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EXPERIENCE REPORT

# "SAMU-RISK" technology as a communication and occupational safety strategy in mobile pre-hospital care

*Tecnología "SAMU-RISK" como estrategia de comunicación y seguridad laboral en la atención prehospitalaria móvil*

*Tecnologia "SAMU-RISK" como estratégia de comunicação e segurança ocupacional no atendimento pré-hospitalar móvel*

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**Abstract**

This study aimed to report the experience of creating and implementing a technology focused on communicating risk and violent situations to professionals of the Mobile Emergency Care Service (SAMU 192). It is a descriptive, qualitative study of the experience report type, developed at SAMU Metropolitan II/RJ in 2025. The experience involved the construction and implementation of the "SAMU-RISK" technology, created for recording, monitoring, and communicating risk situations faced by teams during pre-hospital care. The implementation of the technology enabled greater standardization of communication between care teams and the Medical Emergency Regulation Center, strengthening the institutional safety culture, expanding records related to occupational violence, and improving the decision-making process for team deployment. The tool also facilitated traceability of incidents, support for continuing education actions, and institutional strengthening of professional protection strategies. The "SAMU-RISK" project has demonstrated potential as a strategic tool for strengthening communication, occupational protection, and care management in highly complex social scenarios.

**Descriptors:** Emergency Medical Services; Health Communication; Inventions; Occupational Health; Emergency Nursing.

**Resumén**

Este estudio tuvo como objetivo documentar la experiencia de creación e implementación de una tecnología enfocada en la comunicación de situaciones de riesgo y violencia a profesionales del Servicio Móvil de Emergencias (SAMU 192). Se trata de un estudio descriptivo y cualitativo, tipo informe de experiencia, desarrollado en el SAMU Metropolitana II/RJ en 2025. La experiencia incluyó la construcción e implementación de la tecnología "SAMU-RISK", creada para registrar, monitorear y comunicar situaciones de riesgo que enfrentan los equipos durante la atención prehospitalaria. La implementación de la tecnología permitió una mayor estandarización de la comunicación entre los equipos de atención y el Centro de Regulación de Emergencias Médicas, fortaleciendo la cultura de seguridad institucional, ampliando los registros relacionados con la violencia laboral y mejorando el proceso de toma de decisiones para el despliegue de equipos. La herramienta también facilitó la trazabilidad de incidentes, el apoyo a las acciones de formación continua y el fortalecimiento institucional de las estrategias de protección profesional. El proyecto "SAMU-RISK" ha demostrado su potencial como herramienta estratégica para fortalecer la comunicación, la protección laboral y la gestión de la atención en escenarios sociales de alta complejidad.

**Descriptores:** Servicios Médicos de Emergencia; Comunicación en Salud; Invenciones; Salud Ocupacional; Enfermería de Urgencias.

**Resumo**

Objetivou-se relatar a experiência de criação e implementação de uma tecnologia voltada à comunicação de situações de risco e violência para profissionais do Serviço de Atendimento Móvel de Urgência (SAMU 192). Trata-se de um estudo descritivo, de abordagem qualitativa, do tipo relato de experiência, desenvolvido no SAMU Metropolitana II/RJ no ano de 2025. A experiência envolveu a construção e implementação da tecnologia "SAMU-RISK", criada para registro, monitoramento e comunicação de situações de risco enfrentadas pelas equipes durante atendimentos pré-hospitalares. A implementação da tecnologia possibilitou maior padronização da comunicação entre equipes assistenciais e Central de Regulação Médica das Urgências, fortalecimento da cultura institucional de segurança, ampliação dos registros relacionados à violência ocupacional e melhoria do processo decisório para deslocamento das equipes. A ferramenta também favoreceu rastreabilidade das ocorrências, apoio às ações de educação permanente e fortalecimento institucional das estratégias de proteção profissional. O "SAMU-RISK" demonstrou potencial como ferramenta estratégica para fortalecimento da comunicação, proteção ocupacional e gestão do cuidado em cenários de elevada complexidade social.

**Descritores:** Serviços Médicos de Emergência; Comunicação em Saúde; Invenções; Saúde Ocupacional; Enfermagem em Emergência.

## Introduction

Emergency and urgent care represent one of the most complex and strategic components of contemporary health systems, especially in countries marked by social inequalities, high population density, and increasing urban violence, such as Brazil. Accidents and violence are essential causes of morbidity and mortality in the country and worldwide, with significant magnitude and impact on the population's health, generating particular challenges for the Unified Health System (SUS), which demands outpatient services, pre-hospital transport, hospitalizations, surgical procedures, intensive care, and rehabilitation, with high economic costs and also intangible costs resulting from the physical and emotional consequences, which mainly affect young, economically active, black or brown people[1]. In this context, the Mobile Emergency Care Service (SAMU 192) plays an essential role in organizing the Emergency Care Network (RUE), acting as an entry point for critical care, medical regulation, and coordination between different levels of health care.

The organization of emergency and urgent care systems in Brazil was consolidated by Ministerial Decree GM/MS No. 2048/2002, which established the Technical Regulation of State Emergency and Urgent Care Systems and defined guidelines for structuring fixed and mobile pre-hospital care, medical regulation, continuing education, and regional integration of services. The document acknowledges that the growth in demand for emergency care is directly related to the increase in accidents, urban violence, and the insufficient structuring of healthcare networks, factors that significantly contribute to the overload of emergency services[2].

In addition to establishing organizational parameters, the regulation emphasizes that emergency care should be provided in an integrated, regionalized, and effective manner, encompassing everything from primary care to highly complex hospital services[2].

In this model, SAMU (Mobile Emergency Care Service) assumes a leading operational and care-related role, mainly due to its capacity for early intervention and organization of the care flow. However, the increase in violence in large urban centers has introduced new challenges to pre-hospital care teams. In various territories, professionals deal daily with armed confrontations, barricades, direct threats, and access restrictions, situations that directly impact the safety of the teams and the continuity of care. In the state of Rio de Janeiro, particularly in metropolitan areas, these situations have become increasingly frequent. SAMU teams frequently report difficulties accessing certain locations, the need to interrupt services, and exposure to scenarios of high operational risk.

The institutional protocol of SAMU Metropolitan II/RJ officially recognizes this context and establishes specific guidelines for action in situations of risk and urban violence. Among the proposed strategies, the use of the "SAMU-RISK" application stands out, developed to systematize records related to risk occurrences and strengthen institutional communication flows[3].

The incorporation of digital technologies in the healthcare context has proven to be an important strategy for improving care management, strengthening interprofessional communication, and enhancing organizational processes. In the context of emergencies, tools focused on monitoring critical events and rapid communication between teams can significantly contribute to greater operational safety and better decision-making[4].

Furthermore, organizational technologies focused on occupational safety promote institutional recognition of the risks faced by workers and strengthen actions related to continuing education, occupational protection, and worker health surveillance. Despite the increasing exposure of SAMU (Mobile Emergency Care Service) teams to situations of urban violence, studies describing experiences related to the development of technologies focused on communication and occupational risk management in this context are still scarce[4].

Given this scenario, the present study aimed to report the experience of creating and implementing “SAMU-RISK" technology as a communication and risk management tool for professionals in the Mobile Emergency Care Service.

## Methodology

This is a descriptive study, with a qualitative approach, characterized as an experience report, developed from the experiences of professionals involved in the creation and implementation of the "SAMU-RISK" technology within the scope of the Mobile Emergency Care Service (SAMU 192) Metropolitan II/RJ.

The experience report constitutes an important methodological strategy for the critical description of innovative processes in health, especially those related to the reorganization of work processes, the incorporation of technologies, and the development of care strategies in complex scenarios[5].

The experience was developed at SAMU Metropolitan II/RJ, a regionalized service responsible for mobile pre-hospital care in municipalities of the Metropolitan Region of the state of Rio de Janeiro. The territorial context is characterized by high population density, social vulnerability, and frequent episodes of armed violence, factors that directly impact the operational dynamics of the care teams.

The technology development began in July 2025, a period marked by an increase in institutional records related to occupational risk situations during pre-hospital care, including the presence of armed individuals, barricades on public roads, ongoing confrontations, threats to teams, and territorial restrictions, as well as a "sentinel case" in one of the municipalities, resulting in the total loss of the emergency vehicle. Professionals directly involved in the care and management of the service participated in the process, including nurses, regulatory physicians, nursing technicians, fleet operators, continuing education professionals, and operational coordinators.

The development began with the identification of weaknesses related to communication and a lack of standardization in the recording of risk situations faced by

the teams. Before the implementation of the tool, information was predominantly transmitted verbally, without adequate traceability, hindering the monitoring of occurrences, the production of indicators, and the planning of preventive strategies. Initially, a situational survey was conducted based on the analysis of internal records, team reports, administrative notifications, and discussions in operational meetings. This stage allowed the identification of the main patterns related to risk situations and operational difficulties experienced by the teams. Subsequently, a standardized communication flow was developed involving healthcare teams, fleet operators, regulatory physicians, and operational coordination. Criteria were defined related to the classification of risk situations, institutional communication, the evacuation of teams to safe locations, and the systematic recording of occurrences.

Based on these demands, the "SAMU-RISK" technology was developed, structured as a digital tool aimed at recording and monitoring violent situations faced by pre-hospital care teams. The tool was designed to allow for quick and standardized recording of incidents, categorization of threat types, geolocation of events, and production of management reports. After initial development, pilot implementation of the technology was carried out in September 2025 with the service's operational teams. The implementation involved an institutional presentation of the tool, team training, awareness workshops, practical usage simulations, and integration into the service's operational workflows.

The implementation of the technology was accompanied by the Continuing Education Coordination, responsible for conducting periodic training sessions, discussion groups, and critical analysis of the recorded events. The information produced began to support technical meetings, updates to institutional protocols, and the planning of strategies related to team safety. Because this is an experience report based on an institutional process and without the use of identifiable user or professional data, the study did not require review by a Research Ethics Committee, respecting the ethical principles related to the confidentiality of information, and has authorization based on the signing of the letter of consent by the institution's management.

The authors state that they used OpenAI's ChatGPT artificial intelligence tool as an auxiliary support for text refinement and grammatical revision. It is important to note that all scientific content, critical analysis, data interpretation, and intellectual responsibility for the work remained entirely the responsibility of the authors.

**Experience Report**

The experience of creating "SAMU-RISK" arose from the transformations observed in the daily operations of SAMU Metropolitan II/RJ, especially related to the worsening of urban violence scenarios and the increasing exposure of healthcare teams to risky situations during calls.

The increase in incidents in territories marked by armed conflicts, barricades, and the overt circulation of armed individuals began to have a direct impact on the service's care dynamics. Teams frequently reported difficulties accessing patients, interrupted travel, verbal threats, and the need for immediate withdrawal from service areas due to the imminent risk to the physical integrity of professionals. Despite the recurrence of these episodes, institutional weaknesses were observed in the systematization of information related to critical events. Much of the communication occurred informally, predominantly verbally, via radio or telephone, without adequate traceability of incidents. Furthermore, there was significant underreporting of occupational violence situations. Many professionals normalized the risks faced in their daily work, understanding exposure to violence as an inherent part of working in the mobile emergency service.

The initial discussions regarding the need for a specific tool took place in multidisciplinary meetings involving nurses, regulatory physicians, fleet operators, and operational managers. In these meetings, workers shared experiences related to threats faced during calls and communication difficulties between teams and the Central Regulation Center. Among the reports presented were instances of ambulances being prevented from entering certain locations, the need to interrupt calls due to armed confrontations, and the emergency withdrawal of teams from areas considered unsafe. Professionals also reported emotional distress, fear, and a feeling of vulnerability due to the frequency of these occurrences. From these discussions, the need for a tool capable of standardizing incident records, improving real-time communication, and strengthening team protection became evident.

In this context, "SAMU-RISK" emerged, initially conceived as a digital tool for rapid communication between healthcare teams and the Emergency Medical Regulation Center. The technology proposal was built collectively, considering the operational needs identified by the service professionals themselves. The development team prioritized a simple, objective, and functional interface, suitable for the dynamic context of pre-hospital care.

The tool enabled standardized recording of incidents related to violence, including the presence of barricades, armed individuals, ongoing confrontations, threats to teams, inability to access victims, and the need to remove the ambulance to a safe location. One of the main advantages observed during the implementation of the technology was the possibility of rapid and simultaneous communication between the different actors involved in the response. The fleet operator could now alert teams in advance about possible risk scenarios, while the regulating physician could reassess the appropriateness of dispatching the ambulance based on clinical severity and level of occupational exposure. Another important advance provided by the technology was the strengthening of the autonomy of the healthcare teams. Professionals began to perceive greater institutional support for adopting self-protection measures in the face of imminent threats.

During the initial implementation period, awareness workshops and training sessions were conducted by the Continuing Education Coordination. These activities discussed operational flows, safety criteria, the importance

of institutional records, and interprofessional communication. The workshops also provided spaces for qualified listening, allowing professionals to share traumatic experiences that are often overlooked in the service's routine. Over the following months, a progressive increase in institutional records related to risk situations was observed. This growth did not necessarily represent an absolute increase in occurrences, but rather an improvement in the reporting culture and a strengthening of the institutional perception of the importance of monitoring occupational risks.

The data produced by technology began to support management meetings, protocol reviews, operational planning, identification of critical areas, and ongoing education initiatives. Another relevant aspect was the legal and institutional strengthening of the teams, since the records produced by the tool began to function as a documentary mechanism of institutional support in critical situations. With the maturation of experience, the technology was officially incorporated into the institutional protocol for responding to situations of risk and urban violence of SAMU Metropolitan II/RJ[3], establishing itself as a strategic tool for communication and team protection.

The experience also highlighted the importance of listening to workers in building technological solutions applied to healthcare. The development of "SAMU-RISK" arose from the concrete needs identified by the healthcare teams, strengthening multi-professional leadership and valuing everyday work experiences.

**Discussion**

The experience of creating and implementing "SAMU-RISK" highlights the need to incorporate technologies focused on health communication, risk management, and occupational protection in the context of pre-hospital care. In urban settings marked by armed violence and social vulnerability, SAMU professionals are forced to work not only in the face of the clinical complexity of emergencies but also under constant exposure to physical, emotional, and psychosocial risks.

Although the Ministry of Health Ordinance GM/MS No. 2048/2002 recognizes the impact of violence on emergency services[2], there are still significant gaps related to the protection of healthcare teams working in areas of high social risk.

The reported experience demonstrates that the escalation of violence has introduced new organizational demands to the SAMU (Mobile Emergency Care Service). Beyond the need for rapid clinical responses, it has become essential to structure mechanisms for territorial risk management and strengthen team safety. It was found that scenarios of violence directly interfere with the operational dynamics of the teams, the response time for care, clinical decision-making, patient access, and continuity of care. Continuous exposure to threatening situations produces significant impacts on workers, potentially triggering psychological distress, emotional burnout, and a permanent feeling of insecurity. In many contexts, the normalization of these risks contributes to the institutional invisibility of the problem and hinders the development of effective worker protection policies. In this sense, the implementation of "SAMU-RISK" proved relevant by transforming frequently invisible events into systematized and institutionally recognized information. The technology allowed for the consolidation of previously dispersed records, favoring the production of indicators related to occupational violence in pre-hospital care.

From an organizational standpoint, experience reinforces that communication is a central element for patient care and operational safety in emergencies. The absence of standardized workflows compromises not only the protection of teams but also the quality of medical regulation and the effectiveness of the care response. "SAMU-RISK" acted as a mediating technology for communication processes between care teams, fleet operators, and medical regulators, promoting greater operational integration and supporting real-time decision-making. The use of digital technologies in healthcare has been associated with strengthening care management, producing care data, and improving organizational workflows. In the case of pre-hospital care, tools focused on rapid communication and traceability of incidents assume a strategic role given the unpredictability of the scenarios encountered[4,6].

Furthermore, experience has shown that health technologies can also take on an organizational and communicational character, contributing to the transformation of work processes and strengthening the institutional safety culture.

Another relevant aspect concerns the collective construction of the technology. Unlike vertical management models, the development of "SAMU-RISK" arose from the concrete demands presented by the service workers themselves. This process fostered greater team buy-in and aligned the tool with the real needs of daily operations. The active participation of workers in building technological solutions directly relates to the principles of continuing education in health, understood as a strategy for transforming work processes based on problematizing the concrete reality of the services[7].

The experience also highlights the leading role of nursing in the development of innovative strategies focused on the safety of care and care organization. Nurses actively participated in identifying the problem, building operational flows, training teams, and implementing the technological tool, corroborating findings from other studies that emphasize the central role of nursing in managing safety in pre-hospital care[6]. Another important point concerns the ethical and institutional dimension of protecting healthcare workers. The formalization of specific protocols and the creation of technological communication mechanisms contributed to strengthening the institutional safety culture and legitimizing the self-protection measures adopted by the teams. The data produced by "SAMU-RISK" began to support the identification of critical territories, the review of operational flows, the development of protocols, institutional planning, and continuing education actions. In this way, technology went beyond a merely operational

function, also assuming a managerial, educational, and epidemiological role.

In the field of occupational health, the experience reinforces the need to broaden discussions on occupational violence in emergency services. Despite the high exposure of teams to violent situations, there are still significant gaps related to scientific production and the development of specific professional protection policies. Furthermore, the experience demonstrates that urban violence must be understood as a phenomenon that directly impacts health systems, requiring intersectoral responses and integration between health, public safety, and territorial management[8].

Among the limitations of the experience, the initial absence of quantitative indicators capable of measuring the impact of technology on reducing occupational risks or improving operational times stands out. However, since this is an experience report in the initial implementation phase, the study prioritized the description of the organizational process and the transformations observed in daily care. It is suggested that future research evaluate the impact of technology on team safety, the repercussions on workers' mental health, and the operational effectiveness of institutional protocols.

**Conclusion**

The experience of creating and implementing the "SAMU-RISK" technology highlighted the importance of incorporating tools focused on health communication, risk management, and occupational protection in the context of mobile pre-hospital care.

The development of the technology arose from the concrete needs experienced by the SAMU Metropolitan II/RJ teams in the face of worsening violence scenarios and increasing occupational exposure during calls. In this context, “SAMU-RISK” emerged as an innovative strategy to strengthen communication between healthcare teams and the Medical Emergency Regulation Center, allowing for greater standardization of records, traceability of incidents, and support for operational decision-making. The experience demonstrated that the tool contributed to strengthening the institutional safety culture, expanding interprofessional communication, systematizing information related to occupational violence, and improving work processes. In addition to the operational impacts, the experience revealed an important ethical and organizational dimension related to the institutional recognition of the vulnerability of pre-hospital care workers in the face of urban violence scenarios. Another relevant aspect refers to the multi-professional leadership in the construction of technology. The active participation of workers favored greater alignment of the tool with the real needs of the service and strengthened institutional adherence. The experience also reinforces that health technologies can play a strategic role not only in direct care but also in the reorganization of work processes, knowledge production, and institutional strengthening of emergency services.

The experience presented is considered to have the potential for replication in other pre-hospital care services located in areas marked by urban violence and may contribute to strengthening worker safety policies and improving the quality of care. The need to expand scientific discussions on occupational violence in mobile pre-hospital care is highlighted, as is the development of new research focused on evaluating the impact of digital technologies on the safety of teams and the quality of care provided to the population.

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