Introduction: In December 2019, China informed WHO of a new respiratory tract disease caused by SARS CoV-2 (COVID-19), reported by China in December 2019, significantly impacted cancer treatment. However, modern radiotherapy techniques remain in use during the COVID-19 pandemics. They include intensive modulated radiation therapy (IMRT, VMAT), image-guided radiation therapy (IGRT), stereotactic radiosurgery, and radiotherapy (SRS and SRT).

The research aimed to compare the techniques used and the throughput of the linear accelerator before and during the COVID-19 pandemics.

Results: The results were measured during nine months of operation of Almaty Oncology Center before the pandemic (April-December 2019) and the similar period during the pandemic in 2020. The amount of high-tech radiotheraphy services provided before and during the COVID-19 pandemic equaled to (amount of sessions/ number of patients): conformal (3D) radiotherapy – 6510/335 vs. 6005/286; IGRT – 9171/524 and 8977/551; IMRT and VMAT – 4208/190 vs. 5992/287.

The share of more complex methods of radiation therapy (IMRT, VMAT) has increased from 39.3% of sessions before the COVID-19 pandemic to 49.9% during the pandemic. The number of SRS and SRT procedures performed/patients provided before and during the COVID-19 pandemic equaled to (amount of sessions/ number of patients): conformal radiotherapy – from 19.4 sessions to 21.0, IMRT and VMAT – from 22.1 to 20.9, IGRT – from 17.5 to 16.3.

The average amount of services per patient before and during the COVID-19 pandemic has changed as follows: conformal radiotherapy – from 19.4 sessions to 21.0, IMRT and VMAT – from 22.1 to 20.9, IGRT – from 17.5 to 16.3.

Conclusion: During the COVID-19 pandemic, there was no decrease in the amount of radiotherapy services provided; the use of more high-tech radiotherapy techniques has increased 1.4 times.

Keywords: Radiation therapy, pandemic, COVID-19, cancer, linear accelerator.
COVID-19 pandemics, and 551 patients – during the pandemics. The results were measured during nine months of operation of Almaty Oncology Center before the pandemics (April-December 2019) and the similar period during the pandemic in 2020. Patients received five fractions per week on a TrueBeam STx ver. 2.7 linear accelerator (Varian, USA) (Figure 1). The study was conducted in accordance with the ethical principles of the Helsinki Declaration of Patient Safety and Good Clinical Practice procedures.

Results and Discussion:
In total, 10718 RT sessions were provided in April-December 2019 vs. 11997 (+11.9%) sessions over nine months during the pandemic. The amount of high-tech radiotherapy services provided before and during the COVID-19 pandemic equaled to (amount of sessions/ number of patients): conformal (3D) radiotherapy – 6510/335 vs. 6005/286; IGRT – 9171/524 and 8977/551; IMRT and VMAT – 4208/190 vs. 5992/287 (Figure 2).

The share of more complex methods of radiation therapy (IMRT, VMAT) has increased from 39.3% of sessions before the COVID-19 pandemic to 49.9% during the pandemic. The number of SRS and SRT procedures performed/ patients served has also increased from 14/6 to 47/13.

The average amount of services per patient before and during the COVID-19 pandemic has changed as follows: conformal radiation therapy – from 19.4 sessions to 21.0, IMRT and VMAT – from 22.1 to 20.9, IGRT – from 17.5 to 16.3.

In 2020, we introduced the VisualCarePath (Varian, USA) algorithm to improve patient safety, organize their staged preparation for RT, and arrange paperless communication between RT specialists. During the COVID-19 pandemics, this allowed to improve the operation of RT specialists and reduce the number of patient visits.

Figure 1 – Radiological Department of the Almaty Oncology Center with a TrueBeam STx linear electron accelerator

![Figure 1](image1.png)

![Figure 2](image2.png)

![Figure 3](image3.png)
Conclusions: During the COVID-19 pandemic, there was no decrease in the amount of radiotherapy services provided; the use of more high-tech radiotherapy techniques has increased 1.4 times.

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