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Computerized System of Regulation and Evaluation of Emergency Attending Mobile Unit Service – SAMU in the State of Santa Catarina Brazil

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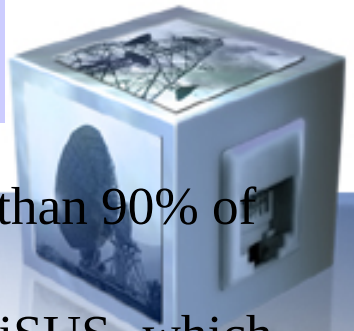
Introduction



- The study data, concluded in the end of 2003, revealed that more than 90% of the Brazilian population is somehow Health System usurer.
- Facing this situation the Health Department elaborated the QualiSUS, which aims establishing a group of changes to offer more comfort to the usurer, encourage care according to the risk level, provide effective attention by the health professionals and decrease the period of permanence in hospitals .
- As integrating part of QualiSUS it is noticeable the Emergency Attending Mobile Unit Service (SAMU/192). The service enables the organization and rationalization in the public sector.
- Following, in order to SAMU work properly , it is fundamental, through regulation centrals, the continuous and systemic accompaniment of urgency/emergency situations.
- **Objective: Facing this ponorama, this study aimed developing and implementing a computerized system of urgency regulation of SAMU in the state of Santa Catarina as well as establishing the data which should integrate the information system of urgency regulation to evaluate the quality of SAMU in the State of Santa Catarina, form the indexes established by the Health Department.**

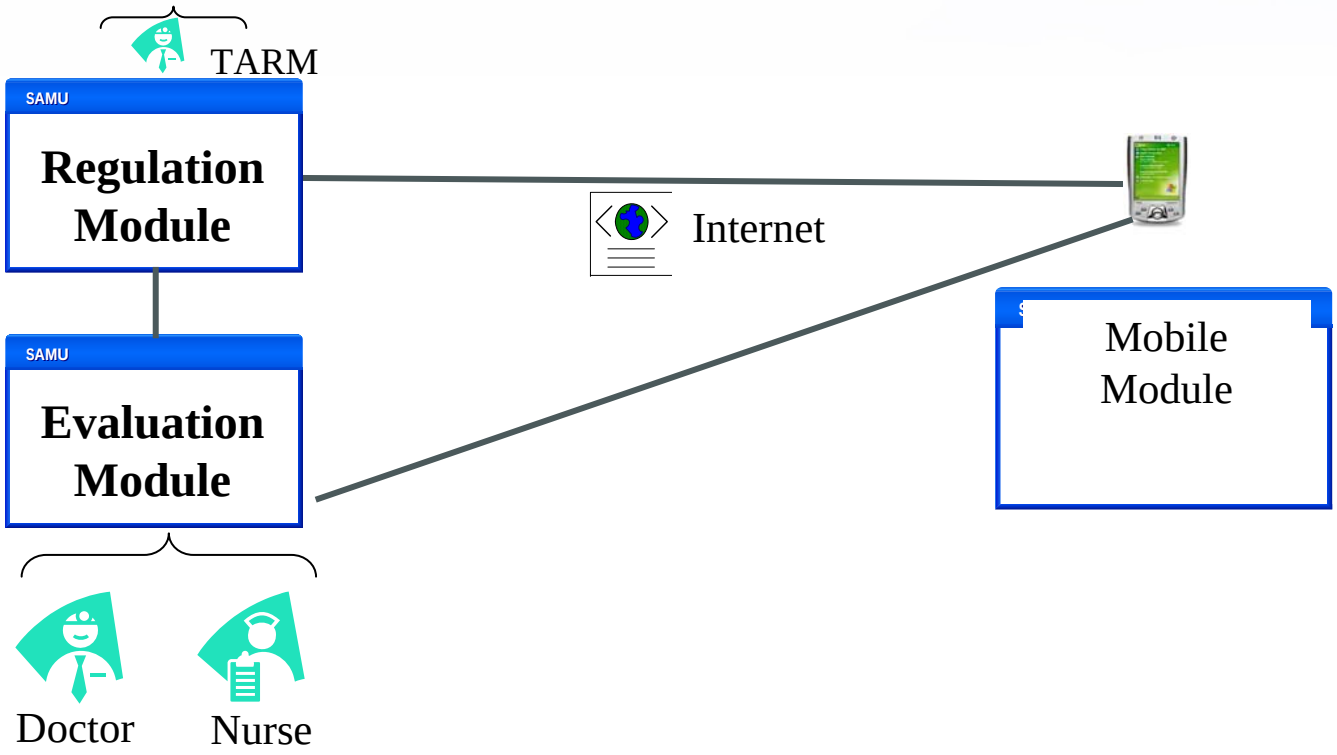
Methodology

- Technological Production and methodological research.
- Involved the participation through intentional or criteria choice of **06 people** specified as follows: 01 regulator doctor, 01 nurse from intensive care unit, 03 systems analysts, 01 IT state manager and 01 Nursing student.
- The study followed ethical principles determined by the 196/96 Decree which determines the Regulating Rules and Norms of Research involving Human Beings and received the approval of the Research Ethics Committee of UFSC according to Protocol number 212/2005.
- A specific systems evaluation tool was used regarding the content criteria, usability and ergonomics.
- The data were analyzed through descriptive statistics and qualitative description.

Results

- In the development of the SAMU regulation and evaluation system the following phases were followed:

  1) **Requirement Collection:** problems of the emergency service and limitations to the development like time, place and economic. The system consists of 3 modules: regulation, Web evaluation and mobile unit according the following structure:



Results

2) Analyses: choosing of the informatics tools to be used in and the design of the system.

- It was chosen that the Medical Regulation Module would be developed in Object Pascal language (Delphi environment) and JAVA to the File of Attendance of Web and Mobile patient, with database MY-SQL-SERVER.

- Delphi was chosen to the Medical Regulation Module due to the experience in the development of this language, made available by SES-SC and due to the facility of communication of other equipments. In the Web Evaluation Module JAVA was used, because it is an open code language, the framework available by SES-SC and its security. The database used was chosen because it is the pattern used at SES-SC in both Delphi and JAVA.

- It was also decided that the mobile system would be developed with Java technology (J2ME) because of, among other characteristics, its portability among different types of existing mobile devices in the market. :

Results

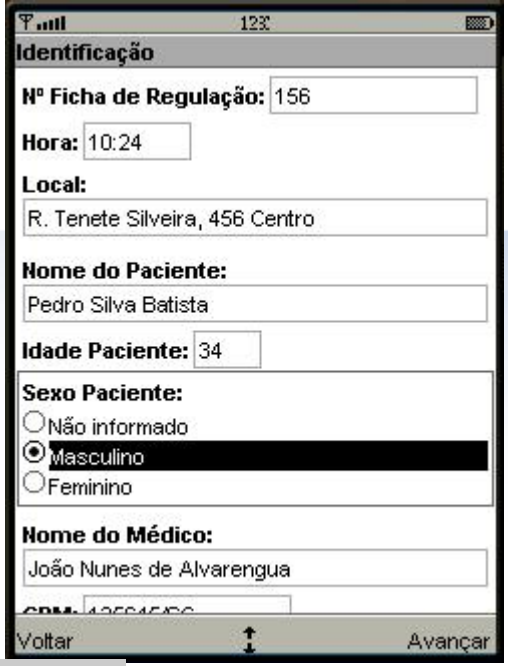
3) Project: definition, modeling of data and implementation in the computerized platform. The database of Regulation and Patient Evaluation via Web Modules was designed using IDEF1X patterns (definition of entity, relationship and characteristics) and, as a design tool of data, the ER-WIN was used.

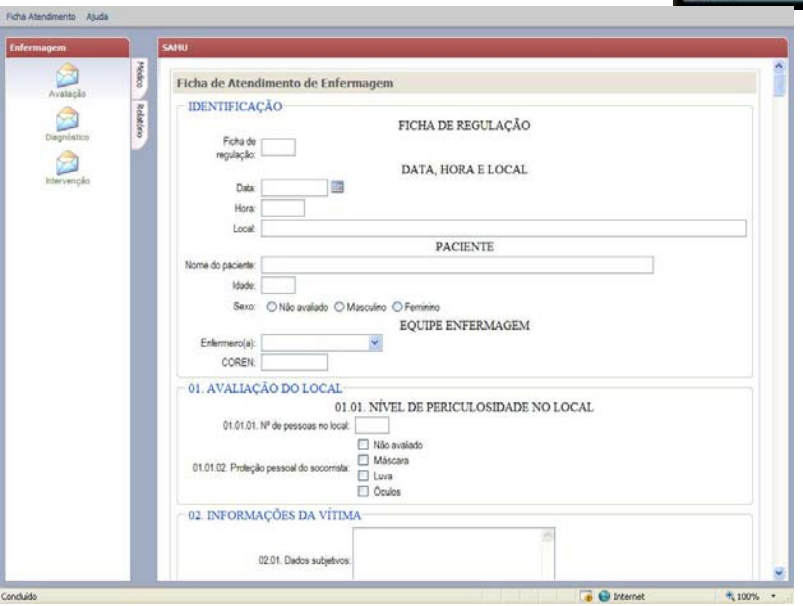
- The Patient Mobile Evaluation system was conceived and implemented using the Objective Oriented Programming approach, in a way each distinctive group of evaluation was treated independently; however, keeping integration among all the groups in the general evaluation context. In this way, the system enables a progressive interaction and not necessarily sequential among the information universe which consists all the evaluation.

4) **Implementation**: development of the system in the reality of emergencies and test: pilot test of the system implementing and analysis of ergonometric and usability functions.

In this phase, the system was structured in the computerized platform established this way:

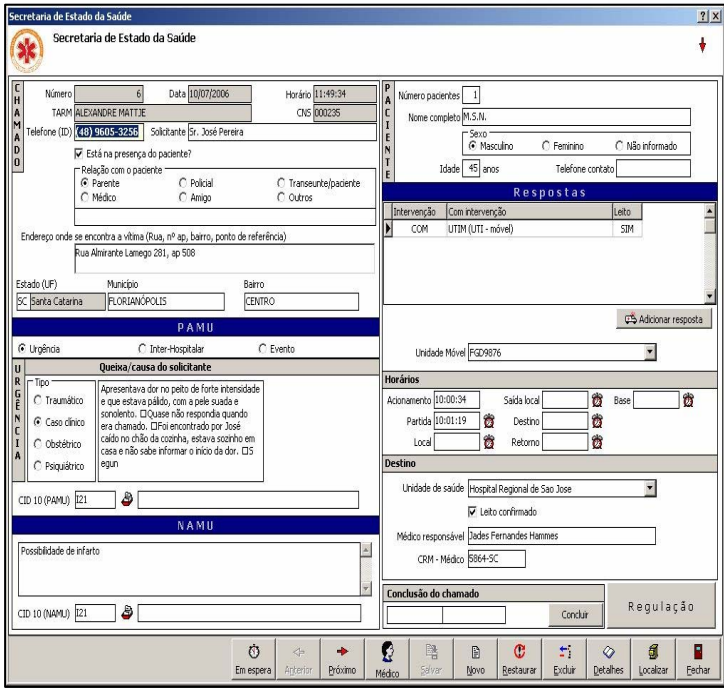
Exemples





Example of WebEvaluation of Patient Module Screen

Example of Mobile Evaluation Module Screen



Example of Medical Regulation Module Screen

Results

- The form of Medical Evaluation consists by items which identify the patient's situation in many areas. The forms to emergency evaluation were also developed and organized according to ICNP version 1.0.
- The minimum necessary to the Mobile System work basically consists in a mobile device (PDA), which presents some type of implementation of the Java Virtual Machine (JVM) and has GPRS access through the qualified telephony operator. All access to the system is obligatory notarized through a login and password previously registered in the Web system.
- From the structuring of the system, progressive evaluations were applied with the developing team discussing and reformulating the data in the system according to the needs and problems found. After that, a pilot test was organized simulating two real emergency attendance situations: one meningea syndrome and a hypovolemic chock due to displayed breaking.
- 04 appraisers from the informatics and health areas participated in this test, they evaluated the items: ergonometric and usability. The item ergonomics evaluated the criteria of organization, interface, content and technical. To each item scores were established from 1 to 5, being (5) excellent, (4) very good, (3) good, (2) regular, (1) bad.
- The data are presented in a statistics descriptive way. In the usability criterium 24 items were evaluated determined by scores from 1 to 5, being (5) totally agree, (4), agree, (3) disagree, (2), totally disagree and (1) not applicable according to qualitative analyses.

Results – Ergonomics Evaluation

- It was observed in the ergonomics evaluation that the evaluators perspective the system is Very Good with an average variation of 4,0 to 4,4. The items content and interface received the best evaluations inside the ergonomics criterion with an average variation from 4,3 to 5,0.
- The technical item inside ergonomics criterion received a minor score, with average score variation from 3,3 to 4,0, specially because the system is under construction and the connection and communication among the modules (especially from mobile to fixed) are not finished.
- The average deviation among variables of ergonomics evaluation was around 0,4 to the Regulation Module and 0,3 to the Evaluation Module of patient form fixed and mobile. The main items approached by the evaluators to the usability criterion evaluation with scores (5) and (4) corresponding to totally agree and respectively agree were:
  - the system easily runs on fixed and mobile platforms with no interferences, the system screens are clear, easy to read and interpret, the usurer is able to access the system easily, the menus are viable and easy to use, the system is modular and shows the structuring in the programming, the system has a limit of growing appropriate to the use demands, the memory requirements do not hinder the program running on the platforms, the system has automatic saving, the connection and communication among the Regulation and Fixed and Mobile Evaluation modules are appropriate, the system enables the recovery of data in the various modules, the hardware requirements are compatible to the reality, the system holds attendance network, the system has data locking.

Results – Usability Evaluation

- Amongst items which received evaluation do not agree, with score **(3),** and that were marked only in the evaluation Regulation Module, are distinguished: does not run in different platforms; does not accept inexistent data and the system allows recovery of data in the various modules.

- Positive aspects of the system are also distinguished: the agility, the neatness, the system is complete, it is easy to use it, friendly and it accomplishes the objectives. Another positive aspect is that it enables the emission of reports which contribute to the control and accompaniment of the quality of the attendance in SAMU from the indexes established by the Health Department. As negative aspects we have: the absence of the item help top the usurer in the menu of the Regulation and Web Evaluation Module, little functionality of tables of vital signals, scale of coma of Glasgow and progressive evaluation of trauma in the Mobile Evaluation module, as well as the lack of a complete database of streets and avenues of the State.

Discussions and Conclusions

- Although the system is not completely developed, it was perceived through the data collected during the pilot test that it has appropriate ergonomic criterion, content and usability to the emergency situations enabling the feeding of the system directly from the place of the accident. It is a pioneer and innovator system in Brazil due to including a complete structure of Regulation, Web and Mobile Evaluation of emergency embracing the doctor and nurse attendance.
- The study also enables emphasizing that the information is a key element in the decision making and an essential requisite in the support and efficient management of health care, once it enables a systematic way of evaluating and comparing.

References

1. BRASIL. MS **:** Portaria n.º 2048 Portaria n.º 2048/GM de 5 de novembro de 2002. Disponível em: http://dtr2001.saude.gov.br/portarias/2002_5.htm acesso em março de 2004.
2. BRASIL. Ministério da Saúde : **Portaria n.º 814/GM Em 01 de junho de 2001**. Disponível em: http://dtr20**01**.saude.gov.br/sas/ PORTARIAS/Port20**01**/GM/GM-814.htm acesso em março de 2004.
3. BRASIL. Ministério da Saúde: Portaria ministerial n° 824de 24 de junho de 1999. http://dtr2001.saude.gov.br/sps/areastecnicas/ mulher/Portaria%20SAS%20356-00.doc - . acesso em abril de 2004
4. BRASIL. MS :Anuário estático de saúde do Brasil 2001. introdução geral. Disponível em: http://portal.saude.gov.br/saude/aplicacoes/anuario2001/mortal/introd.cfm acesso e**m: 01 de** março de2004.
5. OLIVEIRA, L C e CICONET, R M Atendimento pré-hospitalar. In: ESTRAN Neida Valesque Brum et al. Sala de Emergência – emergências clínicas e traumáticas.Porto Alegre:UFRGS, 2003.
6. MACHADO et al. Atendimento no trauma craioencefálico (TCE). In: ESTRAN Neida Valesque Brum et al. Sala de Emergência – emergências clínicas e traumáticas.Porto Alegre:UFRGS, 2003.
7. ABEDELLAH, F G LEVINE, E. Better patient care through nursing research. New York. MacMillan,1965.
8. LAUDON, K LAUDON, J P. Sistemas de Informação. 4ed.Rio de janeiro:RTC, 1999.
9. ISO 9241-11: Guidelines of Usability. (1998). Disponível em: <http://www.usabilitynet.org/tools/r_international.htm#9241-1x> Acesso em: 12/05/2006.
10. ORGANIZACIÓN PANEMERICANA DE LA SALUD. Bases metodológicas para evaluar la viabilidad y el impacto de proyectos de telemedicina. Washington: D.C:
11. OPAS, 2001. 138p.
12. ORGANIZACIÓN PANAMERICANA DE LA SALUD. Desarrollo de sistemas normalizados de información de enfermeira. Washington, DC:OPS, 2001. 160p.

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