

Economic assessment and key success factors of nationwide telemedicine in the Slovenian Blood Transfusion Service

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Keywords: Telemedicine, Economic assessment, Pre-transfusion tests

Background

The Slovenian Transfusion Service Network has centralized its operations. Transfusion medicine centers and blood banks have been merged into three regions: Ljubljana, Maribor, and Celje.

Pre-transfusion testing

Transfusion medicine is practiced under a strict regulatory framework to ensure the safe and appropriate use of blood and blood components [1]. One of the safety measures is also obligatory pre-transfusion serological testing before a blood transfusion is given to the patient, in order to confirm donor-patient compatibility. In 2013, the Slovenian Transfusion Service Network performed almost 140.000 pre-transfusion cases, or on average around 370 cases per day.

An average of 31 cases daily were performed per center, with the largest one performing 131 cases and the smallest one only 5 cases on an average day.

Standard service provision of pre-transfusion testing in Slovenia before telemedicine

The provision of hospitals with blood products and pre-transfusion serological testing requires the continuous availability of a well-qualified medical team (24h per day, 7 days a week) in each institution. The transfusion laboratory personnel perform the tests, while the read-out and interpretation are carried out by transfusion medicine specialists.

For most units, the continuous presence of a transfusion medicine specialist presents a great staffing (not enough available) and financial challenge. Consequently, the departments have come up with two solutions to the problem: a) To have their own medical specialist on standby and called in when necessary (delayed in-person care locally), and b) to have medical specialists from other fields working in nearby hospitals called in when a case appears (under a specialized in-person care locally and a delayed in-person care locally). Both alternatives have certain drawbacks in service quality compared to having medical specialists present on site.

Telemedicine for pre-transfusion testing

According to the law, each patient in Slovenia has to be treated with the same quality of service regardless of the geographic location [1]. Professionals argued that having standby physicians translated into unequal access to care throughout the country and was more prone to mistakes, especially with emergency and complex cases. Consequently, a telemedicine system was developed allowing the remote inspection and interpretation of pre-transfusion tests from the central reference laboratory for any remote site.

The increasing importance of telemedicine in the Slovenian Transfusion Network is backed up by the figures. While in 2010 only 18% of all pre-transfusion cases at smaller sites were performed via telemedicine, in 2013 that number grew to 46% “Fig. 1”. The two smallest sites are almost fully covered by telemedicine.

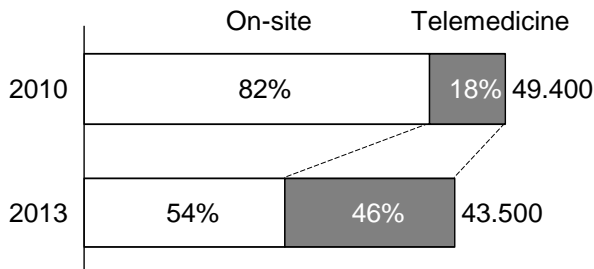


Figure 1: Pre-transfusion cases performed via telemedicine in nine blood transfusion departments, 2010 and 2013

Objective

This study evaluates how a telemedicine alternative (experienced transfusion medicine specialists interpreting pre-transfusion tests remotely via telemedicine) compares to the standard (pre-telemedicine) mode of interpreting pre-transfusion cases in terms of cost performance.

Methods

As part of the economic evaluation we carried out a cost minimization study to determine the cost difference between performing pre-transfusion testing in blood supply by teleconsultation versus standard pre-telemedicine practice [2]. Only incremental resource use was included; costs common to both alternatives were eliminated. The analysis was performed from a health care provider perspective.

Study design

The framework examined the actual volume of the pre-transfusion tests performed by the Slovenian Transfusion Service Network in 2013, and compared the costs of providing the pre-transfusion service between the telemedicine alternative and standard (pre-telemedicine) practice for one year. The basic scenario encompasses the regionally organized telemedicine network.

Results

The total annual incremental fixed cost of running a telemedicine network is 206.000€, of which the equipment costs are estimated to be 86.500€ [3]. The annual equivalent internal development and implementation costs were 43.000€ per year. The yearly maintenance fee totals 76.460€. The basic scenario requires 4 medical specialists, which adds up to 1.020.000€. The total incremental cost for the telemedicine alternative, as currently introduced, is estimated to be 1.226.000€. If consultants were to be shared between the regions, an additional optimization could be introduced, thus bringing an additional 200.000€ of savings.

The total annual incremental cost for standard pre-telemedicine practice is estimated to be 1.906.908€. In 2013, regionally implemented telemedicine saved 681.000€ for the Slovenian Blood Transfusion Network compared to the standard, pre-telemedicine practice. An additional 220.000€ could be realized by combining the regions together.

The incremental cost of having a medical specialist present 24/7 at each site is estimated to be almost 3mil€. The telemedicine alternative offers the same quality of service for as much as 1,8mil€ less.

Conclusion

Pre-transfusion testing is carried out at 12 centers throughout Slovenia. Most of the procedures are performed by laboratory technicians, while the read-outs and interpretations are carried out by transfusion medicine specialists. The service needs to be available 24/7. For smaller units, the continuous presence of a transfusion medicine specialist was too expensive. The transfusion network has developed a system allowing the remote interpretation of pre-transfusion tests from any remote site.

The essence of this study was to investigate and synthesize the findings as to whether telemedicine is able to deliver in terms of cost savings. Compared to standard pre-telemedicine practice, the nationwide implementation of telemedicine in pre-transfusion testing brings 0.65 mil€ annual savings. Short-term savings are mainly realized through a reduced number of medical specialists by combining pre-transfusion cases throughout the country.

While this study is limited to economic evaluation, the effect of introducing telemedicine into the Transfusion Network is much broader. Medical professionals feel the strongest impact of telemedicine on pre-transfusion testing is intra- and inter-organizational, especially the improvements in the work processes which in effect could result in an improved quality of service delivery and patient outcomes. The following effects were most prominent: Streamlining the work process for laboratory technicians, having dedicated medical specialist positions, bringing experienced professionals to every transfusion unit, and instant second opinions.

References

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