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Building Resilience and Modernizing Radiation Therapy in Ukraine Through Comprehensive Education and International Collaboration

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INTRODUCTION

The Russian invasion of Ukraine has significantly disrupted radiation therapy (RT) services. Many departments were damaged or destroyed.



Figure 1. [Top left] OKHMATDYT children's hospital hit by the Russian missile in July 2024. [Top right] Kherson Oncology Center, RT department bombed in Dec 2024, now non-operational. [Bottom left] Zaporizhia Oncology Center hospital hit by missile in November 2024. [Bottom right] Damages of Kharkiv Regional Oncology Center in March 2022

Using Co-60 machines in such a situation becomes even more dangerous. Also the impossibility of further replacing the source Co-60 in old machines highlighting the urgent need to replace Cobalt-60 machines and modernize infrastructure. The chart below shows the changes in the number of linear accelerators and Cobalt-60 machines during 2022-2026 compared to 2021.

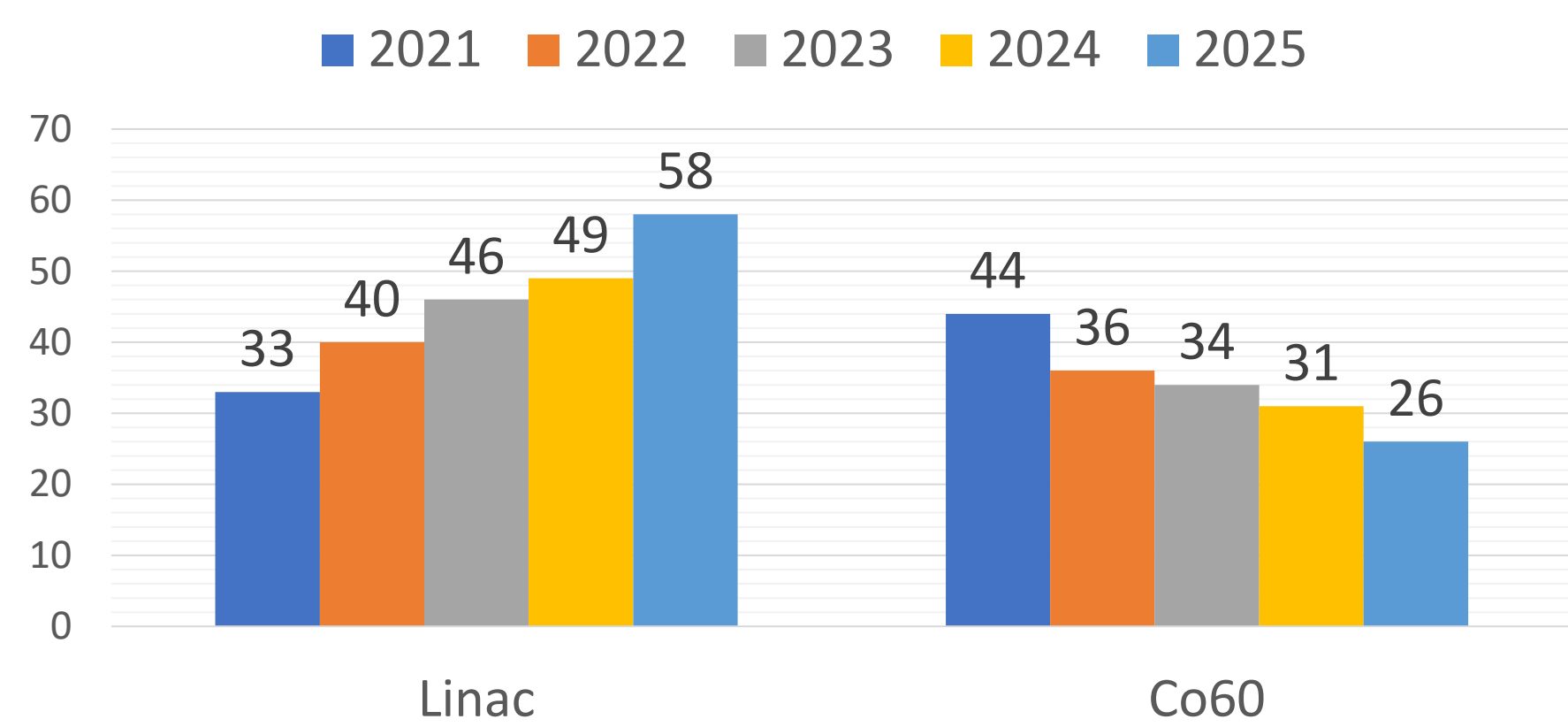


Figure 2. Change in the number of Linacs and Cobalt-60 machines during 2021-2025

Also, after an initial staff shortage due to the war, the number of Radiation Oncologists, Medical Physicists and Radiation Therapists began to increase.

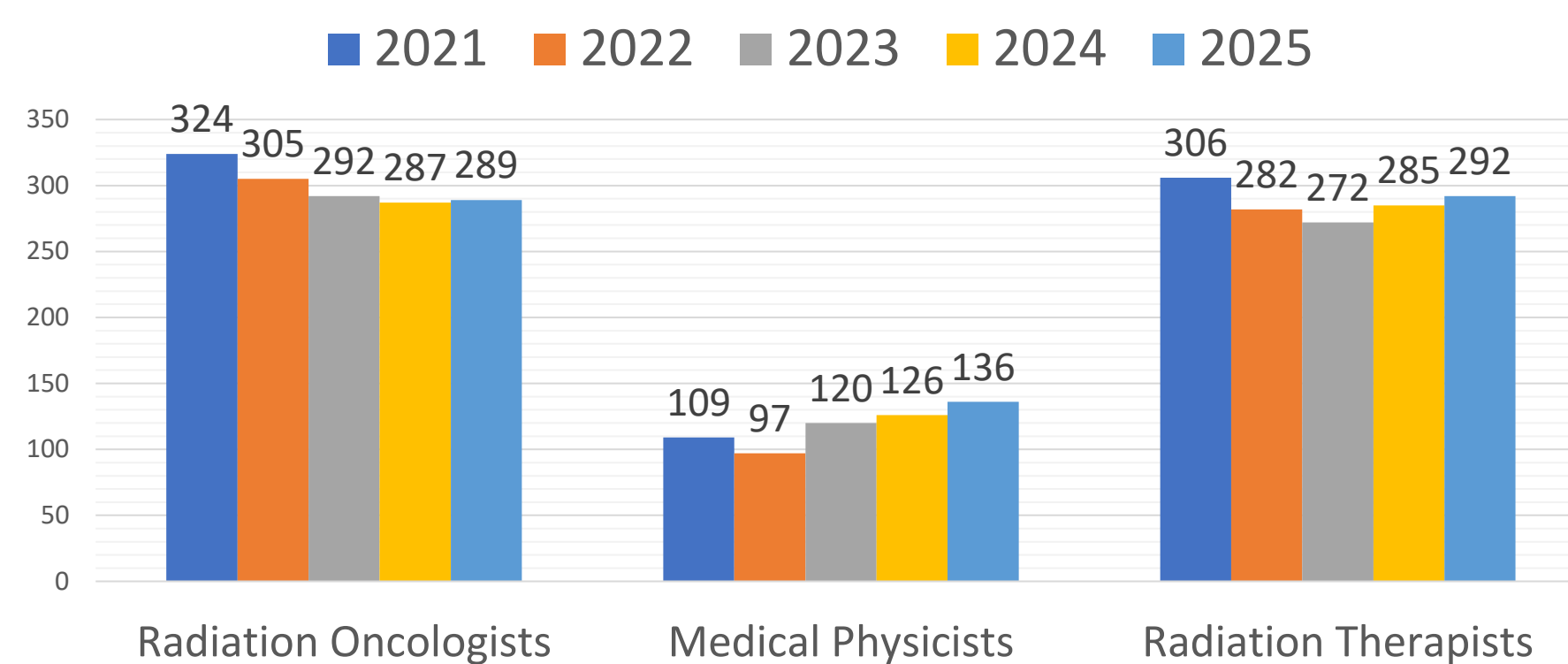


Figure 3. Change in the number of Radiation Oncologists (RO), Medical Physicists (MP) and Radiation Therapists (RTT) during 2021-2025

Upgrading equipment to more modern ones and hiring new staff has led to an urgent need for training of RO, MP and RTT across 43 RT centers.

METHODS AND MATERIALS

In response, Help Ukraine Group (HUG) and Rayos Contra Cancer (RCC), supported by SweCare, AAPM, ASTRO, ESTRO, ABS, and vendors, launched a national RT training initiative in 2025. The program aimed to support Ukraine's transition from 2D and Co-60-based treatment to advanced 3D and IMRT techniques, while building clinical, technical, and research competencies among radiation oncologists, medical physicists, and radiation therapists.

This mixed-format program integrated local, virtual, and international training. Eight 3-day hands-on workshops for RO/RTTs were delivered at the Shalimov Institute, and 15 MP workshops at the Spizhenko Clinic and National Cancer Institute.



Twelve professionals completed 2-week observerships at Södersjukhuset and Akademiska Sjukhuset in Sweden and three attended ESTRO 2025 in Vienna.



Virtual education included RCC-led courses on 2D-to-3D transition, plan evaluation, and head-and-neck contouring, and HUG-led SBRT, brachytherapy, and research methodology courses.



ESTRO provided 40 free contouring course registrations. Full-day RT sessions were delivered at the OncoHUB UpToDate 6.0 national conference.



Program evaluation used pre-/post-tests and satisfaction surveys (1–10 scale).

RESULTS

A total of 1,079 training participations across 39 RT centers were recorded across all formats: 777 via virtual courses, 124 in on-site workshops, 12 in international observerships, and 166 through conference activities.

Virtual training participants demonstrated a 47.3% average improvement in test scores, with a mean satisfaction score of 9.8/10. On-site workshop participants showed a 29.7% knowledge gain and rated the experience 10.0/10. Observership participants reported adoption plans for new clinical workflows and satisfaction of 9.8/10.

CONCLUSIONS

This comprehensive, scalable training model strengthened Ukraine's RT capacity during wartime. Sustained investment in blended education and international collaboration is essential for long-term modernization and system resilience.

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These collaborative efforts represent an invaluable contribution to the future of radiation oncology in Ukraine.