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## A centralized model of effective radiation oncology service development: the Azerbaijan Republic experience

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The history of radiotherapy in Azerbaijan starts in 1940 with the establishment of the Scientific Research Institute of Roentgenology and Radiology (SRIRR). At that time Azerbaijan was part of the former USSR. In the beginning, the Institute was equipped with X-ray orthovoltage machines and one teletherapy machine with cesium source. Radium sources were used for brachytherapy. In 1956 the first cobalt unit was installed. Thereafter and up to the collapse of the USSR, four more cobalt machines and several X-ray machines of Soviet manufacture were provided which yielded to western analogs. In 1985 the first and only afterloading brachytherapy unit was installed, which got out of order in a few months and has never since been repaired. The crisis of the Soviet system led to the deterioration of economic and social spheres including healthcare in general, and radiotherapy in particular in all republics of the former Soviet Union. Isolation from the rest of the world and absence of cooperation of our oncologists with specialists outside the USSR did not allow getting access to updated information on the latest radiotherapy developments. As a result, in early 2003 there were only three orthovoltage X-ray machines and two cobalt machines which sources had not been changed for 18 years. For this reason the treatment of one patient lasted up to 40 minutes.

After Azerbaijan's independence we could only avoid a complete collapse of radiotherapy services due to awareness of the importance of radiation oncology by the management of the National Center of Oncology (the former SRIRR) who raised the problem before high level Government authorities. Since then, the situation has dramatically changed. This was followed by the Azerbaijan Republic presidential decree "On the cancer care", which served as an additional boost for the development of radiation therapy. In 2003 the Azerbaijan Government signed a cooperation agreement with the International Atomic Energy Agency (IAEA) one of the tasks of which was improvement of radiotherapy services quality in the country. As a result, the National Cancer Care Program was established covering prevention, early detection, effective treatment and palliation of oncological patients. It also included a radiation therapy development program.

A very important factor in our case is the existence of a close interaction between state legislative, financial structures and healthcare authorities. This was the basis for making appropriate and goal oriented decisions taking into account radiotherapy service demands defined by specialists in radiation oncology with a public health perspective.

The Radiation therapy development program incorporates a policy of carefully planned, stepwise implementation of modern methods of radiation therapy in practice. Especially the technological developments in radiotherapy we have witnessed in the past 10 years. It has become clear that the only right way to achieve a goal in this area, is the combination of factors such as: governmental support (both legislative and financial support taking into consideration the heavy expenses for equipment and facilities), investment in staff education and training and the guidance and recommendations of experienced international organizations like the IAEA, WHO, and ESTRO. Taking into account the relative complexity and costliness of radiotherapy service in general, relatively small population (about 10 million) and short travel distances in our country and after thorough discussions with health care administration of the Republic we have decided to adopt a so called centralized system of radiotherapy service in Azerbaijan. Following the Radiation therapy development program, for 2003 to 2013, a high level dedicated radiation oncology center was established on the basis of the existing radiotherapy department of the National Center of Oncology (NCO) of the Ministry of Health of the

Azerbaijan Republic. The most conformal and precise treatment modalities such as 3D conformal radiotherapy, IMRT, VMAT, SBRT, IGRT, SRS, 3D image guided interstitial brachytherapy are now implemented at NCO with a flow of 2000-2500 patients per year.

Two additional radiotherapy centers were established in other regions equipped with orthovoltage machines and cobalt units. These units are significantly less expensive and easier in their operation and service. The vast majority of palliative treatments in the country are carried out in these two satellite centers.

Conclusion.

The centralized radiotherapy service is feasible from both organizational and effective treatment points of view in relatively small countries like Azerbaijan. Long-term strategic planning and purposeful progressive implementation according to objective demands in radiotherapy techniques, governmental support, close interaction between state legislative and financial structures, country's medical society and authorized international organizations are key factors for the successful development of an effective radiotherapy service in a country.

## **Country**

Azerbaijan

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