Impact of imaging diagnostics on the budget – Are we spending too much?

To the Editor:

Serbia’s financial constraints in health care should be regarded typical for a wider Eastern European context. Sustainability of long-term funding is threatened by a number of determinants including population aging, consequences of worldwide economic crisis and current budget deficit issues. The underdeveloped legal framework imposes no mandatory cost-effectiveness evidence submission in approval and reimbursement consideration strategies on new medical technologies and therefore contributes to the issue 1. Most responsible policies aimed at achieving an optimal value for money in health care focus on prescribing behavior of physicians 2. The issue of consumption patterns and costs of imaging diagnostic techniques is a particularly underexploited area of research in health economics 3. We witness an unprecedented contemporary development of novel medical technologies in clinical radiology affecting market supply. A substantial budget impact could be attributed not only to the high tech services such as CT, PET and NMR, but interestingly even to the simple classical X-ray examinations in case of massive utilization 4. The key long-term obstacle belongs rather to the demand side of the market equilibrium and the growing burden of prosperity diseases within the national health system 5-6. Getting familiar with determinants of imaging diagnostics utilization patterns and related costs could give us grounds for informed cost saving policy. The amount of avoided unnecessary spending could be essentially allocated to cover current deficits, e.g. in the drug acquisition budget.

In order to give some ground estimates on the extent and structure of radiology related consumption a pioneering local retrospective study was conducted. Electronic registry of 56,007 patient discharge invoices of tertiary university hospital in Kragujevac, Serbia (1,293 beds capacity) was analyzed in 2010. The study provided an in-depth insight into prescription practices of specialty physicians in demanding radiological examination procedures. The observed Serbian tertiary care university hospital is in charge of covering the needs of almost 30% of general population of the central Serbia region. For this reason and due to the paucity of other evidence the authors observed these patterns of care as a likely nationwide state of the art within hospital facilities. In this single year, 16% of patients processed underwent some of nuclear medicine services, while 81% of patients underwent some other imaging diagnostics or emergency radiology services. High tech imaging methods were impressive consumers of hospital budget with CT targeted imaging of particular organs accompanied with the reconstructions on lead (€1,086,895.50). Nevertheless, commonly applied methods of interventional radiology (invasive hemodynamics, followed by selective coronary angiography and cardiac catheterization, PTC revascularisation (without stent implantation) and endovascular treatment of intracranial aneurism exhibited by far the most substantial budget impact (€2,667,510.92). Regardless of monetary value, the authors would like to point out insufficient deployment of interventional radiology methods in Serbia, capable to replace many surgical procedures, greatly shorten the length of hospital stay and reduce the long-term expenses 7. It should be noted that the average imaging diagnostics costs per patient examined in Serbia vary greatly depending on methods observed: classical radiography €17.2, CT+MR+sonography €77.36, interventional radiology €189.86 and nuclear medicine € 33.23 (see Table 1).

Table 1

<table>
<thead>
<tr>
<th>Examination techniques observed</th>
<th>Average number of examinations per 1000 patients</th>
<th>Average imaging diagnostics cost per single patient (CSD)</th>
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<tr>
<td>Radiography</td>
<td>370</td>
<td>1,773.00</td>
</tr>
<tr>
<td>CT, NMR, Sonography</td>
<td>558</td>
<td>7,996.61</td>
</tr>
<tr>
<td>Interventional Radiology</td>
<td>100</td>
<td>19,625.67</td>
</tr>
<tr>
<td>Nuclear Medicine</td>
<td>138</td>
<td>3,434.91</td>
</tr>
<tr>
<td>1116 (total)</td>
<td></td>
<td>8,236.02 (average)</td>
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*relate to the hospital outpatient, emergency room and inpatient care.
The golden axiom of health economics claims that policy makers should be focused on population health improvement rather than cost containment. Therefore, we should point out to the high potential value of reliable imaging diagnostics in clinical radiology. A 1998 study by Rao et al. pointed out to the very cost saving CT technology in treating clinically suspected appendicitis. Ultrasound and bone densitometry for osteoporosis screening in post-menopausal women and positron emission tomography for the management of potentially operable non-small cell lung cancer are also among the cost-effective procedures. Some of the proven policy strategies to improve efficiency of radiology diagnostics are quality enforcement strategies in teaching hospitals. Nevertheless, some other approaches such as routine radiology panels were assessed with unsatisfactory cost-effectiveness.

University hospital in Kragujevac, Serbia, had a disposable budget in 2011 of approximately €40,000,000. The total expenses of imaging diagnostics services provision amounted to €4,462,368.36 in 2010. Most of the expenses of running the facility were covered by the public domain through contracting with the Republican Health Insurance Fund of Serbia. Hospital budget did not expand substantially from the previous year due to ongoing macroeconomic crisis worldwide. Therefore, we can calculate that costs of imaging diagnostics provision account for 11.16% of annual hospital budget. In 2011 Serbia had a national health care expenditure of €3,604,929,979.2 out of which approximately one half was out-of-pocket and another half public source of funding. It means that the observed institution, Clinical Center Kragujevac actually acquired 1.11% of disposable healthcare budget. The last officially reported total number of hospital beds in Serbia was 38,835 in 200913. This would mean that 42 general hospitals and 7 tertiary care clinics in Serbia consume almost €134,026,353.64 value for imaging diagnostics provision. These services would represent 3.72% of total national health expenditure. Grounded in current methods and field results presented, we are not able to assess outpatient radiology examination costs. Official Australian Ministry of Health and Aging 2010 estimate the reported fraction of 2.6% national health spending attributable to diagnostic imaging in Canada, as the top spending example (nation-wide) among OECD countries.

The frequency of Serbian imaging diagnostics examinations, in terms of unit utilization is still lagging behind the ones reported in developed countries. We should remain aware that fraction of CT and MR imaging far exceeds classical radiography in Serbian population unlike in mature health systems. A pattern of overutilization of high tech imaging services seems to be present. The authors share the opinion that CT and MR should be considered a prime target for future health policy interventions aimed at more selective screening of patients – candidates for such examinations. This will certainly become hot topic in many similar countries. Many of these methods are exchangeable for radiography or sonography methods with sufficient test sensitivity and specificity to detect many clinical conditions and far more modest budget impact.

The ongoing regional macroeconomic developments and growing budget deficit in Serbia will likely further constrain resources available to the hospital management. In these conditions, adopting of local guidelines on the recommended frequency of imaging diagnostic examinations in key clinical conditions would be helpful. There is a room for improvement in terms of a wiser resource allocation. Introduction of cost-effectiveness requirements in marketing approvals of the most expensive imaging technologies would be particularly helpful in the future. Frankly speaking, we can observe the landscape of substantial progress in the region through the course of the past decade in terms of service availability for the community. Grounded in this fact we hope that regional clinical radiology provision and management will improve and provide higher value for money in Southeast European health care in the long run.

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