

# Análise do indicador tempo resposta do serviço de atendimento móvel de urgência (SAMU)

**RESUMO** | Objetivo: analisar o indicador tempo resposta do serviço de atendimento móvel de urgência, referente aos chamados para agravos clínicos e traumáticos que resultaram em atendimento pré-hospitalar e avaliar o indicador tempo resposta de deslocamento da equipe até o local da ocorrência e o tempo de deslocamento até o serviço intra-hospitalar. Método: concerniu em uma estratégia de pesquisa de campo do tipo longitudinal e retrospectiva, na qual analisou-se os dados referentes ao tempo resposta despendido em cada fase do atendimento das ocorrências, constituída por 336 fichas de ocorrências no período de janeiro a dezembro de 2019. A pesquisa foi aprovada pelo Comitê de Ética em Pesquisa da Faculdade Integral Diferencial sob o número CAAE: 27613219.1.0000.5211 e parecer de número 3.948.907. Resultados: evidenciou-se que o tempo resposta do serviço analisado possui uma média de 46,18 minutos para os atendimentos dos chamados rurais, e 14,74 minutos para a zona rural. Conclusão: o tempo resposta em análise perpassa os valores admitidos como ideais.

**Descritores:** Serviços médicos de emergência; Tempo de reação; Avaliação dos serviços de saúde.

**ABSTRACT** | Objective: to analyze the response time indicator of the mobile emergency care service, referring to calls for clinical and traumatic injuries that resulted in pre-hospital care and to evaluate the response time indicator of the team's displacement to the place of occurrence and the displacement time to the in-hospital service. Method: it concerned a longitudinal and retrospective field research strategy, in which data referring to the response time spent in each phase of the attendance of occurrences were analyzed, consisting of 336 occurrence records in the period from January to December 2019. The research was approved by the Research Ethics Committee of Faculdade Integral Diferencial under number CAAE: 27613219.1.0000.5211 and opinion number 3,948,907. Results: it was evidenced that the response time of the analyzed service has an average of 46.18 minutes for the attendance of rural calls, and 14.74 minutes for the rural area. Conclusion: the response time under analysis goes beyond the values accepted as ideal.

**Keywords:** Emergency medical services; Reaction time; Evaluation of health services.

**RESUMEN** | Objetivo: analizar el indicador de tiempo de respuesta del servicio de atención móvil de emergencia, referente a las llamadas por lesiones clínicas y traumáticas que resultaron en atención prehospitalaria y evaluar el indicador de tiempo de respuesta del desplazamiento del equipo al lugar de ocurrencia y el tiempo de desplazamiento al servicio hospitalario. Método: se trató de una estrategia de investigación de campo longitudinal y retrospectiva, en la que se analizaron datos referentes al tiempo de respuesta empleado en cada fase de la atención de ocurrencias, constituidos por 336 registros de ocurrencia en el período de enero a diciembre de 2019. La investigación fue aprobada por el Comité de Ética en Investigación de la Faculdade Integral Diferencial bajo el número CAAE: 27613219.1.0000.5211 y dictamen número 3.948.907. Resultados: se evidenció que el tiempo de respuesta del servicio analizado tiene un promedio de 46,18 minutos para la atención de llamadas rurales, y 14,74 minutos para la zona rural. Conclusión: el tiempo de respuesta bajo análisis va más allá de los valores aceptados como ideales.

**Palabras claves:** Servicios médicos de emergencia; Tiempo de reacción; Evaluación de los servicios de salud.

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## INTRODUCTION

Throughout the Brazilian territory, Pre-Hospital Care (APH - Atendimento Pré-Hospitalar) is operated by the Mobile Emergency Care Service (SAMU-192), established in the country in 1990, in the state of São Paulo, together with its Emergency Medical Regulation Centers (RMU - Regulação Médicas de Urgências), it is one of the components in the organization of the Emergency Care Network (RAU - Rede de Atenção às Urgências). This service aims to provide assistance to the popula-

tion, through the nationally known 192 call, allowing the customer to access the health system, through a regulation center, which has a transport group to help the most diverse types. of urgencies and/or emergencies, constituting the interconnection between the extra and intra-hospital intervention. <sup>(1-2)</sup>

The functionality of SAMU presents division and obedience to principles as an organizational tool. In this way, the agility, speed, readiness and technical qualification of the professionals who make up the team, so that they are able to identify the user's failures and emergency signs and carry out the referral to the reference health service, taking into account the institution's aptitude and assistance capacity to offer the best care to patients. <sup>(2)</sup>

The calls required by the APH service are considered time dependent. This means that the shorter the time between triggering and intervention in the scene, the more significant the care results, the higher the chances of living and the lower the damage and sequelae. Response time is understood to be the time elapsed between the call for help and the arrival of the team at the scene, whose appropriate interval would be between 8 and 10 minutes. <sup>(2)</sup>

The response time is the main indicator of APH services, being an extremely relevant factor for the APH to be successful and, therefore, it must be well controlled, in order to increase the chances of survival. <sup>(3)</sup>

Taking into account that the SAMU translates as a factor of great relevance in care, there was a need to analyze the response time indicator for the evaluation of the quality of the pre-hospital component, since this indicator directly contributes to the chances of survival of an individual who needs emergency care, whether due to a traumatic cause or any other occurrence. In view of this, the following question emerged: how is the SAMU response time indicator in the north of Piauí regarding calls for clinical and traumatic injuries demanded by the CRMU and which resulted in pre-hospital care?

Therefore, the objective was to analyze the SAMU response time indicator, referring

to the calls for clinical and traumatic injuries demanded from the CRMU in the APH stages: team travel time to the place of occurrence and travel time to the in-hospital service, according to each support unit.

## METHOD

The study was carried out at SAMU 192 in the city of Piripiri, seen as the pre-hospital component of the aforementioned municipality. The population constituting this research were the 2,714 occurrences attended by SAMU 192 of Piripiri, of clinical and traumatic origin, from January to December 2019, for which basic or advanced intervention teams were moved. The sample admitted consisted of 336 occurrence records, calculated using the Survey Monkey online sample size calculator, with a confidence interval of 95% and a sample error of 5% ( $p \leq 0.05$ ).

Regarding the nature of the injuries included in the research, traumas are highlighted, whether due to traffic accidents, physical aggression (victims of violence), falls and/or other accidents; emergencies, whether psychiatric, clinical, adult, pediatric, obstetric or other; and cases of drowning, burns, electric shocks and poisoning.

It is noteworthy that the Term of Commitment for the Use of Data (TCUD) was used to maintain the confidentiality of the data collected in the files (occurrence files), as well as the privacy of their contents.

The inclusion criteria accepted were all documents that contained complete registration data of the occurrences requested to SAMU 192 of Piripiri between January and December 2019, being of a clinical and/or traumatic nature, that required the displacement of a basic or advanced support unit, which contained information regarding the response time of each stage of care, from the time of receipt of the call by the Auxiliary Medical Regulation Operator, transmission of the request to the Regulator Physician (RP), doctor's opinion for sending the team, time demanded by the interventionist team to leave towards the victim and the time of arrival at the place of the call.

All occurrences demanded by SAMU in Piripiri in the period from January to December 2019, which resulted in hazing, evasion of the victim from the place of occurrence, inter-hospital removals, address not located and medical advice, were excluded from the research.

Data collection was performed using the evaluation of the records of occurrences attended by the service, in which information was collected regarding the time consumed in each step of the SAMU 192 service, as follows:

- T1: travel time to the location of the occurrence: time spent between the start of the move, when activated by the central, until the moment the team arrives at the scene.
- T2: travel time from the place of occurrence to the hospital: time elapsed between the displacement of the team from the place of the occurrence, after care, to the hospital unit.
- FRT: final response time: time elapsed from the team's displacement from the support point to arrival at the unit.

The consultations were analyzed through the service sheets that were generated by the service, after attending to the occurrences for which they were called, thus seeking to analyze the response time spent by the service in each of the stages of service.

Biostatistical analysis was used, such as descriptive analysis through the use of Microsoft Excel 2019 software to organize the findings, which were later expressed in tables and charts for a better discussion of the mathematical correlations between the results obtained. The significance level adopted was 5% ( $p \leq 0.05$ ).

This study complied with all the ethical precepts included in Resolution No. 466 of December 12th, 2012 and Resolution No. 580 of March 22, 2018 and only started after approval by the Research Ethics Committee (CEP) of Faculdade Integral Diferencial (FACID) under number CAAE: 27613219.1.0000.5211 and opinion number 3,948,907.

## RESULTS

The results shown below refer to the annual statistics of occurrences attended by the urban and rural USA and USB of SAMU 192 in Piripiri with regard to calls for clinical and traumatic injuries, considered dependent times, throughout 2019. The exposure and discussion of the data are described in two axes, in which the first refers to the description of the occurrences attended by the service throughout the year, the second deals with the times spent in the stages of service of SAMU 192.

**Response time spent from the point of service to the place of occurrence.**

Table 1 shown below, brings the comparison between the USA and USB with regard to travel times from the support point to the place of occurrence in urban and rural areas.

When analyzing Table 1, it can be seen that the average travel time for the urban USA was 7.35 minutes, with a standard deviation of 5.67, with a minimum time of 1 and a maximum of 47 minutes. The urban USB, on the other hand, obtained an average time of 8.31 minutes, with a standard deviation of 5.17, with a minimum time of 1 and a maximum of 32 minutes. It is noteworthy that the statistical comparison between the times of USA and USB in the urban area did not show statistical significance.

Travel times in rural areas were higher than those found in urban areas. From the above, the rural USA took an average of

19.68 minutes to reach the QRU site, with a standard deviation of 13.14, and taking a minimum time of 4 minutes and a maximum of 60 minutes. In comparison, the rural USB had an average time of 26.80 minutes, with an established standard deviation of 13.00, and spending a minimum time of 7 and a maximum of 65 minutes in answering calls. When analyzing the numbers of each rural care unit, it can be seen that there is a statistical disparity between the times of the basic and advanced units, and it is noted that the time spent between the different areas showed significant divergence.

**Response time spent from the place of occurrence to arrival at the in-hospital service**

Table 2 shows the comparison of travel time from the place of occurrence to arrival at the hospital in urban and rural contexts.

Table 2 showed that the mean time of the AUS was 7.42 minutes with a standard deviation of 5.84 and, in terms of shorter time, it obtained 1 minute and in terms of longer displacement, this was 36 minutes until arrival at the hospital. USB took an average of 6.72 minutes between leaving the place of occurrence until arrival at the destination health unit with a standard deviation of 3.73 and a minimum time of 2 and a maximum of 31 minutes. Regarding the statistical comparison, no difference was noticed between the travel times to the hospital when comparing the USA and the USB

in the care of urban calls.

It was found that the travel times from the place of occurrence to the hospital increased considerably in rural areas. The USA presented an average time of 19.94 minutes, with a standard deviation of 13.78, a minimum of 6 and a maximum of 76. On the other hand, the USB took an average of 23.58 minutes, with a standard deviation of 12.63, minimum of 3 and maximum of 62 minutes. However, there was no statistical difference when comparing USA and USB in their time in rural areas.

When comparing the times recorded by basic and advanced support units, urban and rural, from the point of care to the place of occurrence, and from the place of occurrence to arrival at the hospital, it is observed that rural care is always longer and that there is no great disparity between the variables

**Final Response Time**

Table 3 represents the final response times of the USA and USB in the urban and rural environment.

The analysis of table 3 shows that the USA totaled an average time of 14.74 minutes compared to 9.75 minutes for the USB. It is noticed that there was no statistical difference in the comparison of the two support units.

The FRT was higher in rural areas, as the USA took an average of 39.62 minutes and the USB 50.39 minutes. As in the urban space, there was no statistical difference when

**Table 1 – Travel time\* from the point of care to the place of occurrence, in urban and rural environments. Advanced Support Unit (USA) and Basic Support Unit (USB). Piripiri-PI, 2020.**

	Urban area			Rural area		
	USA	USB	p-value	USA	USB	p-value
Mean	7,353	8,310	0,4992	19,685	26,809	0,0009
Median	6	7		17	25	
Mode	5	5		17	13	
Standard-deviation	5,670	5,174		13,143	13,003	
Minimum	1	1		4	7	
Maximum	47	32		60	65	

Source: the author, 2020.  
\* Time in minutes.  
\*\* Statistical significance p-value <0.05.

the support units moved to the rural area of the studied municipality.

Figure 1 provides a comparison of the final response times for urban and rural areas.

The TRF of SAMU 192 in Piripiri has an average of 46.18 minutes for rural calls, and 14.74 minutes for the urban area. These times extrapolate the values accepted and internationally accepted as an ideal response time.

The times shown in Figure 2 attest that, depending on the environment where the call occurs, they can be extended, especially in the space of displacement to the rural area. However, the increase in the TRF demonstrated is largely due to the difficulty of moving on the side roads, mostly carousel and intersected by geographical barriers, such as rivers, dams and lack of preventive

maintenance of these displacement routes.

**DISCUSSION**

The PHTLS, the world standard for education in prehospital care, argues that in the United States, the average RT between activation of the emergency service and arrival at the scene, in the urban environment, is 8 to 9 minutes.<sup>(4)</sup>

The urban and rural FRT presented in the present study allows us to reflect that, when taking into account that the FRT of an occurrence is composed of 6 complementary times, which range from the reception and opening time of the call, medical regulation, decision time on the demand and dispatch of the team, time for the departure of the team for the mission, team travel time to the

place of occurrence and travel time to the in-hospital service, and the values tabulated above, comprise only the last two times of this chain, it can be inferred that the times obtained, once they could be complemented with the other variables of the chain that make up the total response time, would be even higher and outside the established standards.

In comparison with the FRT of the SAMU 192 Piripiri, studies carried out in different Brazilian cities demonstrate divergences in the different times found and in the evaluation methods. It was identified that the average response time of other urban centers were lower than those found, however, the loco-regional differences intrinsic to each analyzed context must be considered.<sup>(2-5-6-7)</sup>

Another study carried out at SAMU 192

**Table 2 – Travel time\* from the place of occurrence to arrival at the hospital, in urban and rural environments. Advanced Support Unit (USA) and Basic Support Unit (USB). Piripiri-PI, 2020.**

	Urban area			Rural area		
	USA	USB	p-value	USA	USB	p-value
Mean	7,429	6,726	0,1512	19,944	23,583	0,0589
Median	6	6		15	22	
Mode	5	6		13	12	
Standard-deviation	5,844	3,733		13,781	12,630	
Minimum	1	2		6	3	
Maximum	36	31		76	62	

Source: the author, 2020.  
 \* Time in minutes.  
 \*\* Statistical significance p-value <0.05.

**Table 3 – Time\* Final Response in urban and rural environments. Advanced Support Unit (USA) and Basic Support Unit (USB). Piripiri-PI, 2020.**

	Urban area			Rural area		
	USA	USB	p-value	USA	USB	p-value
Mean	14,745	9,750	0,3712	39,629	50,392	0,4876
Median	12,5	14		33,5	46,5	
Mode	10	13		24	26	
Standard-deviation	9,750	8,240		25,509	24,497	
Minimum	4	5		10	12	
Maximum	83	63		136	113	

Source: the author, 2020.  
 \* Time in minutes.  
 \*\* Statistical significance p-value <0.05.



in the municipality of Teresina-Pi, whose regulation center is responsible for regulating SAMU 192 in Piripiri, recorded an average response time of displacement to the place of the call of 13.6 minutes for urban calls and 32, 8 minutes for rural calls and travel time from the urban location to the hospital was 11.3 minutes for urban consultations and 28.3 minutes for rural consultations. (8)

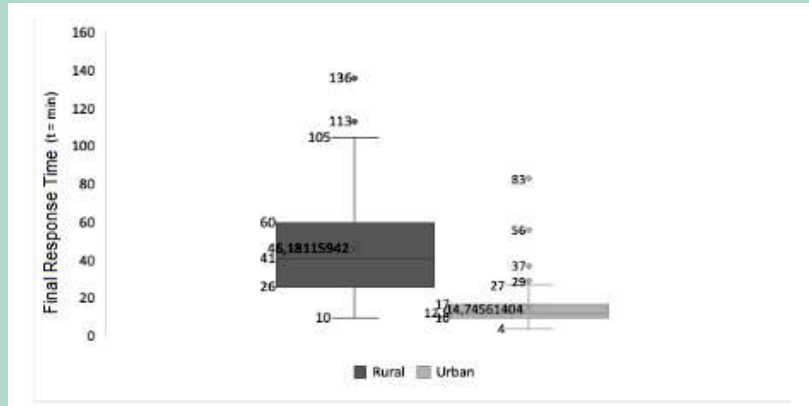
SAMU 192 in the state of Rio Grande do Sul recorded an average response time for travel to the place of the call of 30 minutes to 1 hour, higher than recommended according to the national average, whether in urban or rural areas. (8)

Similar studies showed divergences when comparing the average RT between the attendance of calls from urban and rural areas. It is believed that the difference between the times is influenced by several factors, such as the presence of geographical barriers, traffic conditions, difficulty in locating the address of the incident, the driver's vision in order to choose the best route from the place of the occurrence to the patient's destination hospital, distance from the place of injury, traffic conditions. Situations of permanence of teams in in-hospital emergency services, which transfigure the unavailable support unit while waiting for the patient to be welcomed at the destination, also appears as a contributing factor to the increase in response time. (9-10)

The SAMU CRU is also a critical aspect for the performance of the service and for the response time indicator, they emphasize that the act of regulating is a privilege of the medical professional, highly dependent on the structural conditions of the regulatory centers and their knowledge and ability to mobilize resources and appropriate rules. A key issue is the divergent view of urgency between the RP and the patient. The existing ordinances so far are innovative in admitting that the opinions of RP and client are divergent and real. (11)

A study carried out in a PHC service in the Southeast region identified that, when there is an accumulation of calls, a list of complaints attended by the TARMs appears on the RP screen. The ones considered “non-

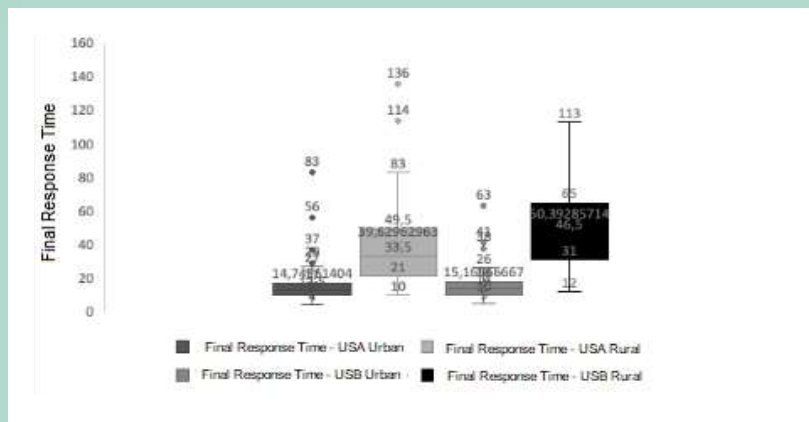
**Figure 1 – Comparison of Final Response Times\* in urban and rural areas. Piripiri-PI, 2020.**



Source: author himself, 2020.

\* Statistical significance p-value <0.05.

**Figure 2 – Comparison of Final Response Times\* of Advanced Support Units (USA) and Basic Support Unit (USB). Piripiri-PI, 2020.**



Source: author himself, 2020.

\* Statistical significance p-value <0.05.

sense” by the RP can be postponed and the waiting time gets longer. Some professionals select the cases they want to handle, putting some calls on hold. The author argues that this is a new type of non-face-to-face queue in which the reasons for selecting priorities (or prejudices) are demonstrated in an emergency care space, with its own refusal strategies. (12)

In this discussion, it is also highlighted

the importance of the quality of filling in the Rescuer Assistance Reports (RAR), responsible for the records arising from all pre-hospital care, in which many of them presented incomplete information. In line with the above, similar studies highlighted underreporting as a problem in emergency services in general and attributed such limitations as possible influences on the results obtained in their research, representing aspects that

need improvement to reach a more reliable study of the services and the population served.<sup>(13-14)</sup>

Furthermore, the TR is considered a quality indicator for the evaluation of PHC care and other emergency systems, as it is associated with time with patient survival, especially in conditions considered time-dependent. Therefore, RT divergences found throughout this discussion, evidence the need for constant and accurate measurements on the stages of the studied indicator. However, it is believed that evaluating only the response time values alone are not enough to measure the quality of the service and guarantee a more effective assistance, in addition, it is essential to identify the main factors interfering in this quality indicator.

## CONCLUSION

It is concluded that the response time of the SAMU 192 of urban and rural Piripiri permeates the values accepted as ideal.

From this perspective, it is important to emphasize that the response time is one of the main indicators for evaluating PHC services and emergency systems. However, although it is a relatively easy indicator to measure, it should not be the only indicator to be used and should not be evaluated in isolation, as it can mask the quality of the service. A response time, although great, does not imply that the assistance was provided with excellence.

During the development of this research, it was possible to verify that most studies carried out to date analyzed the response time indicator in isolation, making it evident the need for further research exploring the

factors that interfere in the increase or reduction of the response time indicator.

The limitations found in this study are mainly related to the quality of the records referring to the response time of the RARs by the interventionist professionals of the service in question. This factor draws attention to the importance of these data so that a more accurate measurement of the RT indicator as an indicator of service quality is feasible, in addition, there is a lack of recent studies on the subject.

Due to the relevance of the topic under study, it is necessary to stimulate the development of new studies that seek to understand the factors correlated with the response time and allow the understanding of scientifically accepted strategies that can contribute to the reduction of this quality indicator. 🐦

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