicitar la consulta Minuto	2 Momento de entrar al consultorio Hora	2 Momento de entrar al consultorio Minuto	3. Minutos de espera
1							
2							
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Figure 2. Format "Survey to Users of the Service for Indicators of Decent Treatment of Emergency Services".

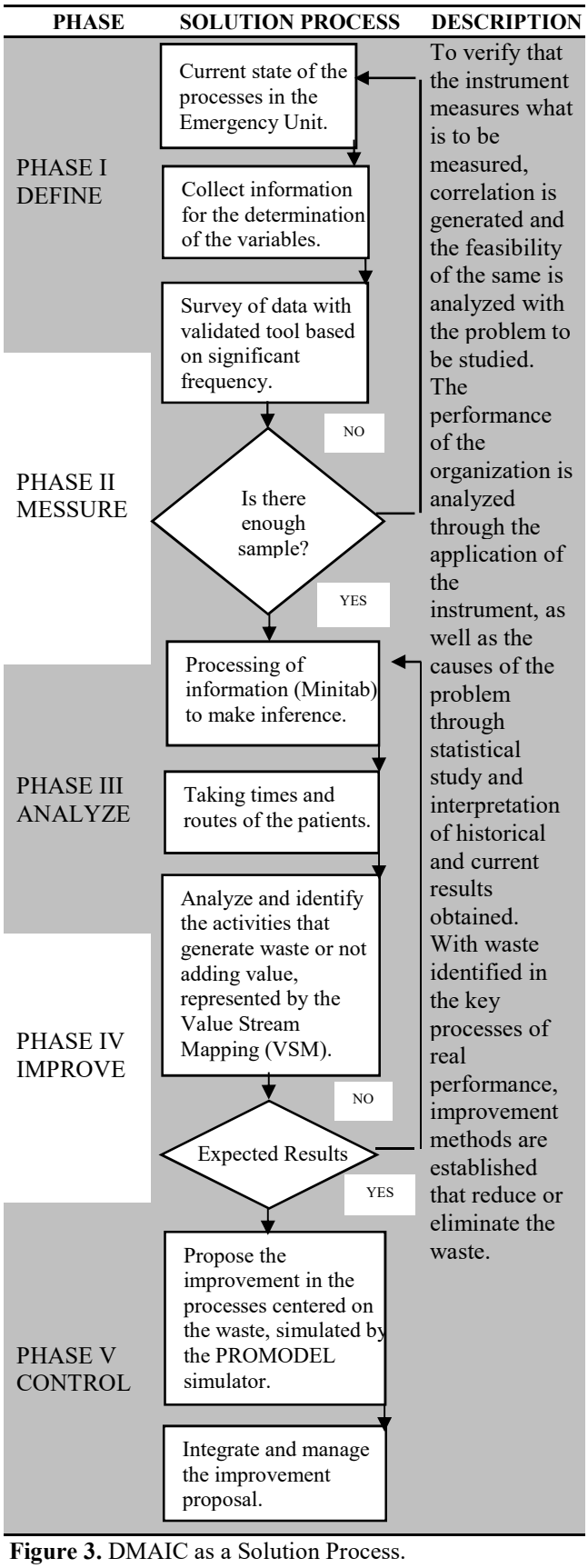

Figure 3. DMAIC as a Solution Process.

3. Ethical Considerations:

For the development of the research, the ethical principles relevant to the study were assumed. At all times the participants' anonymity was guaranteed, as well as the confidential treatment of the data, reiterating the voluntary nature of their participation, the commitment of confidentiality in the processing, analysis and publication of the results by the researcher, as well as their willingness to send the same to whoever was interested and for this the following was done:

- Approval by the directors of the institution, with the commitment to provide feedback with the obtained results.
- Patients who decided to participate in the study made the decision voluntarily and gave verbal authorization.
- The decision of the patients who decided not to participate was respected and they were informed that not participating would not affect their attention.
- The information obtained was used only for the study.
- The participant's names and the information obtained were used confidentially and for purely academic purposes.

4. Performance Analysis of The Apizaco Regional Hospital:

With the instrument applied in its entirety to the subjects previously determined, in a determined time, the statistical analysis can be started (quantitative) that was used to evaluate the established variables in advance (medical attention time), this analysis was carried out, identifying the effects of variables and redirecting the efforts translated into improvements to reduce the detected deficiencies, which are known as "gaps" and the areas that need to be improved.

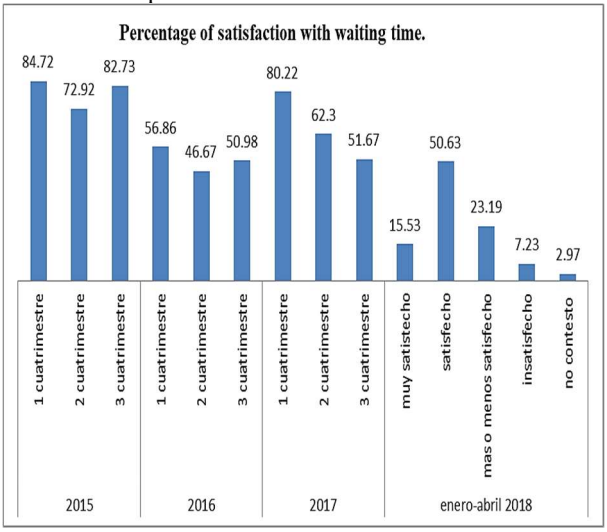

Figure 4. Percentage of Satisfaction with Wait Time.

The analysis was carried out using the statistical package "Minitab 16" which allowed, through a statistical summary and a graphical analysis, to observe trends in respondents' responses by means of histograms, cash charts, and basic descriptive statistics. It is important to mention that the values will be interpreted around the Likert scale with which the instruments were elaborated where the minimum value of the scale is the least desired and the maximum value is the best possible and most desired value.

For the analysis process, a general concentrate was made, in which the results that were related to each variable were combined. Once the general database was made, data was processed in the aforementioned software. Detonating in the first instance, that the variable that required more consideration was attention time, followed by human resources mainly in the triage classification and infrastructure, being the causes that required immediate attention, for which improvement proposals were generated.

4.1. Selection and Design of Interventions:

The generated proposal in this section of the research seeks to generate the desired social impact of the organization, or else, the benefits obtained by the work society of the Regional Hospital of Apizaco reflected in its service in the emergency area. That is why an optimization proposal during Triage is presented it seeks to reduce the selected gaps and provide an impact on the information flow between patient, nurse, and doctor, which contributes to the well-being of patients in the emergency service.

For the above reasons, a "Triage Sheet" format is proposed, which allows clinical risk management in order to adequately and safely manage patient flows when demand and clinical needs exceed resources. Nursing professionals have demonstrated the ability to carry out triage, but the doctor participation in relative decisions to the case of greater clinical relevance is positively valued (Soler, Gómez Muñóz, Bragulat, & Álvarez, 2010). The doctor in Triage area of the emergency service, the general nurse or nursing assistant and the doctor in the classification area of the emergency service are the actors in charge of receiving, classifying and linking the waiting patient, as well as identifying the risk factors to categorize the qualified emergency.

As mentioned above, each actor has specific functions to attend to the proper functioning of the process, however, in the presented proposal, Triage Sheet, is of the utmost importance, in a theoretical sense this format works as an essential filter, since it is based on the evaluation of vital signs, living conditions, therapeutic interventions and dynamic evaluation by the person responsible for applying it.

4.2. Triage Sheet Proposal:

The five levels triage system application in patients who come to the emergency service of the Apizaco Regional Hospital, ensure good management of existing resources, both physical and human by the designation of which area and group are prepared the best in every moment for the treatment of a certain pathology. The format for the "triage sheet" proposed and valued by the emergency department of the Regional Hospital of Apizaco is presented below.

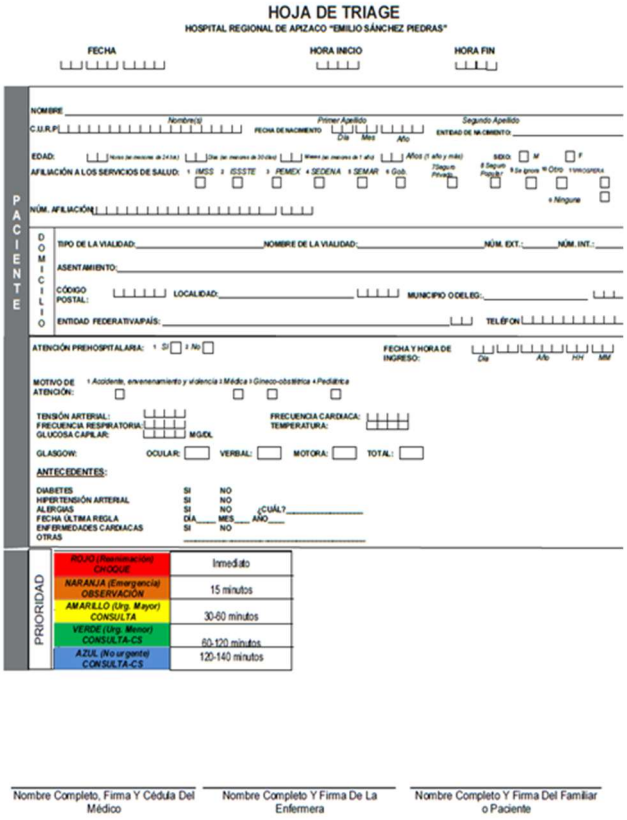

Figure 5. Triage Sheet.

5. Conclusions:

The current research was focused on the total fulfillment of the specific objectives set out in Chapter I, based on the knowledge established in a face to face case study, linked to an exhaustive review of the bibliography focused on the attention times, lean tools and the demanded Lean-Healthcare peak in health services. This research based on DMAIC made reference to specify the current state of the processes, to observe and measure the lead time of routes and key processes of the area, with this they make that this inquiry based on data and depending on the variables to fulfill the general objective of the investigation.

This developed approach and tools offer satisfactory results for the type of problem evaluated. The need of optimizing and innovate the processes in the emergency department has been clarified, important points have been clarified, such as the lack of application knowledge on the part of medical personnel, as well as the lack of information from patients and family members who require the service. However, despite having successful models worldwide, it is proven that the case of the public health sector and specifically in Mexico, does not consider the time and resources optimization in the emergency area, coupled with difficult situations and compromised in classifying, the nurse should always be aware of choosing the level of major severity, consulting if necessary with a doctor.

In Tlaxcala, the problem is the same as in the whole country, an apparent and systematic lack of precise and concise information flow, coupled with a limited supply of resources in the demanded areas. On the other hand, to amend these deficiencies, the improvements must be continuous and they must be the result of the analysis and constant study of the situation and the development of public health institutions, once the analysis has been carried out, a lap was verified and unstable achievements in terms of the quality offered by the emergency department, with patients and relatives who visit it. The conclusion can be summarized in the following points.

- The public hospital sector in Mexico needs a specific, continuous and methodologically contrasted action so the user (patient) in contact with the general emergency service (infrastructure, personnel, signs, etc.), perceives what the institution does for him throughout the process and the quality granted, within what is known as a "System or Quality Management Program" based on Lean methodology and hospital logistics application, in an efficient way, in which lean tools in the health sector can be applied, which allowed reaching the desired results. This way, we also identified the activities that do not generate value (shrinkage) within the process, those that do not allow the health service to be efficient and satisfactory for the patient, which were improved in order to achieve the main objective raised.
- The use of maps and diagrams facilitated the identification of the process performed by the patient, which was improved to reduce the waiting time. The use of the Pro model simulator allowed a broader visualization of said process, reflecting in the results that with the proposed improvement an increase of patients attended in a workday is obtained, with respect to the process that is currently applied, therefore said an investigation showed positive results.
- The decrease in the waiting time for triage care, especially in the time zone of the day and weekend, due to the fact that during these times there is a greater influx of people.
- Keep conducting surveys in order to establish consolidation actions and improve the quality of service, since it is understood that success depends to a large degree on the application of the administration process
- Continuous training is key to provide a more friendly treatment to patients and their families since they are

with whom they have contact and general impressions of the quality of service.

Finally, it is possible to affirm that Lean Healthcare tools are adapted with success to processes in the health sector, which can also lead to undertaking improvement programs in different service organizations, obtaining benefits for them. However, compliance with quality standards is still heterogeneous among the different providers, since their efficiency and resolution in some cases is reduced, which still generates dissatisfaction among users.

6. Implications:

This work can be considered as a predecessor of numerous quality projects that are presented in the future, projects that seek to generate development by means of task distribution, process optimization, leadership and satisfaction factors of nursing staff and complaints in the emergency area, that is why the following suggestions for future work in relation to the present investigation.

- *Internal Software*: Due to the time and lack of programming knowledge, software for the hospital was not developed, however, it is essential to have one. It is of vital importance the development of a networked software in the area of urgency that allows real-time communication between registry, triage and medical personnel, for a quick and efficient assessment of quality care.
- *Distribution of the Area*: This suggestion is based on the infrastructure of the area, based on a layout made, the possibility of generating a third doctor's office is observed, or the redistribution of the space of entry and registration of patients. Considering that redistribution must be evaluated prior to its integration by the State Health Sector.
- *User Information Handbook*: Once the opportunity area has been detected based on keeping users informed according to the type of processes to be carried out in the emergency area, it is suggested that an information handbook is made for users, which must be delivered to all staff and generate activities that allow keeping the current user informed they deserve to receive and maintain welfare based on the time of attention of each priority.
- *Personnel Training Handbook*: Staying constantly trained guarantees the fulfillment of the mission, vision, and objectives of the hospital, the elaboration of an internal personnel training handbook endorsed by the quality area is suggested, which allows the indoctrination of the personnel and to generates a consistent service, systematized processes. This will ensure continuous improvement in customer service and to fulfill the services in a timely way.

Corresponding Author:
Karen Margarita Herrera Cruz, Eng.
Division of Graduate Studies and Research in Administrative Engineering, National Institute of Technology of Mexico, Technological Institute of Apizaco, Tlaxcala, Mexico
E-mail: karen.herrera@ilab.net

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