

\* The high cost of currently-available IGRT technologies is not worth their benefit to patient care.  
**For the statement.**

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\* The problem is that nobody can really estimate (in quantity units) IGRT benefit to patient care.

\* If we correct patient position daily, how can we measure the clinical outcome for this corrections?

\* Are we doing really better than if we do no shifts and corrections?

Unfortunately we cannot measure delivered dose in target, enclosed structures and critical organs.




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\* The whole procedure seems legit - we compare everyday image with initial image and calculate the difference. But we should compare dose distribution as well.

\* Why this talk about dose? Because we know how dose is related to patient outcome. What about geometric displacement?

*Individual care for each patient, which we try to implement with help of IGRT technologies, cannot be realized without estimating doses and biological effects.*

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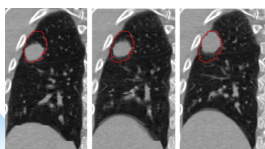
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\*Ok, let's assume, that we've made correct shift and so on, but what about patient and organs moving during irradiation, organ deformation? So IGRT is not so as it can be without respiratory gating, which result in much more expenses.




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## \*Expenses for IGRT

- \*Inroom MR - View Ray - 8,500,000 \$
- \*CBCT - 350,000 \$
- \*On-line ultrasound - Calypso - 500,000 \$

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\*IGRT makes treatment procedure more complicated and time consuming. The capacity of one linac is in average five patients per hour, IGRT adds five minutes to each, so we have 25 additional minutes per hour. Totally in a day it results in more than 2 additional hours. Maintenance, physics, and physician times also increase.



In Russian Cancer Research Center it sometimes plays critical role, because almost all physics' and engineering works are made in the evening after treatment of all patients. And working day starts at 8:30. 2-3 hours more in the working evening can cause disturbance of safety technique.

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\*Nowadays nearly all linacs come with IGRT. But are we ready to use it?? I mean it should get through ours heads, there should be proper education for physicists and especially physicians for the rational usage of this technology.




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\*Thank You!

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