

Implementation of a training module on the establishment and utilization diagnostic reference levels in medical imaging for radiation protection training courses for professionals in Georgia

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I. Beritashvili Center of Experimental Biomedicine

The history of the Ivane Beritashvili Center of Experimental Biomedicine began at 30s of the 20th century.

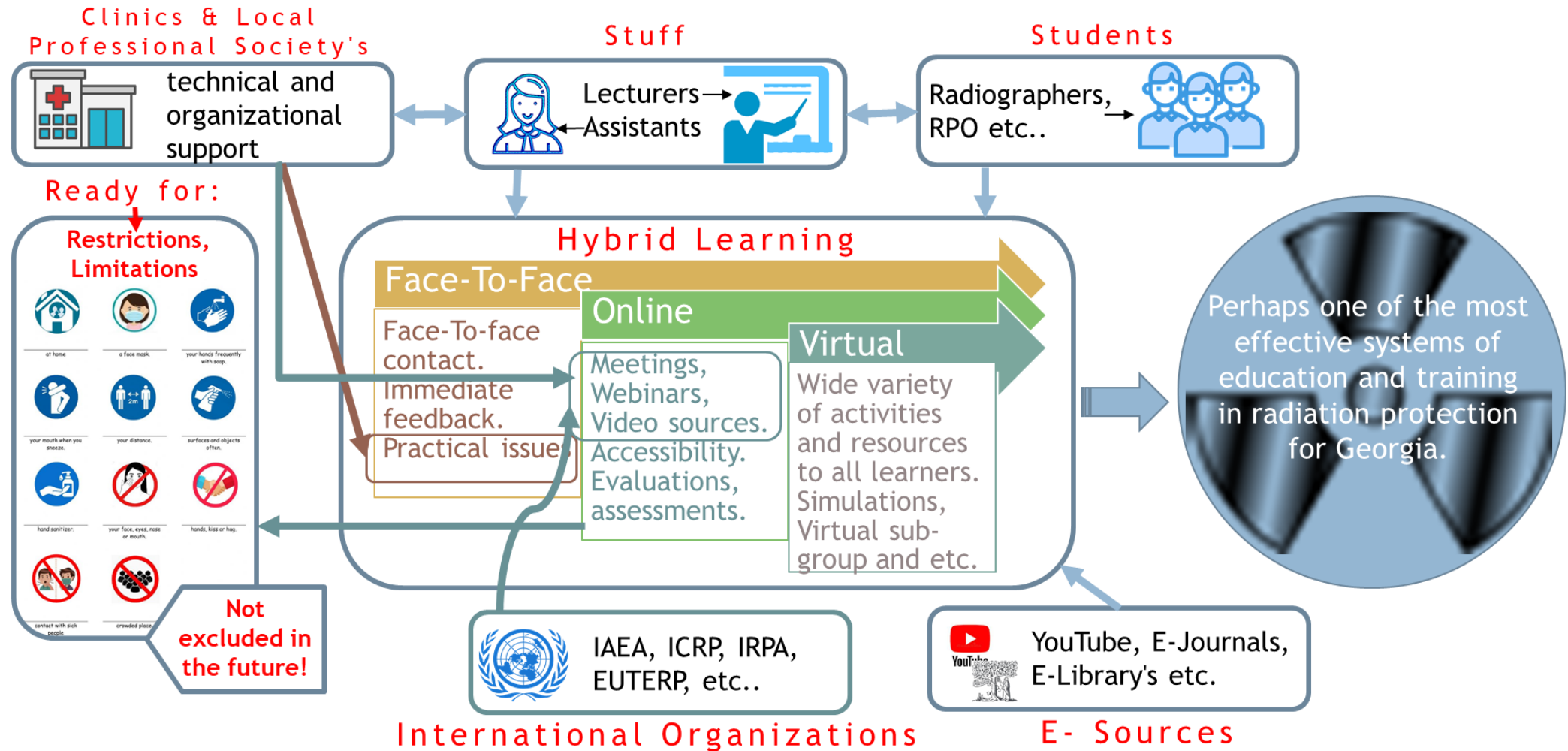


Our Center has specialized laboratories and has been conducting research in radiobiology, radioecology and radiation protection since 1971.

Since 2010, we have been developing educational programs in radiation protection and providing training and retraining courses for personnel in the field of radiation protection in medicine.

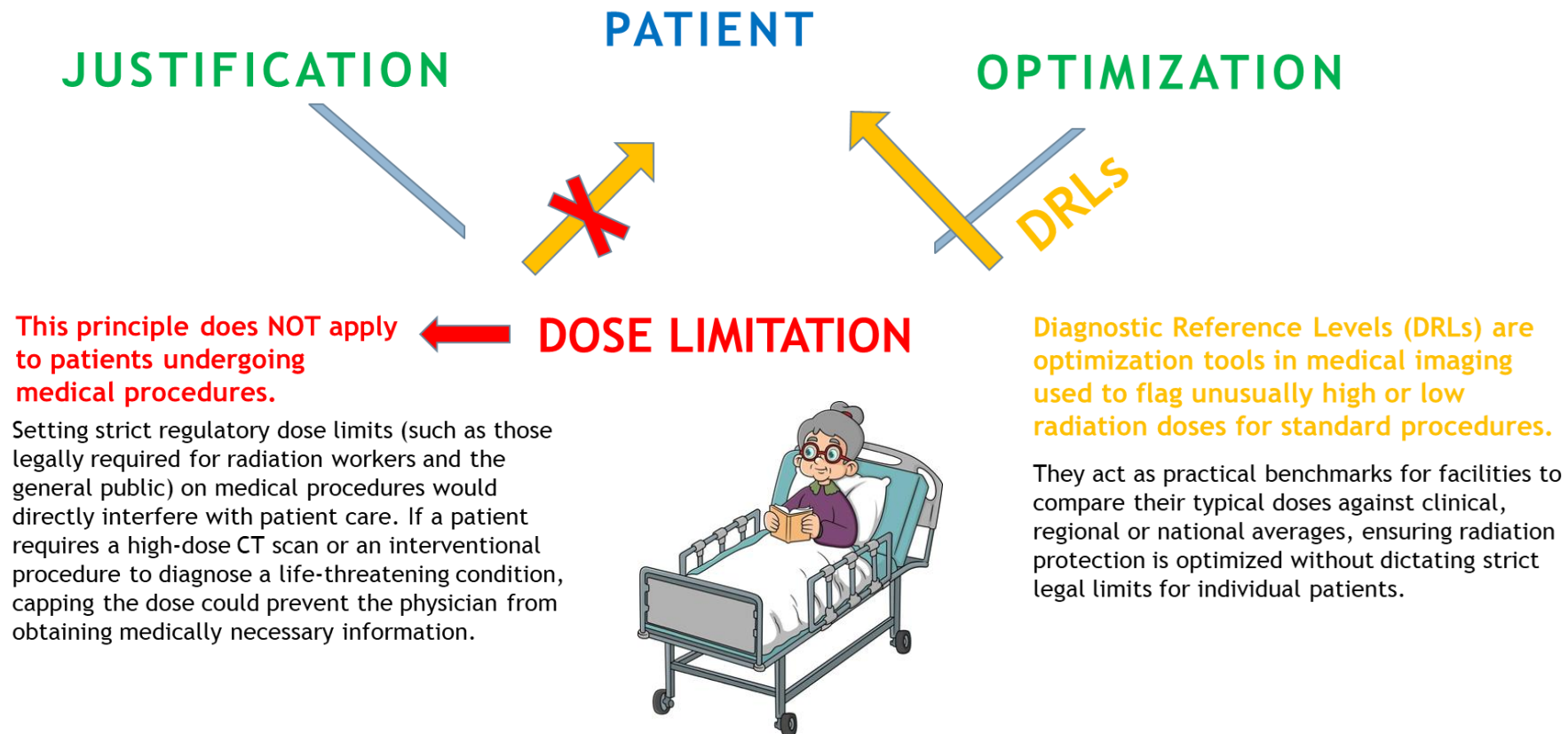


Our current education and training system was presented for the first time at ETRAP 2023



General Principles of Radiation Protection in Fields of Diagnostic Medical Exposure and DRLs

Unfortunately, in recent years, when reviewing the basic principles of radiation safety with students and touching on the principle of optimization, we only briefly mentioned DRLs, limiting ourselves to providing only basic information, since they were not used in our country.



The number of radiation-related examinations in Georgia has increased significantly in recent years.

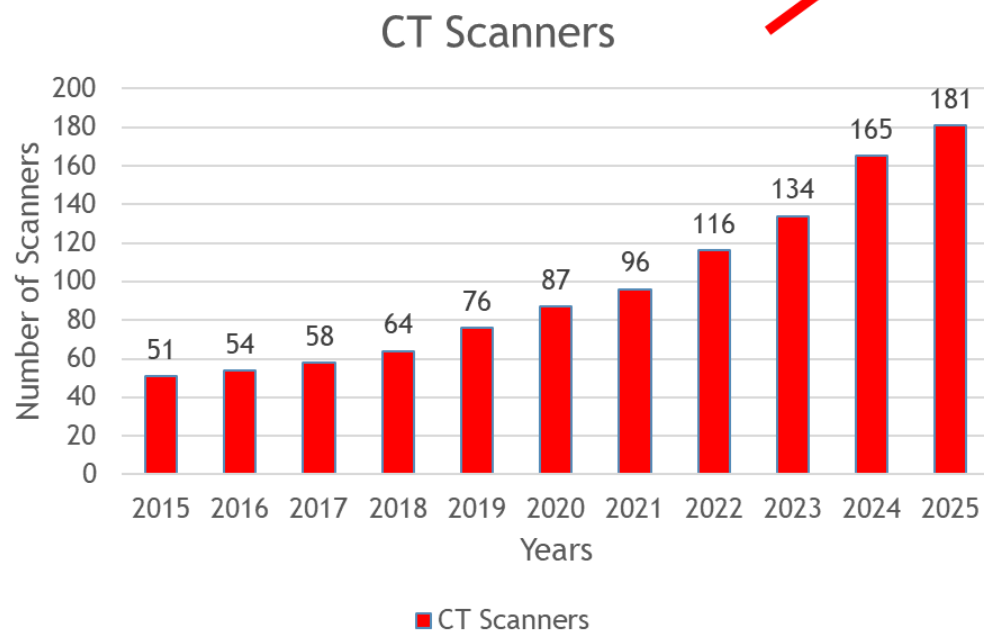
- Of course, responding to such challenges on a national scale requires a multi-level and multi-modal approach to solving the problem.
- Many different approaches are being considered for a comprehensive solution to this problem.
- One of these solutions was the establishment and utilization diagnostic reference levels at the local and national levels.
- This decision required training of personnel for the establishment and utilization diagnostic reference levels.



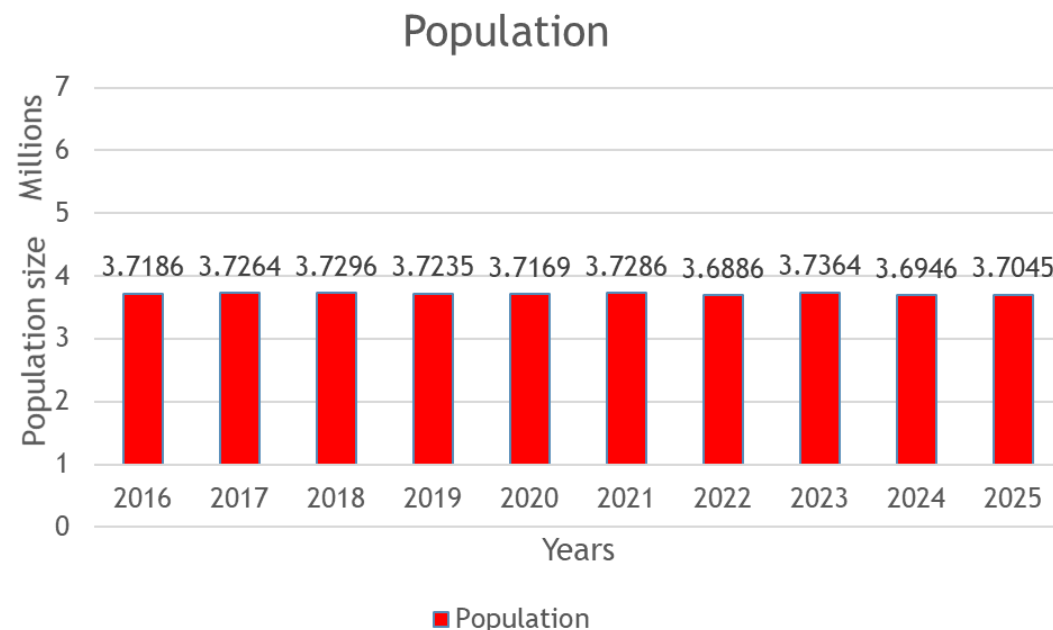
A new challenge: The increase in radiation related examinations in Georgia is becoming alarming.

Comparison of the growth dynamics of the number of CT scanners in Georgia and population growth

Growth dynamics of about 300% over the last 10 years



Small changes in population size of about 1-2% over the last 10 years



Figures were calculated using data kindly provided by ANRS under project FR-24-12976 funded by the SRNSF

Data from SAKSTAT 2025 on the population of Georgia were used (SAKSTAT-National Statistics Office of Georgia)

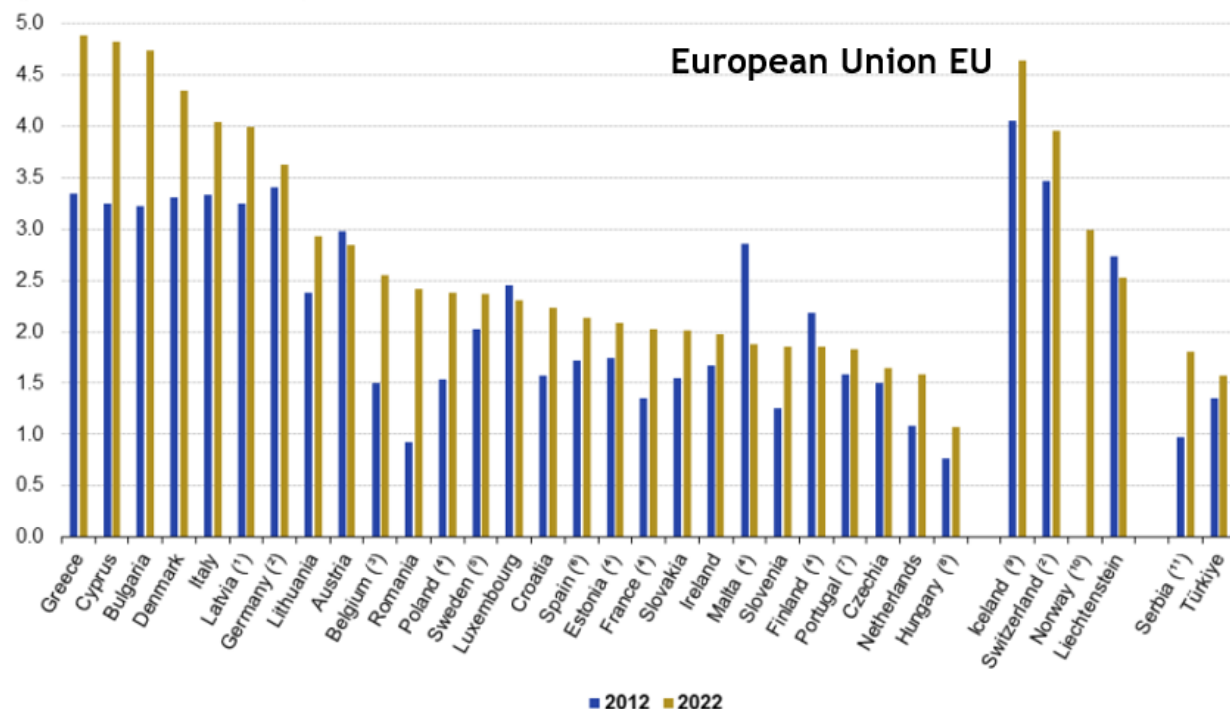


A new challenge: availability of radiation related examinations has also increased dramatically

Comparison of CT scanner availability dynamics

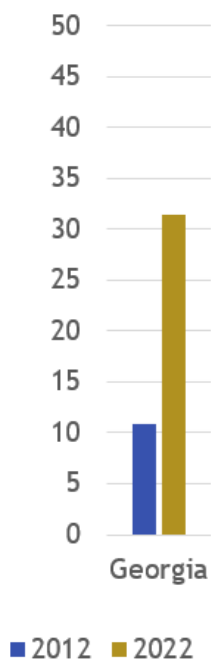
Even without calculations, it is empirically clear that such an increase in accessibility will inevitably lead to an increase in the number of procedures. ➡

Availability of computer tomography (CT) scanners, 2012 and 2022
(per 100 000 inhabitants)



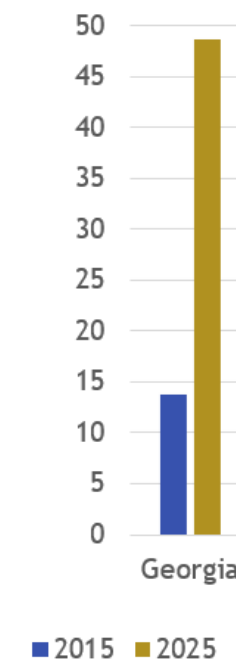
Growth dynamics of about **300%** for 2012-2022 ➡

Availability of CT scanners, 2012 and 2022
(per 100000 inhabitants)



Growth dynamics of about **500%** over the last 10 years 2015-2025 ➡

Availability of CT scanners, 2015 and 2025
(per 100000 inhabitants)

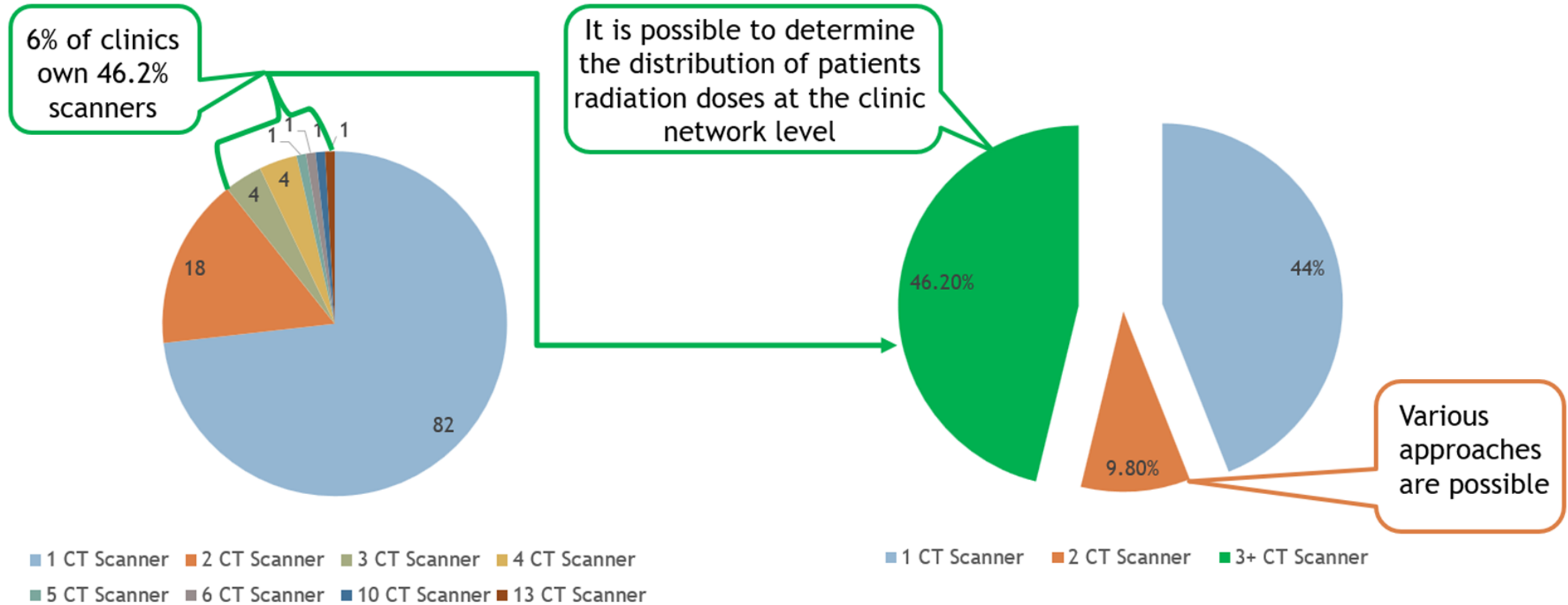


New requirements for DRLs in Georgia

- Diagnostic Reference Levels (DRLs), as one of the tools for implementing the principle of optimization in radiation protection in medical imaging, are used in many countries.
- Unfortunately our previous training courses included only basic knowledge regarding DRLs, since they were not established at either the national or local levels.
- In Georgia, through the efforts of the regulatory body and the scientific and medical communities, this process has already been launched, although it is still in its infancy.
- A legislative framework has been established on the basis of international and European standards, and scientific research in this area has begun.
- First of all, we want to establish an NDRL for high-dose procedures such as CT and IR, the National Science Foundation has funded the project FR-24-12976 “Study of distribution of patient doses from most common diagnostic radiology procedures in Georgia” The research is being carried out with the support of the National Regulatory Body (ANRS)
- One of the important first results of the project was the following: the possibility of parallel, fairly rapid establishment of LDRL for CT



Establishment of LDRL for CT



To better understand the task, a one-day special training course on the establishment and use of local diagnostic reference levels was also developed for top managers - heads of medical facilities, departments and other managers of relevant organizations.

The special training course includes the following information:

- ✓ What is DRLs?
- ✓ What is the purpose of DRLs?
- ✓ Are DRLs effective in improving patient radiation protection?
- ✓ What is the difference between national DRLs (NDRLs) and local DRLs (LDRLs)?
- ✓ Who is responsible for setting and updating LDRLs?
- ✓ How to set LDRLs?
- ✓ National legislation requirements regarding LDRLs.
- ✓ What kind of help and support can we provide?



Based on the relevant IAEA and EU documents, we have developed a special training course for those who directly involved in the process of collecting data for establishing NDRL and LDRL

We have also translated and adapted into Georgian the data collection forms and instructions for their use kindly provided by the IAEA for:

- ✓ Fluoroscopy&IR
- ✓ CT
- ✓ Hybrid Imaging
- ✓ Mammography
- ✓ Radiography



Basic approaches to creating a specific training module:

- However, the establishment and utilization of DRLs require specific training.
- Given that periodic training and retraining courses in RP for medical personnel are mandatory in the country, it is reasonable to incorporate a training module on the establishment and utilization of DRLs into these courses.
- Based on our experience in developing and delivering periodic training and retraining courses, we designed a module consisting of three parts.
- Each section consists of several elements relevant to participants involved in different types of diagnostic procedures, such as CT or Mammography, etc.
- We have also developed a new evaluation system for this training module.
- A two-stage (before and after the course) self-assessment system was also developed, which is very important for feedback from the student.



The training module on establishing and using diagnostic reference levels consists of three parts.

- ✓ The first part provides general knowledge about DRLs and their role in radiation protection in medicine and will be common to all participants, including RPOs, radiographers, radiologists and medical physicists.
- ✓ The first part of the module will be delivered during the theoretical component of the course, while the second will be conducted during practical sessions, taking into account the specifics of each type of medical imaging.
- ✓ The second part consists of modules on the utilization of local DRLs for different types of procedures, including CT, Angiography and others.
- ✓ The third part is intended for personnel directly involved in the process of installing local DRLs in medical facilities. In addition to knowledge, the third group will be provided with all necessary equipment, including data collection forms.



Conclusions:

This process should involve collaboration with the regulatory body, other education providers in this field, and all relevant stakeholders.

This approach, taking into account the mandatory retraining of personnel every three years, will enable the effective preparation of professionals in Georgia for the utilization of DRLs at both the national and local levels.

The third part of the module will also enable professionals to participate in the development and optimization of guidelines for the establishment of local DRLs.

By adopting this integrated approach, it will be possible to implement and apply national and local DRLs in practice within a relatively short timeframe and at an acceptable level, thereby supporting good practice in medical facilities.



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Our team:



Thank you!

