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## Cost-effective public procurements of equipment for radiotherapy: starting point of patient's safety

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### Introduction

Preparation of tender documentation for public procurement of expensive radiological equipment (e.g. linear accelerators, MRI and CT systems, etc.) is an important and highly demanding task. Involvement of senior professionals with broad knowledge, expertise and understanding of radiation therapy procedures and technology is essential for optimal outcome of the particular procurement. Hence, Radiation Oncologist, Medical Physics Experts (MPE) and Radiotherapy Technologist usually work as a team, which governs procedures related to such public tenders. Among them, MPE has pronounced role and responsibility for the preparation of technical specifications for the equipment as well as for the evaluation of offers. The competency of MPE has been underlined also in the latest 'International Basic Safety Standards' (IAEA, 2014) as well as within the European 'Basic Safety Standards' (EU Council Directive 2013/59/ EURATOM). In addition to technical specifications, it is worthwhile that tender documentation contains also a binding and cost-effective post-warranty maintenance contract sample, to assure, that the equipment performance remains at a high level throughout its life-period. Such approach could enhance the output of health service, shorten waiting lists and contribute to the overall well-being and safety of patients as well as to assure a higher quality of radiological procedures. The aim of this work was to find a simple analytical evaluation point system for a public tendering process when medical radiological equipment needed in radiotherapy is to be purchased. Such system should be fair and transparent on one hand and financially acceptable for hospitals on the other.

### Methodology

It is assumed that apart from technical specifications, the price for the equipment and for the post-warranty maintenance contract are the most important parameters for the evaluation of offers for medical radiological equipment. Transparent tender procedures along with adequate management policy and system for the financial evaluation of bids is of paramount importance in a nowadays very fragile economic situation in many countries. Three main criteria were followed in our attempt to find adequate point system for the evaluation of bids: (i) it should be simple, transparent and fair (ii) it should reflect hospitals' needs (iii) it should be structured in such a way to eliminate the possibility of unreasonably high prices of the equipment or post-warranty maintenance. These considerations were analysed in order to find adequate formulas for the evaluation of final bids and to fulfil the aim of this work.

### Results

(i) Our goal, to construct a system which is simple, transparent and fair was achieved in elaborating formulas which are linear without containing any complex analytical function. Such approach eliminates possibilities of misunderstanding or misinterpretations of the system. In addition, having in mind manufacturers of the equipment, transparency and fairness can be achieved by publishing complete evaluation system together with needed explanations already within the official public tender documentation.

(ii) Hospital needs and available financial resources have to be identified and consequently, technical specifications for the equipment shall follow demands of modern radiation therapy and comply with financial restrictions. Hence, it is obvious, that management of the hospital and professional staff have to work hand in hand to use their financial assets in a cost-effective way, ultimately for the benefit of patients. It was assumed, that tender specifications are written in a way which allows, that at least two bidders (manufacturers) can fulfil all technical requests, considering also the conditions for the specific and general functionality of

the equipment.

(ii) Most challenging part of the evaluation point system was the question, how to avoid potentially unreasonably high prices of the equipment and post-warranty maintenance contracts. To overcome this problem, we have provided two sets of formulas. Within the first set, points are granted on the basis of normalising particular price to the average price of all bids. Within the second set of equations, prices for maintenance contracts are included in such a way to encourage bidders to offer financially acceptable prices. Taking into account both sets of formulas, it is virtually impossible that financially unfavourable bids would receive a high number of points. Formulas for the evaluation point system of bids are presented in Table 1.

Conclusion

Governing public procurements of expensive radiological equipment is demanding task for hospitals. On one hand, hospital management has to take care of financial sustainability of their services, on the other hand, a rapid development of technology in radiation oncology forces radiotherapy professionals to strive for best possible equipment and technical support for their patients in order to raise overall cancer cure rate. Within our study, simple formulas are presented, which could help hospitals to avoid high pricing and to purchase expensive equipment for the reasonable and competitive price. Additionally, such system provides a warranty that also the prices for post-warranty maintenance will be kept at reasonable and acceptable level.

## Country

Slovenia

## Institution

Institute of Oncology Ljubljana

**Primary author:** CASAR, Božidar (Institute of Oncology Ljubljana)

**Presenter:** CASAR, Božidar (Institute of Oncology Ljubljana)

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