TELE-ULTRASOUND: A NEW TOOL FOR QUALITY CONTROL AND MEDICAL SUPPORT IN LARGE AND PUBLIC RADIOLOGY PRACTICE

Sergio A. Ajzen, MD, PhD; Harley De Nicola, MD, PhD; Simone V. Reis, BA, MBA; Flavia N. Falcone, BA, MSc; Mariana Mendieta, BA, MSc; Juliana C. Martire

Fundação Instituto de Pesquisa e Estudo de Diagnóstico por Imagem (FIDI) - Serviço de Educação e Revisão em Ultrassonografia (SERUS) - Escola Paulista de Medicina/UNIFESP - São Paulo – Brazil

1 PURPOSE

Improving the quality of a public large-scale radiology practice is an extremely challenging mission, and yet, a necessary one. Particularly within our institution, where the volume of examinations performed is very high, health units are located in faraway distances from our headquarters, and both physicians and patients' profiles are highly diverse.

The aim of our work is to demonstrate how tele-ultrasound serves as a useful and innovative tool that not only creates new ways of supporting physicians from afar during ultrasound examinations, but also boosts the quality of medical reports and results performed in large and public radiology practice.

2 METHODS

Our Social Organization for Health – FIDI (Institute for Research and Studies in Diagnostic Imaging's Foundation) is the largest provider of radiology services for public health institutions in Brazil. Our quality improvement project on ultrasound started in March 2016, with the aim of monitoring and giving support to our physicians and teams working at our health units, as well as ensuring that both our protocols and our patient's care culture were well integrated among all professionals.

SERUS – which stands for Service of Education and Revision in Ultrasonography – is the acronym after which this project was named. We started a pilot program in 4 health units, and nowadays the project covers 13 hospitals, monitoring a total of 31 ultrasound examination rooms and 70% of our medical team.

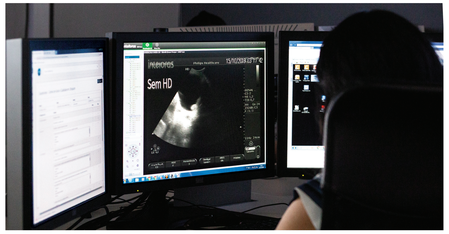

Figure 1 – View of one of the workstations of SERUS's Support Room

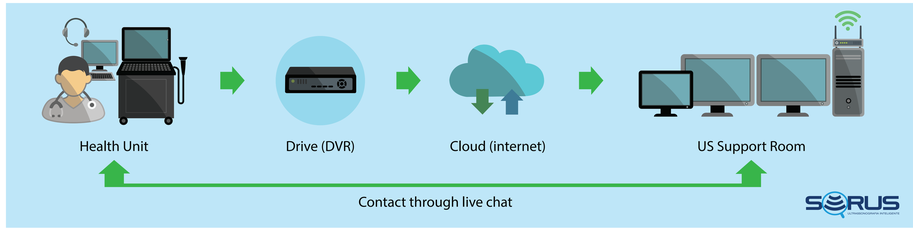

Figure 2 – Operating diagram of SERUS's monitoring technology

Expert physicians are physically present at an Ultrasound Support room, where they monitor the execution of both examination and its medical report, which are being performed remotely by local physicians in the health units (figure 1). The applied technology to capture data transmission include the use of ultrasound equipment and specific systems. Through a DVR device installed in the US equipment and PC monitors, the exams and the medical reports are transmitted in real time from the local health unit to the practitioners based at the Support Room. The contact between local and remote physicians is done by live chat, at any time and in real time (figure 2).

The expert physician based at the Support Room must fill out an evaluation form during the monitored examination. This form was carefully and objectively designed by experienced ultrasound practitioners with solid academic background, and it is widely comprehensive, as it has also been developed to address every kind of ultrasound examination. According to each question marked in the evaluation form, the system provides an automated score, which classifies the examination into 5 categories: 1) Excellent, 2) Appropriate, 3) Satisfactory, 4) Unsatisfactory, 5) Unsuitable. The data are automatically loaded into a Business Intelligence dashboard and they generate both quantitative and qualitative information, as well as performance indicators that are used for quality control purposes (figure 3). The indicators are regularly reviewed to guide decision-making on training and further medical education. They also shed light on important issues related to the overall management of an ultrasound room, from the quality of the equipment to the type and intensity of the examination schedule.

Figure 3 – View of the BI dashboard and indicators

3 RESULTS

The main data collected from the evaluations, transformed into analytic graphs, include, for example, the evolution of results vs. the quality goal established for our institution, which was set at 80% of overall satisfactory exams for the start of the project and will evolve as the project matures (figure 4), and the volume of examinations and general quality indicators (figure 5).

Since the beginning of SERUS project over 2.11% of total US examinations were monitored by the Ultrasound Support Room (figure 5) and we observed an increase of approximately 20% of the overall percentage of satisfactory exams (figure 4).

An example which illustrates our increased results is one of the units we monitor, where the number of satisfactory exams was lower than the 80% desired. Some factors that could contribute to this result were identified and discussed, from the technical deficiencies of the professionals involved to flaws in the physical structure of the unit. After introducing medical education actions on specific themes that we identified from the most frequent errors performed, while adding improvements to the physical environment, this unit went from 60% of overall satisfactory exams to 86% in the third month following these actions.

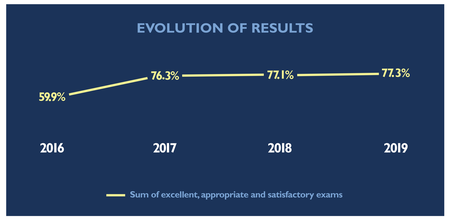

Figure 4 – Evolution of project's results

Total of evaluated exams	42,981
Excellent	14,929 (34.8%)
Appropriate	5,211 (12.2%)
Satisfactory	12,974 (30.3%)
Unsatisfactory	5,669 (13.0%)
Unsultable	4,198 (9.7%)
Total of US exams performed by the institution	% of total evaluated US exams
2,036,637	2.11%

Figure 5 - Volume of examinations and general quality indicators – from July 2017 to September 2019

As part of our efforts on continuing medical education, we also create video content for radiologists, made publicly available on YouTube as a contribution to the scientific community. Expert practitioners are invited to prepare a quick class on practical cases, based on data generated at SERUS, indicating how to avoid major mistakes and tips to easily perform a good screening.

SERUS also grants us the possibility to deploy human development actions, such as professionals' recognition for both physicians and their support teams. They have a better understanding of their role in improving the quality of patient's care and feel valued both as individuals and professionals.

Finally, the fact that our local practitioners can rely on expert physicians to give a second opinion on complex cases can represent a great difference on the patients' quality of life. Our Support Room's physicians are regularly contacted by local practitioners – and vice-versa – to provide specific guidance on demanding examinations.

4 CONCLUSION

Since the implementation of SERUS we have observed a positive impact on patients' treatment and medical reports, as well as an increased accountability and credibility of ultrasonography practice in the public health institutions we serve. SERUS has proven its interest in reducing potential diagnosis errors that can lead to cost savings, by reducing the amount of dispensable complementary examinations' requests, and most importantly, helping to avoid unnecessary invasive medical practice from taking place.

We conclude that tele-ultrasound for quality improvement purposes provides a solid base for the creation of health policies, education and further medical support actions.

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