



ONKOLOŠKI INŠTITUT
INSTITUTE OF ONCOLOGY
LJUBLJANA

*Institute of
Oncology Ljubljana
80 years
1938
2018*

Institute of Oncology Ljubljana
80 years

1938
2018

Celebration, marking the 80th anniversary
of the Institute of Oncology Ljubljana,
is under the honorary patronage of
His Excellency **Mr Borut Pahor**,
President of the Republic of Slovenia.

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Introduction



Since its establishment 80 years ago, the Institute of Oncology (IO) has transformed into the national centre of oncology for the comprehensive treatment of cancer patients in Slovenia. Since its beginnings in the 19th century, the Institute has been led by many deserving people who have integrated their visions and ideas of how to comprehensively treat cancer patients. Among them, I would especially like to praise Prof. Dr. Ravnihar, who has during her 20-year period at IO, achieved that Institute became a modern centre, on the national as well as international levels, by setting up laboratories, introducing different diagnostic procedures, and being aware of the importance of a multidisciplinary approach in oncology.

Today, the Institute represents an important centre of oncology in its region. With numerous international connections, the Institute takes part in international networks of oncology centres. The Institute also acts as a learning base for many faculties and schools, it provides courses for physicians and other health care personnel, organises professional and scientific symposia, and is also the main research institution for pre-clinical and clinical research in the field of oncology. In this field, IO has exceptional researchers who publish articles in the most renowned and prestigious scientific journals.

IO closely cooperates with representatives of different cancer patient societies, which further strengthens its role as the main institute in the field of oncology in the country. In the future, we will continue to treat these societies as important partners in pursuit of our mission.

I believe that if we stay on this course, we will continue to successfully achieve our set goals and keep up with the global trends in cancer treatment, co-creating them for the wellbeing of all our patients.

Zlata Štiblar Kisić, LL. B.
Director General of IO



Today, in all fields, also in oncology, we emphasise a high level of specialisation of professionals, both in health care and in the services that complement the comprehensive treatment of cancer patients.

Because the basic mission of IO is a comprehensive treatment of patients, our priority task and direction is to connect all segments that cooperate in the treatment of patients in a multidisciplinary manner.

We successfully implement this by monitoring the newest findings and introducing new types and forms of diagnostic examinations and treatments at the same time as they are being introduced in other parts of the world. We can also point out the newest tumour radiation techniques, the introduction of different new targeted treatments and immunotherapies, and the newest surgical approaches. In the field of diagnostics, we also follow international trends. We assimilated the methods for determining different molecular markers that show if a tumour will react to a treatment with a certain targeted drug, which is an important step towards treatments adapted to individual patients or so-called personalised medicine. Such treatments are more patient-friendly, cause less stress, and are more effective, all of which contributes to a better life quality of patients.

With the mentioned approaches, and others, we are contributing to the fact that cancer mortality in Slovenia is decreasing. Of course, this is also the result of successful cancer prevention, which includes raising public awareness as well as introducing and consistently implementing screening programmes that enable the detection of cancer in its early stages and, consequently, a more successful treatment.

If we consider the development of oncology in the last 30 years, we can see an immense progress in diagnostics and cancer treatment that enabled the realisation of the concept of patient-centred treatment. We can only imagine how quick the development in the following decades will be. In any case, a lot of effort and financial assets will need to be invested in following the global trends.

However, it is true that development does not depend on technological advancements alone, but also on all the employees who with their enthusiasm, high-quality and selfless work, knowledge, and experience contribute to the high level of quality that we achieve in all fields of cancer patient treatment.

Viljem Kovač, MD, PhD

Medical Director of IO

Values

The treatment of cancer patient is multidisciplinary, which is why IO is organised and functions as the national centre of oncology for comprehensive cancer treatment.

To ensure the best possible treatment and care for cancer patients, we strive towards a higher quality of life and health care. Additionally, we are also among the best centres of oncology in Europe in the field of cancer research and education.

We follow the values that are the foundation of our development strategy:

- **Patient wellbeing** is a key value. We treat the patient comprehensively, considering all their aspects and their own value system and dignity.
- **Good mutual relationships** that reduce the influence of stress factors to which we are exposed in our field of work, and that at the same time enable an unselfish transfer of knowledge among colleagues. They are based on the integrity of individuals, their responsibility, and honesty.
- **Excellence** appears in the high level of expertise guided by constant trainings, in the obligation to comply with international guidelines and standards in the field of patient treatment, and in the effort to achieve the highest possible level of quality and safety.

Mission

The fundamental mission of IO is to limit the burden of cancer in Slovenia as much as possible. As a tertiary institution, we try to reduce the increasing rate of cancer incidence, decrease cancer mortality, increase the survival rate of cancer patients, and improve the quality of their lives.

Vision

The vision of IO is to remain the leading institution in the field of oncology in Slovenia, and hold its place among the leading centres of oncology in Europe.

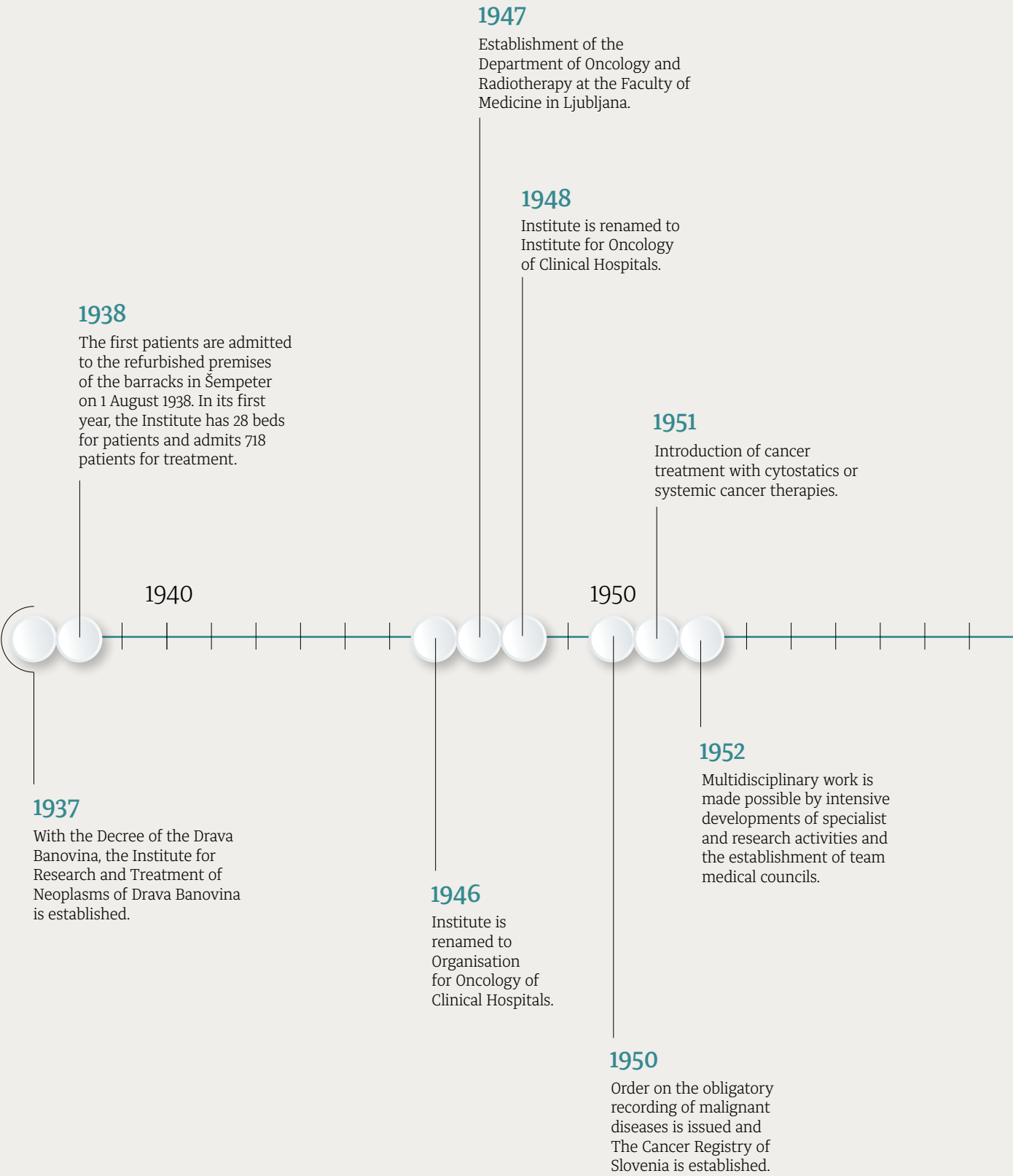
To achieve our vision, we follow our set goals in all our fields and activities:

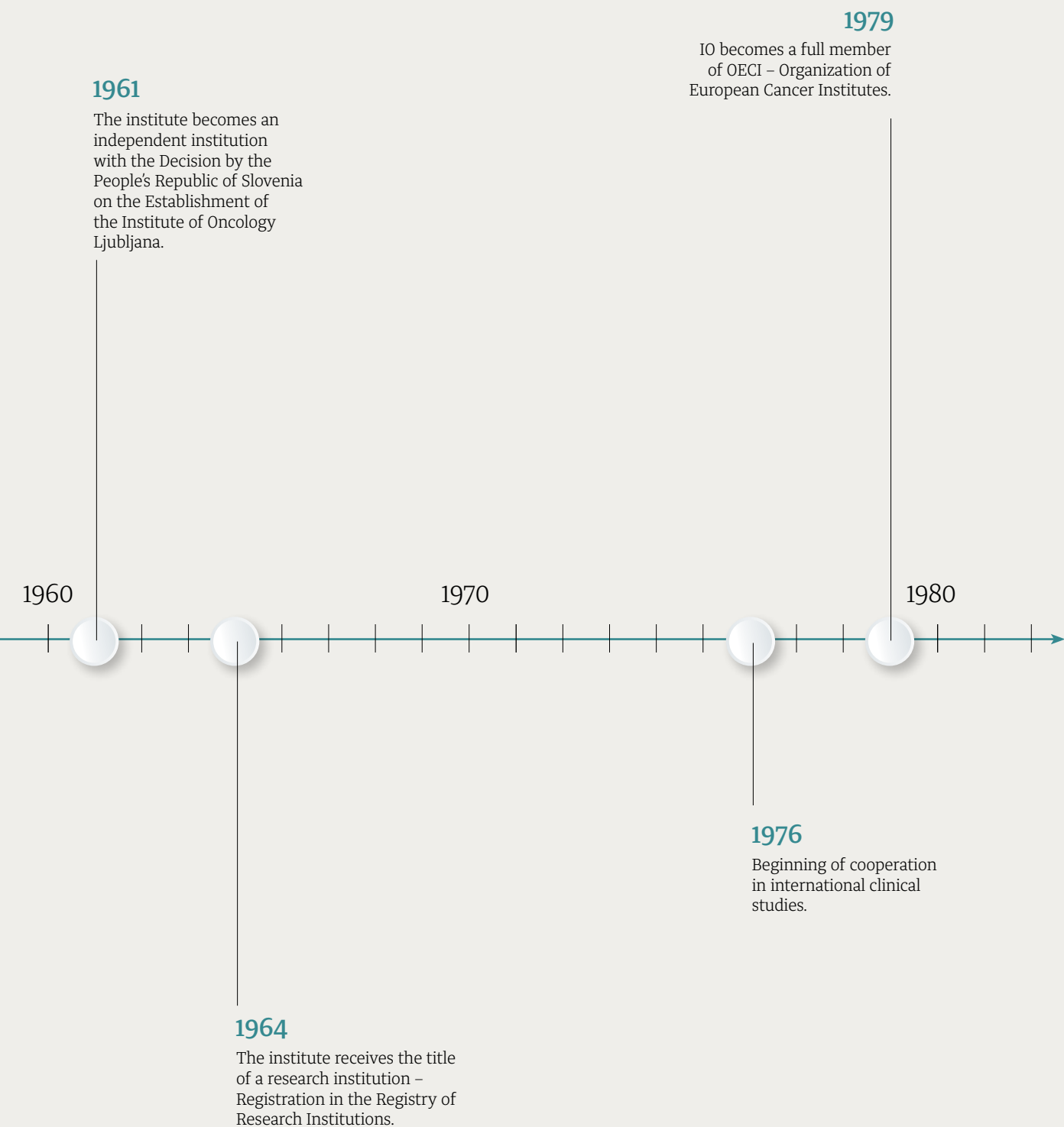
- In **the professional field**, IO's goal is to continue with the multidisciplinary approach for the comprehensive treatment of cancer patients and to ensure a consistent development of all professions in oncology, both of which ensure that IO will continue performing the function of a comprehensive centre of oncology on the national level in the future. Another important goal is to constantly update the guidelines (recommendations) and to determine the minimum standards in diagnostics and treatment in the field of oncology in Slovenia, as this is necessary to ensure consistent approaches in detecting and treating malignant diseases on the secondary level in the country. It is also our goal to strengthen our international connections, cooperation, and exchange of professionals in all fields of expertise.
- In **the field of education**, IO's goal is to stay a reference national learning institute for both Faculties of Medicine in the country, the Faculty of Health Sciences, and other faculties and schools at the undergraduate and postgraduate levels, and to establish itself as a recognised international educational institution for all fields of expertise in oncology.
- In **the field of research**, IO's goal is to expand and improve the coordination of research work in the field of oncology in Slovenia, and to cooperate on European research projects.
- In **the field of financing**, IO's goal is to ensure sufficient assets that will enable financial stability and further development, and at the same time increase the influence on the decisions regarding the distribution of assets in health care for the benefit of oncology. Another goal is to establish a system that will enable fund gathering outside of the guaranteed assets (contract with ZZS) from public sources, i.e. marketing of health services.
- In the **field of premises and equipment**, our goal is to complete both planned construction phases and to acquire and maintain a suitable medical equipment that will be replaced with new and modern equipment when necessary.

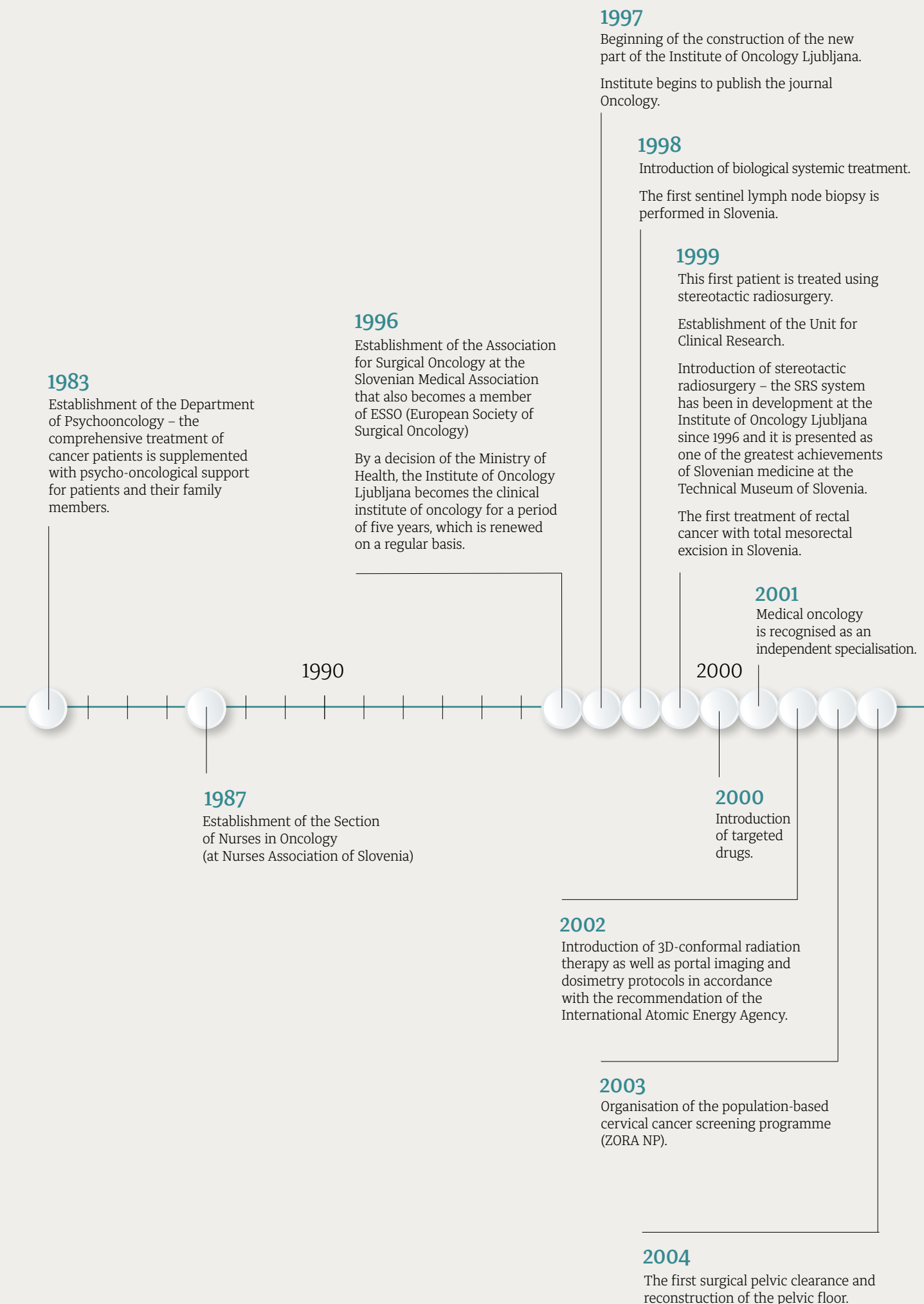
From the beginning to today



Important historical milestones







2005

Establishment of the Department of Experimental Oncology and the Department of Molecular Diagnostics.

2006

In vivo dosimetry becomes part of the routine.

2007

At the beginning of October, the majority of the departments are relocated from Building A to new premises in Buildings D and E.

Introduction of hybrid imaging diagnostics at the Institute of Oncology Ljubljana: PET/CT with 18-F-FDG.

Establishment of the Department of Acute Palliative Care.

Introduction of surgical treatment of liver metastases.

2008

The first peritonectomy and intraoperative chemotherapy with hyperthermia (HIPEC) in Slovenia.

Confirmation of oncological genetic consulting and testing activities by the Health Council.

Establishment of the Department of Clinical Nutrition and Dietotherapy.

Introduction of the National Screening Programme for Breast Cancer – DORA.

2010

2011

Introduction of immunotherapy with antibodies.

Introduction of the VMAT radiotherapy technique.

2010

Introduction and implementation of quality standards for the oncology pharmacy service.

2009

Accreditation IO ESMO – Centre of excellence for palliative care.

The Department of Laboratory Diagnostics obtains a Licence of the Slovenian Ministry of Health based on the Rules on requirements to be met by laboratories performing laboratory medicine tests, which needs to be renewed every five years.

The first isolated limb perfusion in Slovenia.

Introduction of the IMRT radiotherapy technique.

Introduction of liver electrochemotherapy for patients with colon cancer metastases in the liver.

2013

In October 2011, the Division of Radiotherapy is assessed by professionals from the International Atomic Energy Agency (IAEA). Based on the results of the assessment, IAEA awards the division with the title of a competence centre in 2013. With this, the Division of Radiotherapy becomes internationally recognised in that it provides high-quality radiation treatment and that it can serve as a model and learning centre for other radiotherapy departments or centres in the country and region.

2014

Introduction of genetic testing in treatment planning of ovarian cancer.

2015

Acquisition of a second-generation DNA sequencer and introduction of this technology for identifying genetic DNA mutations from blood samples and for identifying sporadic DNA mutations in tumour samples.

Introduction of hybrid imaging diagnostics at IO: SPECT/CT.

Implementation of a 10-colour flow cytometer enables reliable diagnosis of lymphoma and leukaemia in samples with few cells and identification of minimal residual disease in children with acute leukaemia.

2017

IO receives the international certificate of the AACI (American Accreditation Commission International) certification that confirms the compliance of the organisation with the requirements of the standard. The AACI certificate is an official confirmation that the employees at IO are providing the best possible care. Patients can feel safe because the quality of their treatment is at the highest level possible.

Expansion of the DORA programme to the whole country and the possibility for all Slovenian women aged between 50 and 69 to be included.

IO becomes a member of the European Reference Network for Rare Adult Solid Cancers (ERN EURACAN) and European Reference Network on Genetic Tumor Risk Syndromes (ERN GENTURIS) and is actively included in different work groups.

IO becomes a member of the connection between China and Central and Eastern European countries in the field of hospitals China-CEEC-Country Hospital Cooperation Alliance.

Introduction of an IT system for supporting work in nursing and care.

2016

IO adopts the Strategic Plan for the 2016–2020 period.

Directors of IO

Assist. Prof. Josip Cholewa, MD, PhD
1938 - 1942

Prof. Leo Šavnik, PhD
1942 - 1945; 1948 - 1963

Prof. Josip Hebein, PhD
1945 - 1948

Prof. Božena Ravnihar, PhD
1963 - 1982

Prof. Stojan Havliček, PhD
1982

Prof. Stojan Plesničar, PhD
1982 - 1986

Prof. Zvonimir Rudolf, PhD
1986 - 1991; 1995 - 1999;
2003 - 2007

Matjaž Zwitter, MSc
1991 - 1995

Albert Peter Fras, MD, PhD
2000 - 2003

Aljoša Rojec, MSc
2007 - 2008

Ana Žličar
2008 - 2013

Prim. Janez Remškar, MD
2013 - 2015

Zlata Štiblar Kisić
2015 - present

Management and organisation of IO today

IO is an independent public health institution which offers health services at the secondary and tertiary levels, provides education, and conducts research. The Director General manages and organizes IO's business, while the Medical Director manages the professional, research, and educational work at IO. In addition to that, the Medical Director also heads the Council of Experts which ensures the comprehensive treatment of cancer patients and a coordinated functioning of all organizational units. Business and administration are supervised by the Council of IO.

The Institute is managed by the **Management** which is in charge of all **financial** and **legal** affairs, as well as all affairs relating to **human resources, planning and analysis, technical maintenance, public procurement, IT, and PR**. Their work is essential in ensuring the transparency of operations that utilize public resources in order to provide comprehensive cancer treatment. The Management interoperates with all the professional activities carried out at the Institute, manages the supply of the material necessary for the provision of health services, and **provides professional support** in health care provision and various work processes. IO has one of the leanest management structures of all public health care institutions in Slovenia, which it has proved with on-going positive business results throughout the past seven years.

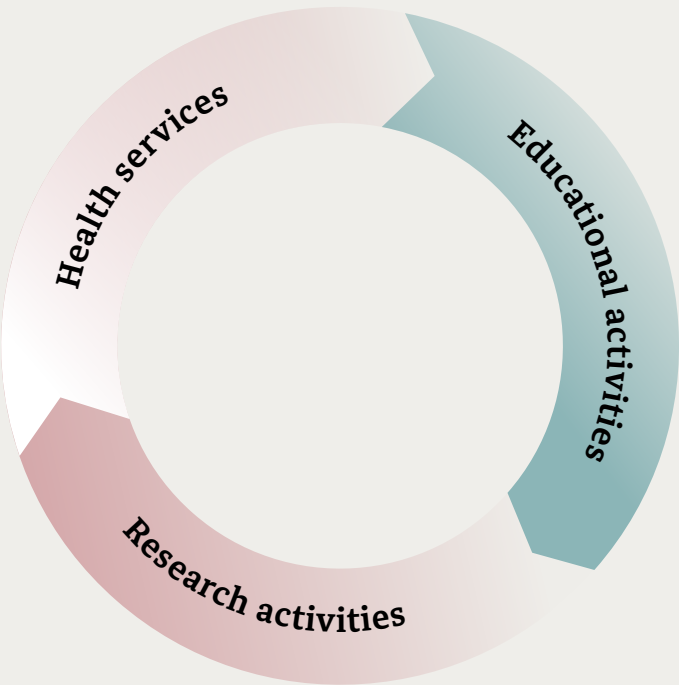
Development through connection



Even after 80 years, IO still has a unique role among Slovenian health, educational, and research institutions. As the only comprehensive centre of oncology with a modern, multidisciplinary, and highly professional approach, its mission encompasses comprehensive cancer patient management, comprehensive cancer care, and cancer control planning.

IO is the main specialised health institution for performing, managing, and monitoring cancer treatments in Slovenia. The Institute successfully accomplishes this task with its **highly trained professionals** that are constantly educating themselves and following all novelties in the field of cancer patient treatment. With its educational and counselling activities within IO and in the broader Slovenian region, the Institute has a key role in the **transfer of knowledge**. As a comprehensive centre of oncology, IO also has an important role in the field of **research activities**. It performs pre-clinical and clinical trials in the field of diagnostics and cancer treatment with new, improved ways and methods. The three basic activities of the institute are inseparably intertwined and form a coherent whole, because **each of the activities** – professional, educational, and research-oriented – **are irreplaceable**. This connection represents the foundation of this Comprehensive Cancer Centre. The operation of IO is also connected to the broader society: different volunteer associations and societies with their needs and suggestions also contribute to how the development is planned and adjusted according to the needs of cancer patients and experts.

Three basic activities of the Institute of Oncology Ljubljana



Epidemiology and Cancer Registry

The Cancer Registry of the Republic of Slovenia (CRRS) is one of the oldest population-based cancer registries in Europe. It was founded at the Institute of Oncology Ljubljana in 1950 by the late Professor Božena Ravnihar, who headed it till 1975. She was succeeded by Professor Vera Pompe-Kirn, who contributed a lot to the further development of the CRRS as well as its recognition at the national and international levels, all until her retirement in 2003. Since 2003, the CRRS has been merged with the Unit of Epidemiology into a single Epidemiology and Cancer Registry service. It was led by Maja Primic Žakelj until 2018. Besides the CRRS, the new service also comprises the hospital-based Cancer Registry of the IO, which contributes a considerable part of information to the CRRS and facilitates a more detailed overview of the patients treated at IO, irrespective of their permanent residence. In the last decade, a new national registry in charge of coordinating and monitoring the organised cervical cancer screening programme (Registry ZORA) has been established, while the information system to support organised breast screening program has been established in 2007 (Registry DORA).

The data on cancer collected by the CRRS, namely the incidence, survival and prevalence, serve together with mortality data collected by the National Institute of Public Health of RS as the basis for assessing the cancer burden in the country. They are important for planning and evaluation of the National Cancer Control Plan (NCCP), in the field of primary and secondary prevention, diagnostics, treatment and rehabilitation, for planning facilities, and funding needed for cancer control (personnel, equipment, and hospital capacities), as well as for clinical and epidemiological research in Slovenia, for international multicentric studies, and for evaluating the effectiveness of cancer screening programs. All the important cancer burden indicators have been available at our SLORA web portal since 2010. Further on, CRRS disseminates its results in the form of regular annual reports, period publications, and specific studies and research papers. The basic cancer burden indicators for Slovenia are gathered in the table below.

Cancer burden in Slovenia in 2006 and 2015

	2006			2015		
	Total	Men	Women	Total	Men	Women
Incidence						
number	11,460	6,055	5,405	14,309	7,844	6,465
per 100.000 population	570.6	614.2	528.5	693.6	767.1	621.3
cumulative* till year 75	36.9	45.4	30.2	39.5	47.8	32.4
Mortality						
number	5,252	2,918	2,334	6,216	3,484	2,732
per 100.000 population	261.5	296.0	228.2	301.3	340.7	262.6
Prevalence**						
number	66,987	27,317	39,670	10,2371	46,152	56,219

* Cumulative age standardised incidence is calculated per 100 inhabitants.
**On 31 December

National Cancer Control Programme (DPOR)

A systemic and long-term reduction of the cancer burden is only possible with a comprehensive cancer control in the country. For that purpose, DPOR was established in 2010 and the first goals were set to be achieved by 2015. The result of this first programme is a slower rising rate of cancer occurrences, especially for women. The cancer mortality rate was reduced during this period for both sexes. The survival rate of cancer patients in Slovenia increased compared to previous periods. The DPRO document, prepared in 2016 in cooperation with numerous stakeholders, defines the strategic objectives of the programme for the reduction of incidence, improvement of survival, and a higher life quality of cancer patients for the period from 2017 to 2021.

The strategic objectives of the programme can only be reached by harmonising the operation of all parts of the health system, which are in the specific programme objectives defined as the fields of primary and secondary prevention, diagnostics and treatment, rehabilitation, palliative care, research, education, monitoring of the burden of cancer, and information technology. To achieve each of these strategic objectives, measures, deadlines, and persons responsible were defined.

DPOR 2017–2021 also defines a renewed and more operative programme management scheme that will enable a more transparent, competent, and professional steering of one of the most complex systems in the Slovenian health system.

The promoter of the programme is the Ministry of Health of the Republic of Slovenia. IO and its professionals represent the driving force of the programme, of course in cooperation with other professionals in Slovenia.

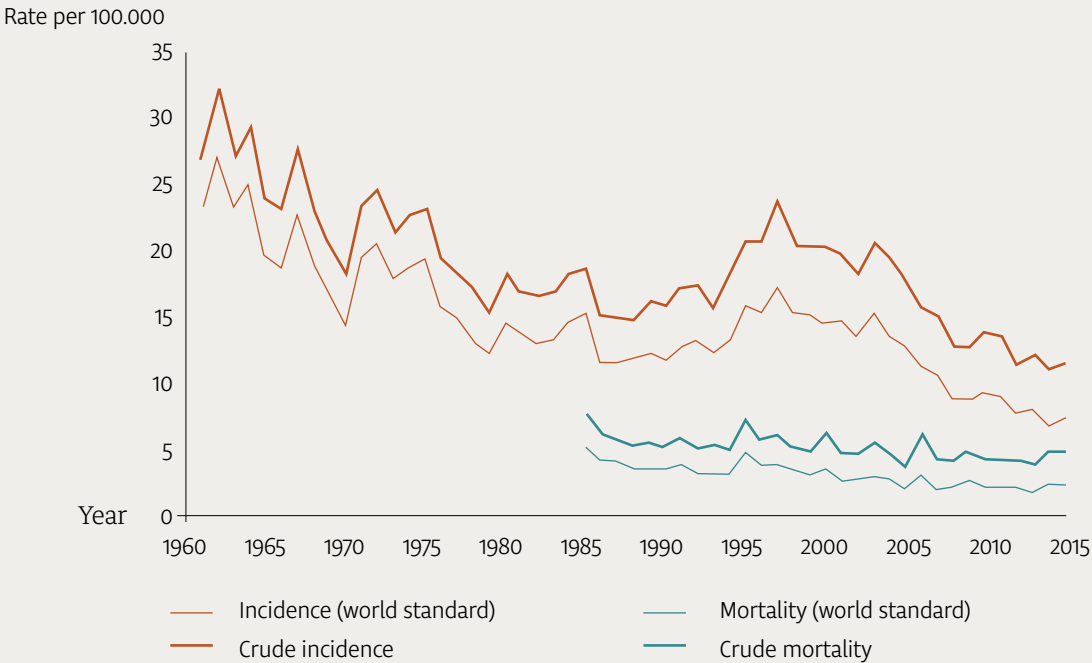
With this programme, the country commits itself to providing high-quality care for cancer patients, which includes modern diagnostics and treatment and is most successful in the early stages of cancer. For this reason, there are three screening programmes for early cancer detection in Slovenia: the objective of the screening programmes is to identify pre-cancer or early cancer stages in seemingly healthy persons using simple examinations. These programmes have been justified by the experience of countries where these programmes have already been in place for a long time. At the secondary preventive level, the following screening programmes are carried out in Slovenia: ZORA (the programme for early detection of pre-cancer and early cancer changes of the cervix in women aged 20 to 64), DORA (the programme for early detection of breast cancer in women aged 50 to 69), and SVIT (the programme for early detection of pre-cancer changes and colorectal cancer in women and men aged 50 to 74). With DORA, SVIT, and ZORA screening programmes, it is essential to actively encourage individual population to undergo the examinations and monitoring of certain programme indicators. These programmes can only be effective if at least 65 percent (SVIT) or 70 percent (DORA, ZORA) of the target population is included.

IO is the promoter of the DORA and ZORA programmes, and the promoter of the SVIT programme is the National Institute of Public Health.

Cervical Cancer Screening Programme ZORA

Cervical cancer screening programmes have successfully reduced the incidence of and mortality from cervical cancer in several countries. Similar findings were identified in Slovenia after the implementation of the population-based, organised cervical cancer screening national programme (NP) ZORA. The NP ZORA was implemented in 2003 with conventional cytology in three-year screening intervals in women aged 20–64. The programme is managed by the Institute of Oncology Ljubljana, where the central screening registry is based. Since cervical cancer screening is implemented within the primary health care system, all Slovenian gynaecologists are involved in the programme, as well as nine cytopathology, eleven histopathology, and two laboratories for HPV testing. The programme was well accepted among the Slovenian women. The three-year coverage of the target population with a screening test is just above 70 percent, and its five-year coverage is just above 80 percent. Slovenia is among the European countries with the highest historical cervical cancer incidence rates, but is also among the countries with the most pronounced decline in cervical cancer incidence rates over time. After the implementation of the ZORA NP, cervical cancer incidence almost halved. The lowest age-standardised incidence rate (world standard) was reported in 2014 (6.8/100,000), and the lowest mortality rate in 2016 (1.7/100,000). These results place Slovenia among the European countries with the lowest cervical cancer incidence and mortality. However, this has not always been the case. During the first years after the implementation of the Cancer Registry of Republic of Slovenia, namely from 1962 to 1965, cervical cancer was the second most common cancer in women. The highest registered incidence in Slovenia was reported in 1962 (27.5/100,000), which is comparable to the cervical cancer incidence in Africa today. A recent European study published in 2015 showed that Slovenia is not only among the European countries with the historically highest incidence of cervical cancer, but also among the countries that offer organised screening and have managed to reduce this incidence to the greatest extent possible. Mortality rate reports are available from year 1985, when the age-standardised cervical cancer mortality rate was 5.4/100,000. Decrease in cervical cancer incidence in Slovenia is a result of efficient detection and treatment of pre-cancerous cervical lesions within the ZORA NP, and the reduction in mortality rate of cervical cancers patients is a result of cancer detection in early stages and more effective treatment.

Crude and age-standardised (world standard) incidence and mortality rates for cervical cancer, Slovenia, 1960–2015



DORA Screening Programme for Breast Cancer

The DORA national breast cancer screening programme provides biennial mammography screening for women aged 50-69 years by sending personal invitations with fixed appointment. The programme is centralised with one managing, implementation, training and auditing unit at IO. The objective of the programme is to reduce breast cancer mortality in the target group by 25 to 30 percent. Breast cancer is the leading cancer site in women.

The rollout of the DORA programme started in 2008 in the central Slovenian region and has been gradually expanding ever since. In 2017, the programme reached an important milestone. In accordance with the Strategic Plan, new stationary screening centres were established in all regional units of the Health Insurance Institute of Slovenia (HIIS), and the programme became available to all Slovenian women aged 50 to 69. Screening mammography is now performed in all regional HIIS units, namely in DORA centres that are found in health institutions (hospitals and community health centres). Radiographers from IO also perform screening mammography in three mobile units of the DORA programme, found at different locations. Altogether, The DORA programme combines **20 full-field digital mammographs** in screening units across Slovenia.

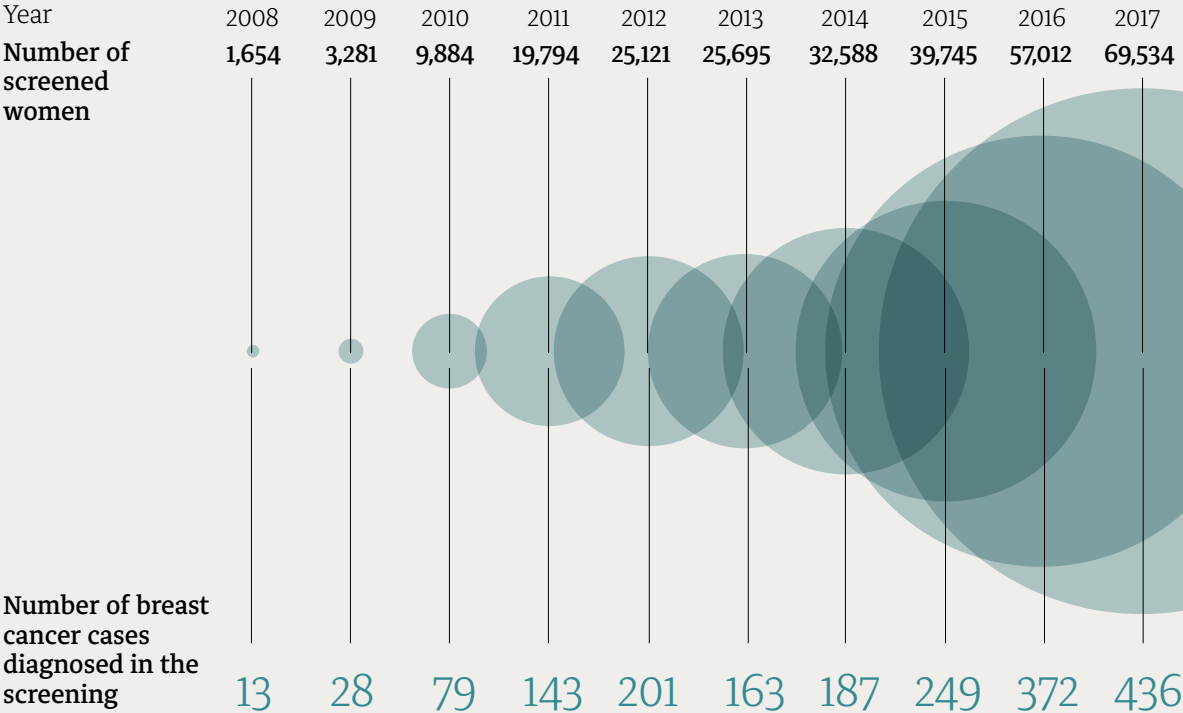
Since the beginning, the programme has taken a comprehensive approach to quality assurance as recommended in the European guidelines for quality assurance in breast cancer screening and diagnosis, 4th edition. All screening units work in accordance with **unified standard operating procedures**, and are subject to **regular professional quality** control. Additional examinations and screened-detected breast cancer treatment are currently performed only at the screening and diagnostic centre at IO in Ljubljana.

In 10 years, over 200,000 women have been invited to the DORA programme, screening mammography has been performed 350,000 times, and over 2,000 women have been diagnosed with breast cancer. In most of these cases, women were unable to palpate a tumour in the breast by themselves. The average participation rate in the DORA programme is 73 percent, which proves that the programme is well accepted and effective. In the Slovenian health system, the programme is recognised as a high-quality medical service that shows clearly measurable effects. This is made possible with regular employee trainings that are included in the programme, with coherent information technology, and a comprehensive quality assurance system. DORA, with its early detection and early treatment of cancer, provides a better treatment outcome and a higher quality of life of women diagnosed with breast cancer. Today, the DORA programme is also a good practice example for breast cancer screening programmes in both Europe and the world.

Stationary screening units in the DORA programme



Number of women
screened in the
DORA programme,
2008–2017



Care for patients

The comprehensive care for cancer patients is only possible in specialised institutions like, for example, IO. Such care includes diagnostic and therapeutic patient treatment, and suitable health care during and after the treatment. For an effective treatment of the patient, additional specialised health activities are required that provide adequate support to the patient. These include dietary, psychological, and palliative care. At IO, all the above activities are connected and combined by specialised multidisciplinary teams, enabling all the patient’s needs to be satisfied to the greatest possible extent.

Diagnostics

Existing diagnostic procedures are constantly upgraded and new procedures developed through technological advancements. IO is trying to the best of its abilities to follow these trends and regularly introduce new diagnostic procedures in molecular, pathological, cytopathological, imaging, and functional diagnostics. In **molecular, pathological, and cytopathological diagnostics**, new techniques and methods for better identification of different types and characteristics of tumours are being introduced. These procedures are also used for the recognition of specific molecular markers or targets in cells for the application of so-called targeted drugs. These drugs have an impact on the “target” within the cell, preventing specific activities of the tumour cell linked to its immortality. This enables tailored-made treatments for individual patients and their tumours,

which provides the best possible anti-tumour effect of the drug with the fewest possible undesired side effects. At IO, we also identify the presence of hereditary molecular genetic markers. We also offer **genetic counselling** to persons carrying mutated genes.

We are introducing new techniques in **imaging and functional diagnostics**. These are becoming increasingly focused on recognising specific biological and physiological characteristics of tissues. Perfecting the existing and searching for new methods is important for an exact identification of the site and the extent of tumour growth and its characteristics. The latter which play an important role in predicting the reaction of tumours to treatment and the disease outcome.

In the field of clinical biochemistry (haematological and biochemical examinations), the main focus is on the **accuracy of trials and the adequate capacity of laboratories**, which IO ensures by constantly introducing the newest technological solutions.

Professional work

IO uses all the modern methods of oncological treatment: surgery, radiotherapy, and systemic treatment. The different types of treatment available at IO make sure that the patients are always, if so required, treated multi-modally. These treatments are all in accordance with modern principles and professional knowledge, and make use of state-of-the-art technology. Simultaneous support of diagnostic services makes it possible to control the planning and the implementation of treatment and monitoring of treatment efficiency. Of course, safe and effective treatment is only possible when providing a patient with top-quality care, which allows for the preservation of the patient's human dignity, promoting their well-being in general.

Treatment quality assurance

The growing knowledge of cancer and cancer treatment is increasing the already large amount of information. This is why specialisations in individual groups of professionals are inevitable. In the framework of the different oncology services, the demand for specialists in all the different, highly specific fields – e.g. specialists for blood cancers or different types of solid cancers – is on the rise.

The optimal cancer treatment must be performed in accordance with the modern **guidelines**. In Slovenia, it is up to IO to prepare and regularly update these guidelines in cooperation with other partner institutions that treat cancer patients.

IO also creates new and updates the current **clinical pathways** that determine the procedure (protocol of activity) at a certain point in cancer patient treatment when dealing with a certain health situation.

Clinical trials that are conducted at IO enable patients the access to new treatments that are not yet widely available or are not being used regularly. These treatments are precisely defined in the trial's protocol, which also determines the selection of patients to be treated.

The consulting service at IO comprises a multidisciplinary medical consulting network that takes place at IO and some other health institutions. It provides consultations and, to some extent, the control of implementing specific cancer treatments at other centres that only provide certain types of treatment.

Due to the fast advancement and development of new diagnostic methods, professional staff **training** is a key factor that ensures an adequate quality and successful professional work. The employees at IO regularly take part in trainings and attend professional events that are organised internally at IO and other institutions, mostly abroad. Free access to professional and scientific literature or databases, which they can access through **the services of the IO's professional library**, enables them to stay in touch with the newest trends within their sphere and profession.

The pharmacy plays a key role in the centralised and controlled preparation of drugs for systemic treatment. The centralised preparation of cancer drugs ensures a high-quality and safe treatment and a cost-effective use of drugs. Clinical pharmacists offer physicians advice on the use of medicines and possible drug interactions, provide centralised data collection and reports on adverse drug reactions of drugs used at IO, and manage the registries on the use of all drugs and medical devices.

A proper nutrition is also very important in the provision of high-quality cancer treatment and the patient's successful rehabilitation after treatment, and is provided by the professionals at the **Unit for Clinical Nutrition and Dietotherapy**.

IO also provides **palliative care** services for comprehensive management of patients with incurable diseases, and assistance to their family members. This includes managing physical symptoms, providing care, and mitigating various emotional, social, and mental difficulties. The purpose of palliative care is to maintain an optimal quality of life in cancer patients with an incurable disease, both during the specific treatment and after the treatment has been concluded. During the disease, passing, and mourning phases, assistance is also provided to family members.

Introduction of new diagnostic procedures and treatments

An important task of IO is also the introduction of new diagnostic procedures and treatments in the field of oncology in Slovenia. Considering that these procedures and treatments are usually very expensive, a prior well-considered decision regarding their necessity and planned extent is required. The opinions of IO's **Board of Experts** (RSK) in the field of oncology at national level play a vital role.

Education

As the main national institution for cancer treatment and research, IO also provides extensive education. **Education is included in all fields of activities** and are implemented at two levels. The first level includes education of the professional staff, including students from different Slovenian faculties in the field of health and natural sciences. The second level pertains to informing and educating the non-professional public.

As lecturers or mentors, the employees at IO take part in study programmes at both Faculties of Medicine and numerous other faculties in the field of health and natural sciences across all Slovenian universities. IO is involved in education at all three study levels: bachelor's degree, master's degree, and doctoral degree. The Chair of Oncology (previously the Chair of Oncology and Radiotherapy) at the Faculty of Medicine, University in Ljubljana, has had its domicile at IO since 1947. Many future specialists in different fields of oncology are being educated and trained at the pre-clinical and clinical units and departments at IO, especially medical oncologists and radiotherapists. For a short period, other residents of other specialties as well.

For the professional public, IO holds regular weekly presentations regarding the current developments or novelties across the different fields of IO's activities. The corresponding chambers evaluate these lectures and professional events with credit points, which are required for the renewal of professional licences. IO regularly publishes different publications for the professional and the non-professional public. Twenty-eight such publications were published in 2017 alone. In 2018, IO also published and issued a new university textbook entitled *Oncology*, which is intended for students of both Slovenian Faculties of Medicine and other interested parties. In order to present the problem of cancer to the wider public, the textbook is also freely available as an online publication on IO's website.

The employees at IO also take care of active self-education. They are aware that an investment into their education is necessary if they want to maintain the high quality of their work and keep following the modern professional and research trends in all the fields of IO's activities. Due to the specificities of the subject field and because IO is the only institution in Slovenia for comprehensive cancer treatment, these trainings are mostly held abroad. They are organised as short visits at different schools, workshops, and congresses, or as longer stays at other globally recognised oncological institutions. These types of trainings and education are also made possible by the important connections that IO and its professionals have made throughout the decades with important professional organisations in different fields, such as the International Atomic Energy Agency (IAEA), the European Society for Medical Oncology (ESMO), the European Society for Radiotherapy and Oncology (ESTRO), and the European Society of Surgical Oncology (ESSO).

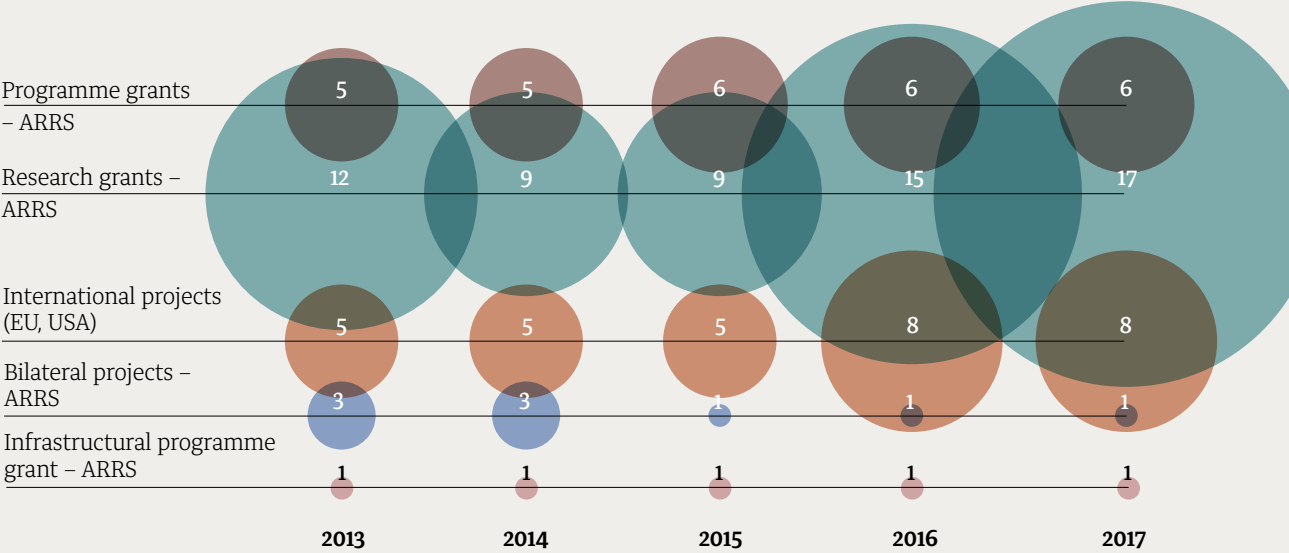
Research

Research represents an **integral part** of IO because all employees are required to take part in oncological research in line with the Institute’s mission. For the purpose of conducting research, IO is registered as a public institution with a concession given by the Public Research Agency of the Republic of Slovenia Research (ARRS), which enables the Institute to take part in calls for tenders by different Slovenian agencies and ministries. IO has its own committee for awarding scientific research titles that enable the registration of researchers at ARRS. At IO, there are 183 habilitated employees with a university degree and 20 technical and professional workers. The majority of research work is conducted as part of **one infrastructure and six research programmes**. These programmes are organised to cover all the basic activities of the institute: pre-clinical research, research in the fields of diagnostics, internal oncology, radiotherapy, genetic cancer, and gene counselling, and lately also medical physics. Heads of these research programmes are internationally recognised experts that guide the research. These programme groups also train and educate young researchers and other doctorate students who bring fresh and creative energy to the existing groups.

IO also has the **Department for Experimental Oncology** that exclusively performs research work. Pre-clinical and translation studies are performed independently of, in cooperation with IO’s clinical departments or other health and research institutions.

IO also performs numerous **research projects** that are more specific and focus on precisely defined research goals. These are the projects that were selected in tenders at the national level (ARRS) and the projects that were successful in obtaining the funds of the European Union and the United States of America. In 2017, IO formed the European Reference Network for Rare Adult Solid Cancer (EURACAN) in cooperation with other European centres and supported by the European Commission. Rare cancers are cancers with an annual incidence of less than six cases per 100,000 inhabitants, which represents 22% of all tumours or 4.3 million inhabitants of Europe. The survival rate of patients with rare cancers is worse compared to the patients with more common tumours. The EURACAN network includes 64 European centres of oncology from 17 countries, and 33 connected partners. The main purpose and objective of the project is to establish a network of multidisciplinary and research-focused oncology centres, capable of treating rare adult cancer. Besides actively cooperating in this reference network, IO is also included in the GENTURIS network, which is a European reference network in the field of rare genetic tumour syndromes that includes 23 centres from all around Europe.

Number of programmes and projects at IO



Clinical trials

In the field of clinical trials, IO mostly performs international **multicentre studies under the European Organisation for Research and Treatment of Cancer (EORTC)**. Some clinical trials are performed in cooperation with pharmaceutical companies, and some are developed by the researchers at IO.

There were 180 medical trials in 2017, of which 68 were clinical.

The concept (protocol) of every trial performed at IO is reviewed by a committee that assesses its proficiency and justification, providing an opinion on the possibilities of its implementation. IO also has an **ethical committee**. Members of the IO's ethical committee are medical professionals and, following the example of the National Medical Ethics Committee (KME RS), professionals from the fields of psychology, law, social sciences, humanities, and deontology. The role of the ethics committee is to protect the life and wellbeing of patients who want to take part in medical trials. These committees are managed by the Unit for Research and Educational Activities at IO (ERID).

The measure of good research work is the **number and quality of publications**. IO's researchers regularly publish the results of their research in renowned international scientific journals, including journals that are at the very top of the individual fields of oncology.

Bibliographic data
for the last five years

	2013	2014	2015	2016	2017
Independent publications	60	83	74	67	64
Chapters in scientific monographies	4	5	1	14	4
Scientific and academic articles	134	137	147	182	139
Scientific articles	96	110	101	129	87
of which in SCI journals	78	90	82	104	72
Popular articles	23	59	33	52	37
Complete reports and lectures	121	132	150	117	89
Published abstracts	193	139	192	210	222
Mentorships (Master's degree, Doctorates)	15	18	15	20	9

Significant support in carrying out the different activities at IO is also provided by the **specialised library**. The library supports professionals in their educational, professional, and research work, also providing materials for the students at Slovenian faculties who require information in the field of oncology.

Since 1997, IO had been publishing the scientific journal *Oncology*, which is distributed among all Slovenian physicians twice per year. The mission of this publication is to inform physicians and other members of the professional public of the activities and advancements in the field of oncology in Slovenia and worldwide.

Covers of the
publication
Onkologija
(Oncology)



Cooperation with the civil society

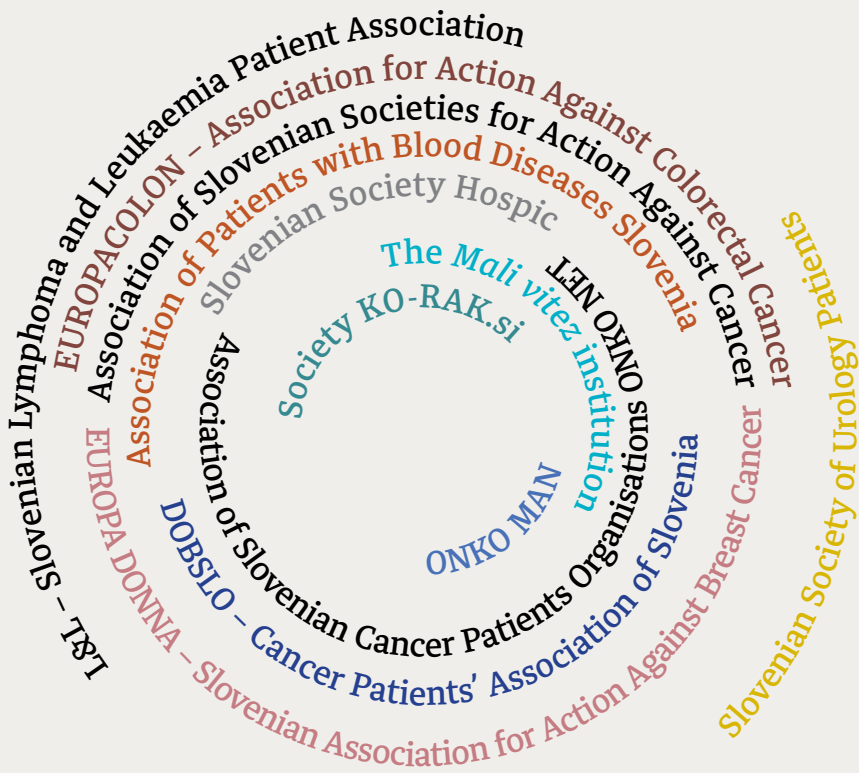
Volunteers

In the developed world, voluntary work is an established form of work in hospitals that translates into a better quality of life in patients, prevents burnouts of the hospital staff, and contributes a better understanding of the problems that hospitals are facing. Besides the high level of professional treatment provided by modern medicine and the professional IO staff, patients – those who wish and require so – also receive informal emotional and social assistance provided by volunteers. The main purpose of the voluntary assistance provided is to inform and socialise with patients and, if required, to accompany them to examinations and treatments at IO. IO introduced volunteering in 2006.

Societies and self-help groups

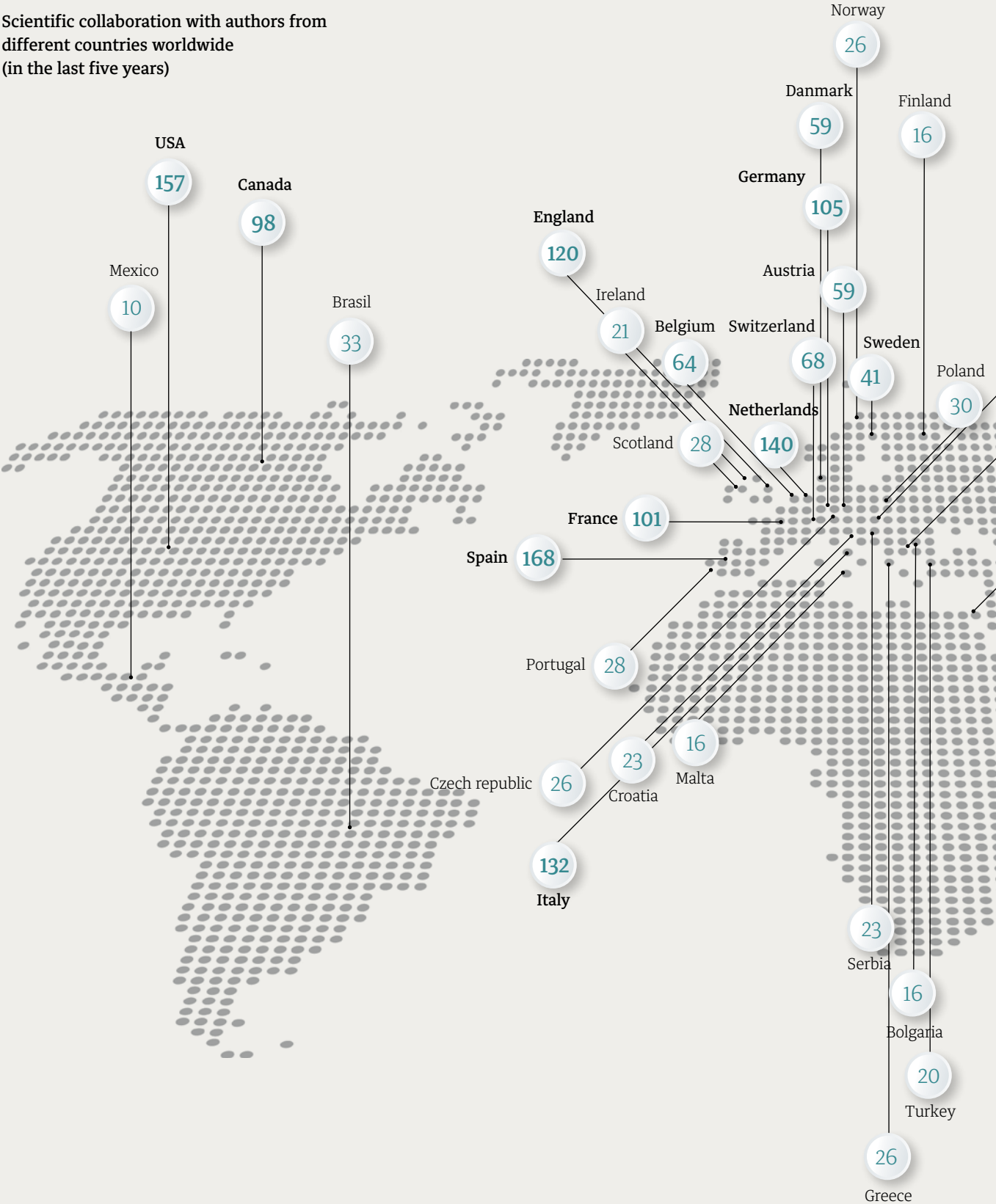
There are many self-help groups and association, which have been organised at IO for many years now. They play an important role in providing emotional and social assistance to patients; they complement the services provided by the health system and inform the wider public about cancer.

Societies that actively cooperate with IO

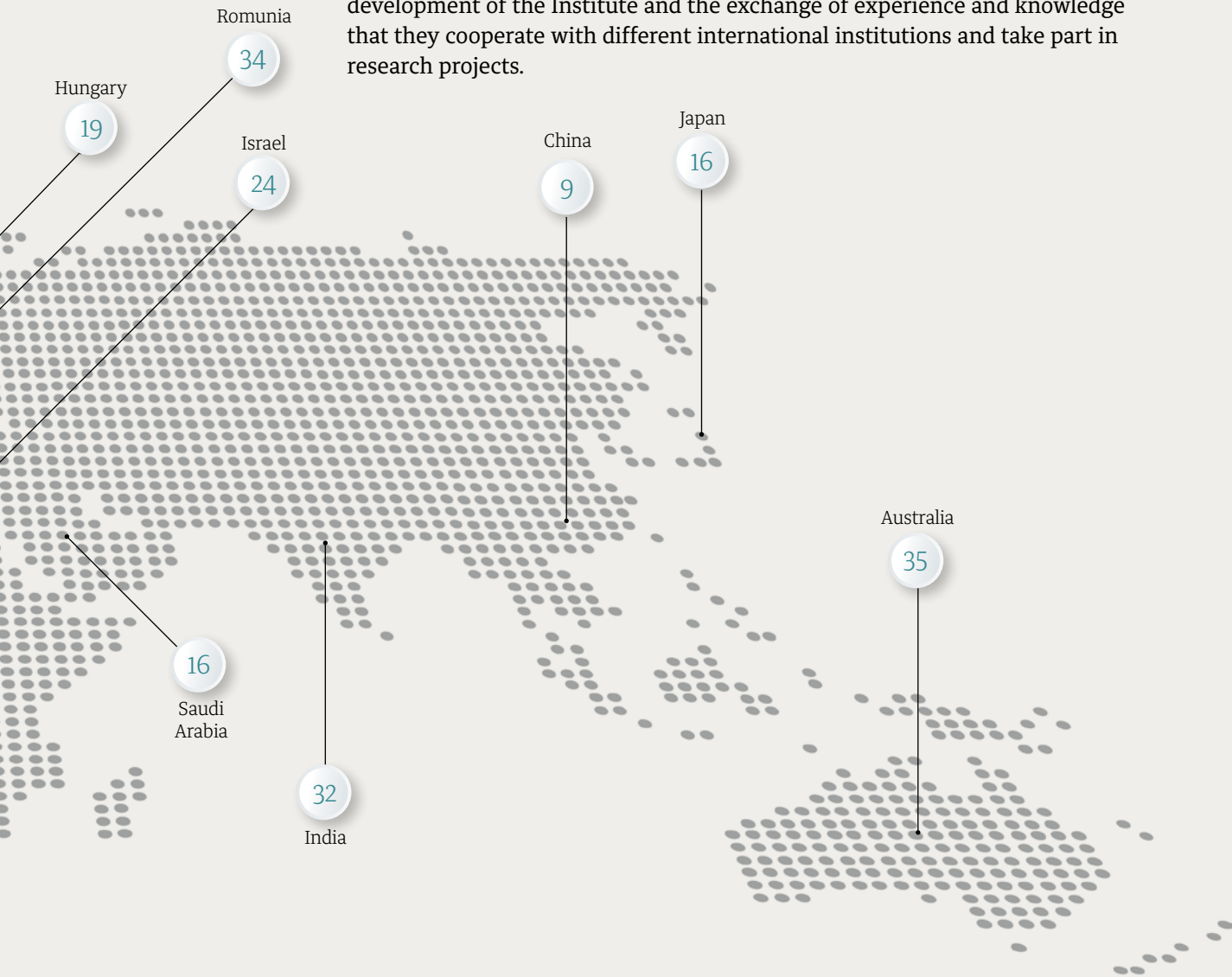


International cooperation of IO

Scientific collaboration with authors from different countries worldwide (in the last five years)



Professionals at IO regularly take part in international-level trainings, which enables them to achieve a high degree of specialisation and to follow the novelties in all fields of IO's activities. They participate in short (schools, lectures, seminars, and workshops) and long trainings at renowned foreign oncology centres to obtain new knowledge and skills; and they make important connections that enable IO to cooperate with foreign institutions and jointly respond to international calls for tenders. It is necessary for the development of the Institute and the exchange of experience and knowledge that they cooperate with different international institutions and take part in research projects.



Professional work

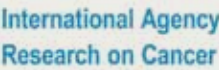
Because Slovenia is small, highly specialised professionals need to acquire an important part of their knowledge and experience internationally, especially by cooperating in international associations that were established to educate and promote the progress of the profession. IO's professionals are active members of many international associations like EORTC, ESMO, ESTRO, ESSO, European Association for Palliative Care (EAPC), and others. They also cooperate in different work groups, especially in EORTC, and attend scientific meetings. With their knowledge and experience, they are also welcome as lecturers at numerous renowned international professional meetings.

Education

The experts at IO work as lecturers and teachers at many international schools, courses, and workshops. As evaluators of doctoral theses, they are often guests at foreign universities. Every year, IO invites foreign experts from different professional groups that cooperate in different professional and other organisations (e.g. the International Atomic Energy Agency) to Slovenia to attend short and long professional trainings, mentored by IO's professionals.

Research

IO's research is basically a part of international research efforts. Scientific results are generally published internationally and can be achieved solely by IO's professionals or in cooperation with other foreign research groups. IO takes part and competes in international tenders for research projects in Europe and the USA. IO is currently implementing 13 such projects, and many have already been implemented and completed in the past. The Department for Experimental Oncology at IO is included in the LEA-EBAM virtual laboratory, which operates under the European Union.



Presentation of main clinical activities





Department of Nuclear Medicine

23
employees

5 specialised doctors (4 nuclear medicine specialists and 1 internal medicine specialist), 8 radiology engineers, 2 pharmacists, 2 nurses, 1 health technician, 1 electrical engineer, 2 administrators, and 2 attendants. One PhD employee.

Fields of work

The department performs conventional and hybrid nuclear medicine examinations for IO, other health institutions in Slovenia, and some clinics at the University Medical Centre Ljubljana. It is the only nuclear medicine department in Slovenia that provides radioiodine therapy for thyroid cancer patients, the treatment of metastatic and castration-resistant, metastatic prostate cancer with Radium-223 chloride (Xofigo), radionuclide therapy of neuroblastoma and other MIBG-avid tumours, and lymphoma treatments with marked antibodies. The department takes part in IO's medical board for thyroid diseases.

Key professional
and technological
achievements

- Introduction of hybrid imaging diagnostics using positron-emitting radiopharmaceuticals (PET/CT with 18-F-FDG and with 18-F-choline) or conventional radiopharmaceuticals (SPECT/CT).
- In cooperation with colleagues from the Department of Radiotherapy: radiation planning based on PET/CT results in patients with colorectal cancer, lung cancer, and oesophageal cancer, and women with genital malignancies.
- Cooperation on the development of the Slovenian guidelines for treating and monitoring thyroid cancer.
- In cooperation with colleagues from the Division of Surgery: verifying the suitability of isolated limb perfusion during an ongoing operative procedure (with 99mTc-labeled serum albumin and using a scintillation counter) in patients with melanoma.
- Introduction of the treatment of metastatic and castration-resistant prostate cancer using Radium-223 chloride.



Department of Radiology

46
employees

15 radiologists, 22 radiographers, 4 nurses, and 5 administrators. One PhD holder, two MSc holders, and one assistant professor.

Fields of work

Performs modern radiological examinations for cancer patients and potential cancer patients:

- MR examinations of the central nervous system, neck, breasts, abdomen, pelvis and skeleton;
- CT examination of the head, skeleton, chest, and abdomen;
- Mammography and intervention procedures in the breast;
- Ultrasound of the abdomen, breasts, neck, testis, soft tissues, as well as ultrasound-guided biopsies and ultrasound with contrast agents;
- X-ray of the skeleton and chest organs, and contrast examinations of the digestive system;

The department is completely equipped with digital imaging modalities, and all global trends are considered when acquiring new equipment.

Key professional and technological achievements

In the last 10 years, we have introduced four new methods: tomosynthesis that produces three-dimensional breast images, new examination techniques using MRI-like diffusion and perfusion, elastography in ultrasound imaging, and contrast-enhanced spectral mammography. We have also replaced multiple devices. Radiologists are part of the team in clinical trials and scientific studies. They are involved in the education of residents and medical students at the Faculties of Medicine, Faculties of Health Sciences and the Faculty of Mathematics and Physics.



Diagnostic Centre for Breast Diseases and the Unit for Screening Logistics and Planning / National Screening Programme for Breast Cancer – DORA

43
employees

IO's screening and diagnostics centre has 3 radiology specialists (doctors), 31 radiology engineers, 3 nurses (staff and senior), 5 health administrators, and 1 secretary. Two employees are MScs. There are another 13 stationary DORA screening centres at health institutions across Slovenia, in which mammography examinations are performed by 74 radiology engineers, who are employed by these health institutions but are additionally trained for the DORA programme.

Fields of work

IO also manages the National Screening Programme for Breast Cancer DORA, including the DORA screening and diagnostic centre and the DORA stationary screening centre. The DORA screening and diagnostic centre provides additional health treatment services to women who were previously examined in the DORA programme; and the DORA stationary screening centre, which also includes three mobile units, performs examinations on women.

Key professional and technological achievements

The biggest achievement is the expansion of the DORA programme to the whole country of Slovenia at the end of 2017. This provided all Slovenian women aged between 50 and 69 with an equal access to the system for early cancer detection and treatment. Since 2008, they have treated 180,000 women and detected 2,000 cases of breast cancer using screening mammography. In most cases, women could not feel the tumour themselves.

The DORA programme is recognised as a high-quality medical service that shows clearly measurable effects. This is made possible with regular employee trainings included in the programme, professional supervision, and a unified information technology (DORA application).



Department of Laboratory Diagnostics

25
employees

4 specialists in laboratory medicine, 1 MPhar – analyst, 7 laboratory medicine engineers, 13 laboratory technicians. Two employees are PhD holders and two are MSc holders.

Fields of work

The department is a medical laboratory that performs examinations in the field of clinical biochemistry on different types of biological samples (blood, urine, stool, bone marrow, and other). Modern analytical equipment enables a quick and reliable implementation of different haematological and urine examinations, coagulation tests, examinations of electrolytes, substrates, enzymes, serum protein electrophoresis, tumour markers, thyroid hormones, and antibodies.

Key professional
and technological
achievements

They have established a comprehensive quality-assurance system and met all the professional and technical requirements for a license granted by the Ministry of Health of the Republic of Slovenia based on the Rules on requirements to be met by laboratories performing laboratory medicine tests. In 2009, they received their first licence which has to be renewed every five years. They have introduced modern flow cytometry to haematological and urine diagnostics. They have also introduced capillary serum protein electrophoresis, many new laboratory examination techniques, mostly in the field of thyroid diagnostics (intact PTH, calcitonin), new tumour markers (SCC, proGRP, Cyfra-21, HE4, and CA 72-4), and biochemical examinations that are important in the monitoring of cancer patients (procalcitonin, NT-proBNP, testosterone, vitamin D, vitamin B12, folates, and others).



Department of Cytopathology

23
employees

5 cytopathologists, 1 pathology resident, 3 senior analysts in laboratory medicine, 4 analysts in laboratory medicine, 2 laboratory medicine engineers, 4 laboratory technicians, 3 administrators, 1 employed partly as an administrator and partly as a laboratory assistant. One employee is a MSc holder, five are PhD holders, and one is an associate professor.

Fields of work

The department performs cytopathological diagnostics for IO and other Slovenian health institutions. The outpatient clinic performs fine needle aspiration biopsies (FNAB) of palpable lumps and masses, skin scrapings, collection of nipple discharges, and smears. The laboratory processes and examines various cytological samples of patients suspected to have benign or malignant tumours. Immunocytochemical and flow-cytometric immunophenotyping techniques are used in difficult cases to obtain a more reliable cytopathological diagnosis. The laboratory also performs examinations of peripheral blood and bone marrow samples, as well as high-risk human papillomavirus (HPV) testing for women with low grade cytology abnormalities in PAP smear.

Key professional
and technological
achievements

In the last decade, the department has made significant progress, especially in the fields of cervical cancer diagnostics, immunocytochemistry and flow cytometry diagnostics of lymphoma and leukaemia. In the framework of the ZORA national organised screening programme, they started to perform triage tests for high-risk human papillomaviruses (HPV) with Hybrid Capture 2 Assay in 2010. Hybrid Capture 2 in 2010. With the development of new antibodies, immunocytochemistry became an important additional method for classifying malignant tumours and diagnosing cancer of unknown primary. In 2013, they joined the iBFM international consortium and started to provide flow cytometry diagnostics of minimal disease residues in children with acute lymphoblastic leukaemia for the whole Slovenia. Two years later, they received the first international certificate for performing these diagnostics. In 2015, the implementation of the 10-colour flow cytometer enabled more reliable diagnoses of lymphoma and leukaemia, especially in samples with few cells.



Department of Pathology

32
employees

8 pathology specialists, 3 independent analysts (chemistry and biology engineers, and a veterinarian), 3 laboratory medicine engineers, 13 laboratory technicians, 3 administrators, and 2 archivists. Four employees are PhD holders.

Fields of work

The department takes samples of tumour tissue, processes these samples, prepares histological preparations, and performs histochemical and immunohistochemical staining as well as fluorescent in situ hybridisation. Employees perform histological diagnostics, cooperate in multidisciplinary teams and medical councils, take part in trainings for technicians, engineers, pathology residents, and pathology and other specialists, and they cooperate in national and international trials.

Key professional
and technological
achievements

They introduced many new immunohistochemical and FISH examinations that enable the modern diagnostics of tumours and identification of biological markers that are decisive for determining the suitable patient treatment (CD20, CD30, ER, PR, MIB-1, ALK, HER2, MMRP, PD-L1, etc.). They regularly participate in multiple external quality-control schemes, in which they receive excellent reviews for the above examinations. By establishing multi-tumour networks, they cooperate in different IO studies; they test new antibodies and create internal quality control protocols for our trials and research.



Department of Molecular Diagnostics

10
employees

2 specialists in laboratory genetics (one is also a specialist in laboratory medicine), 3 independent analysts in laboratory medicine, 3 analysts in laboratory medicine, and 2 laboratory technicians. Five employees are PhD holders and one is a research full professor.

Fields of work

In hereditary types of cancer, the department identifies certain genetic changes to enable the early detection of mutation carriers, that are linked to a high risk of developing different types of cancer.

In case of sporadic forms of cancer, certain changes have to be identified that are important for predicting the development of the disease, the sub-classification of tumours, the recurrence of the disease, and for selecting the most suitable drugs and protocols for the so-called personalised treatment (treatment adapted to individual patients and their tumours).

Key professional
and technological
achievements

This professional and technological department performs molecular diagnostic methods for IO and other external institutions. They introduced the methods that enable exact identification of DNA changes from patient samples (e.g. the direct sequencing method, the multiplex ligation-dependent probe amplification (MLPA) method, and next generation sequencing). The employees are constantly educated to enable a high professional interpretation of the obtained results. The results of molecular diagnostics are indispensable for genetic counselling, cancer diagnostics, or treatment protocol selection (e.g. identification of changes in KRAS and NRAS genes in patients with metastatic colorectal cancer; identification of changes in BRAF gene in patients with metastatic colorectal cancer, metastatic melanoma, and thyroid cancer; determination of the clonality of lymphoid proliferations).

Division of Surgery



Department of Surgical Oncology

21
employees

16 surgical oncologists and 5 residents of general surgery
5 university professors, 11 PhDs, 1 MSc

Fields of work

The Department of Surgical Oncology treats patients with breast cancer, melanoma, colorectal cancer, liver metastases, sarcoma, thyroid cancer, and parathyroid diseases. They annually perform more than 3,400 major and more than 1,000 small surgical procedures. Operative procedures are performed in a classical, minimally invasive way, and procedures in the abdominal cavity are performed with the open or laparoscopic approach. They perform prevention activities, gene counselling, early cancer treatment, treatment of locoregionally advanced cancer and metastatic diseases, symptomatic treatment, and palliative treatment. They monitor patients and treat surgical complications of radiotherapy and systemic treatments.

Department of Gynaecological Oncology

5
employees

5 gynaecology and obstetrics specialists, 1 PhD

Fields of work

The Department of Gynaecological Oncology annually performs more than 320 major surgical procedures on patients with genital cancer. The majority of procedures are performed laparoscopically.



Department of Anaesthesiology and Intensive Therapy

20
employees

- Unit for Intensive Therapy and Reanimation
- Unit for Anaesthesia

13 anaesthesiology and reanimatology specialists
2 intensive medicine and infectology specialists, 5 residents
2 PhDs, 2 MScs

Fields of work

The Department of Anaesthesiology and Intensive Therapy provides anaesthesia to patients undergoing surgery and gynaecology patients. Anaesthesiologists perform reanimations of patients and, in the intensive care unit, treat patients with life-threatening complications. Members of the Unit for Pain Treatment take care of patients with severe pain and performs acupuncture.

Key professional
and technological
achievements

Numerous novelties are constantly being introduced in patient diagnostics and treatment, as is the case with top foreign centres. In recent years, surgical treatment is often individualised as part of personalised medicine that is adjusted to individual patients and their tumour characteristics. If possible, the operative procedure is performed with a single-day hospital stay, but new complex and painful surgical procedures (e.g. breast reconstruction, peritonectomy with hyperthermic intraperitoneal chemotherapy, isolated limb perfusion, etc.) require a longer hospitalisation.

Division of Medical Oncology



Department of Solid Cancer Treatment

27
employees

21 specialists in medical oncology, 5 residents in medical oncology, 1 young researcher, 6 university professors, 13 PhDs, 1 MSc

Department of Lymphoma Treatment

6
employees

4 specialists in medical oncology, 1 university professor, 3 PhDs, 2 residents in medical oncology

Department of Daily Hospital and Clinical Activities

Fields of work	<p>The Division of Internal Oncology provides systemic cancer treatment. The Department of Lymphoma Treatment performs treatments of lymphoma, plasmacytoma, and cancers of unknown primary; and the Department for Solid Cancer Treatment carries out treatments of melanoma and other skin cancers, gastrointestinal cancer, sarcoma, lung cancer, breast cancer, gynaecological cancers, urological cancers, head and neck cancers, rare cancers, and cancers of unknown primary. The employees provide prevention, gene counselling, diagnostics and early cancer treatments, treatment of locoregionally advanced cancer and metastatic diseases, and symptomatic and palliative treatment. They monitor patients and treat surgical complications of systemic treatments. They introduce new methods of systemic treatment and participate in international clinical trials, which provides their patients with an early access to new systemic treatments.</p>
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Key professional and technological achievements	In all filed of systemic treatment, they follow novelties and introduce them in both diagnostics and systemic treatments According to these trends and many biomarkers, systemic treatments are becoming more adapted to individual patients and the characteristics of their tumours; treatments are being individualised. Treatments are becoming more and more outpatient, enabling patients to remain in their home environments longer and, thus, improving the quality of their lives.
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Division of Radiotherapy



**Department of Teleradiotherapy,
Department of Brachyradiotherapy,
Department of Radiophysics, and Clinical departments**

163
employees

- 34 oncology and radiotherapy specialists (8 university professors, 13 PhDs, and 6 MScs)
- 16 oncology and radiotherapy residents (12 for IO and 4 for MB UMC)
- 9 medical physics specialists, 6 medical physicists, and 12 dosimetrists (1 university professor, 4 PhDs, and 2 MScs)
- 82 university graduate radiology engineers (1 PhD)
- 4 university graduate electrical engineers (2 MScs)

Fields of work

The Department for Radiotherapy treats more than 350 patients daily. Annually, the department treats over 5,000 patients and performs over 6,000 radiation therapies. The department includes six teams of doctors who treat different types of cancer. Besides the 3-dimensional conformal radiation therapy (3D CRT), they regularly perform all the most modern radiotherapy techniques: intensity-modulated radiation therapy (IMRT), volumetric-modulated arc therapy (VMAT), and stereotactic techniques like stereotactic radiosurgery (SRS) and stereotactic body radiotherapy (SBRT). They also use the deep inspiration breath-hold (DIBH) technique. Therapies are performed using eight linear accelerators and one therapeutic X-ray machine supervised by radiology engineers. Accuracy is ensured using routine image-guided radiotherapy (IGRT). They also regularly use the total body irradiation (TBI) technique. The preparation for radiation treatments takes place in two CT simulators, one MRI simulator, and one conventional simulator. In some treatment plannings, the PET CT machine at the Department of Nuclear Medicine can also be used.

The Department for Brachyradiotherapy annually performs approximately 500 therapies. They use 192-iridium sources and two afterloader machines that enable high dose rate and pulse dose rate radiations. In choroidal and retinal tumour

therapy, they use strontium-90 applicators. Intraluminal, interstitial, and surface techniques are used. In gynaecological and rectal tumour treatment, they use image-guided (CT/MR) adaptive brachytherapy.

The Department for Radiophysics performs the planning of tele-radiotherapeutic and brachyradiotherapeutic treatments. Together with the maintenance staff of these machines, medical physicians perform calibrations of radiation therapy machines and implement the quality assurance programme for the whole division. The department plays a vital role in the introduction of new radiation therapy techniques and the acquisition and calibration of new radiation therapy machines.

Clinical departments of the Division of Radiotherapy provide hospital care to patients that require care during or after treatment (poor general state, additional diagnostic examinations, and treatment of radiation therapy side effects). The H2 Department has 56 beds and the Department of Brachyradiotherapy has 10 beds.

Key professional and technological achievements

IO is the only hospital in Slovenia that performs all radiation therapy procedures, regardless of their complexity, in adult and paediatric cancer patients alike. The extreme amount of work performed places us among the top radiotherapy centres in Europe. Internationally acknowledged high proficiency and excellence enable the Division of Radiotherapy to serve as a learning centre of the International Atomic Energy Agency (IAEA) for teaching foreign professionals in the field of radiotherapy.

For some years now, the Department of Brachyradiotherapy has been known as Varian's reference centre for teaching the newest brachytherapy techniques, known for its pioneering work in the field of building and applying individual applicators for the radiation therapy of gynaecological tumours. Also worth pointing out is the total body irradiation translation technique using a linear accelerator, designed by local professionals.

Joint health services



Fields of work

Common health services are support services for patients treated at all the departments of IO, and are organised in eight organisational units. Employees perform specialised activities in the field of palliative care, neurology, psycho-oncology, gene counselling, clinical nutrition, and physiotherapy. All these fields are recognised as important parts of comprehensive treatment of cancer patients, be they outpatient or inpatient. All services provided at IO are supported by the health administration, which provides the processing and invoicing of services, communication with ZZSZS, and care for the quality and safety of treatments.

Department of Acute Palliative Care

5
employees

2 medical oncologists, 1 coordinator of palliative care, and 1 nurse, all with additional knowledge of palliative care, 1 PhD

Key professional achievements

The Department of Acute Palliative Care, which has been in operation for 11 years, provides specialised palliative services, develops early palliative care, and integrates palliative care into the treatment of patients with incurable diseases. It represents one of the key pillars of the National Palliative Care Programme.



Clinical Nutrition and Dietotherapy

12
employees

2 anaesthesiology specialists (2 with additional knowledge of clinical nutrition),
1 doctor, 3 nurses, 5 clinical dietitians, 1 PhD, 1 university professor,
1 resident in medical oncology

Key professional
achievements

In 2008, the Unit for Clinical Nutrition and Dietotherapy was the first in Slovenia to implement a professional multi-disciplinary approach to dietary therapy in all the phases of cancer treatment. In 2017, a clinical path of dietary support and therapy has been established in accordance with the professional guidelines for clinical nutrition. A special clinical department for treatment of gastrointestinal disorders and gastrointestinal failure operates within the framework of the Unit for Clinical Nutrition and Dietotherapy, which also treats patients with other diseases. As the first in Slovenia, the Unit has developed a system of supplementary therapy for gastrointestinal failure which is also provided in the form of home therapy. The Unit is included in the European registry for chronic intestinal failure. The Unit for Clinical Nutrition and Dietotherapy conducts research and continuously provides education in the field of clinical nutrition. The employees are included in pedagogical processes at higher-education institutions and are integrated at all the levels of health care provision. They also work with different patient associations and provide a professional lever for the implementation of systemic regulations in the field of clinical nutrition in Slovenia.



Genetic counselling – The Department of Oncogenetics

7
employees

2 specialists (clinical genetics and public health), 1 resident (clinical genetics – first specialization medical oncology), 3 nurses with a university degree, and 1 person with a postgraduate degree in quality management.

Fields of work

The Department provides genetic counselling to cancer patients whenever the results of genetic testing are important for the planning of oncological treatment and whenever there is a risk that the patient has developed their disease based on a hereditary genetic disorder. The Department also provides counselling to the patients' family members whenever test results indicate a necessity for the planning of early cancer detection and prevention. To this end, their clinic prepares a risk assessment based on the family anamnesis and the results of genetic testing.

Key professional
achievements

In 2018, the Department is celebrating the 10th anniversary of programme accreditation by the Health Insurance Institute of Slovenia. It is a successful demonstration of translating the research project conceptualized in 1999 into practice. In parallel with the development of molecular diagnostics, they have developed a therapy for all known hereditary cancer syndromes by means of sequencing a new generation. Their professional work in this field has resulted in the production and publication of the clinical pathway for genetic counselling and testing, as well as numerous publications on their professional work. In 2017, Department became a reference centre in the European reference network for genetic tumour risk syndromes (ERN GENTURIS), where they actively participate in various work groups.



Psycho-Oncology

4 employees	1 clinical psychology specialist, 2 psychologists, 1 nurse 1 MSc
Key professional achievements	In psycho-oncology, psychotherapeutic treatment according to the cognitive behavioural therapy became part of regular clinical practice.

Neurology

1 employee	1 neurology specialist 1 MSc
Key professional achievements	IO is one of few oncology centres in Europe that includes the neuro-oncological treatment of patients, which qualitatively contributes to a more optimal multidisciplinary treatment of patients.



Physiotherapy

5

employees

5 physiotherapists graduates (2 physiotherapists with special skills)

Fields of work

We perform individual physiotherapeutic treatment of cancer patients at departments, intensive care units and in the physiotherapy unit. With various physiotherapy procedures, we develop and maintain the psychophysical condition of patients.

Key professional achievements

The field of physiotherapy is developing both in the direction of acquiring new specialised knowledge of physiotherapists and modern equipment for a high-quality implementation of these services.

Health Administration

42
employees

The manager and 41 health administrators

Accounting and Invoicing

8
employees

The manger and 7 accountants

Quality Assurance

2
employees

2 employees with education in economical and natural sciences and organisational sciences.

Key professional and technological achievements

An important step in the development is also the automated transfer of data through the information system and electronic document management, in addition to the established system of quality indicator monitoring.

Division of Nursing and Care for Patients



409
employees

The services of the Division of Nursing and Care for Patients are performed in outpatient (650 to 750 treatments per day) and inpatient settings (on 265 hospital beds). The Division of Nursing and Care for Patients employs 173 registered nurses responsible for providing cancer nursing care, 166 technicians, 11 orderlies, 4 social workers, 3 sanitary engineers, and 52 attendants.

Knowledge and skills are defined in the document called Knowledge Map that is continuously updated and developed by employees of all professional groups. Employees in this division comply with the guidelines for cancer nursing and the principle of the professional ethics code.

Fields of work

Departments and units of the Division of Nursing and Care for Patients independently perform and actively participate in the comprehensive care for cancer patients and their family members. They are active in the fields of diagnostics, specific and support cancer treatment, and rehabilitation of cancer patients. They always comply with the principles of safe and high-quality cancer nursing care.

Key professional achievements

In the last decade, the achievements of the departments and units of the Division of Nursing and Care for Patients can be summed up in three visible areas: technological (informatisation and modern equipment), professional (evidence-based practice), and organisational (modern knowledge and solutions for work management and organisation at all levels, and improving the skill mix in cancer nursing care).

Pharmacy



23
employees

7 MPhars, clinical pharmacy specialists (1 PhD)
1 MPhar
14 pharmacy technicians (2 part-time employees)
1 finance accountant

Fields of work

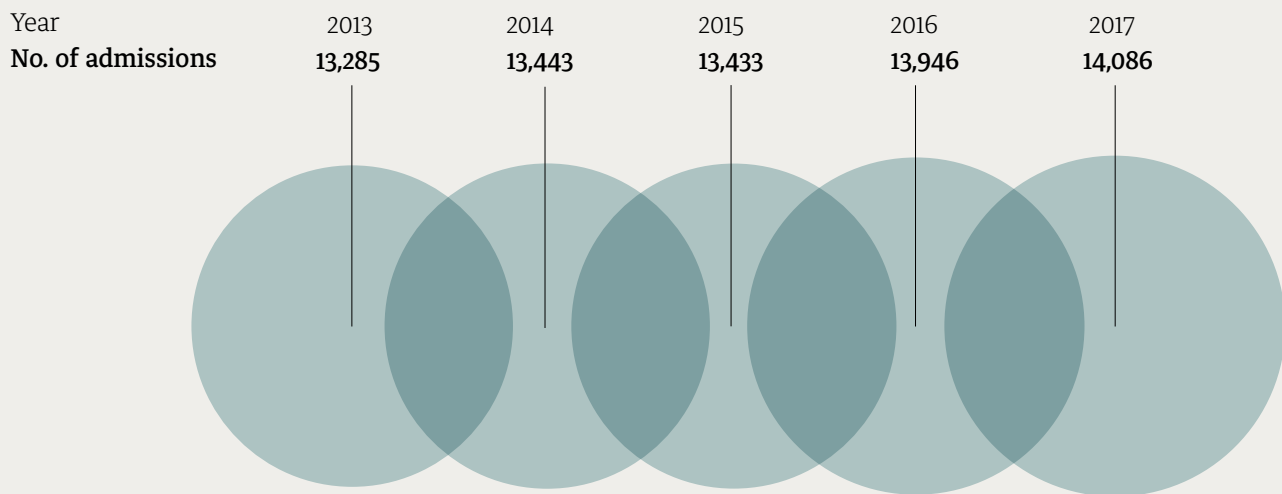
The pharmacy procure, stores and dispenses all medicines, medical devices and medical consumable goods to all IO units. One of the main activities of the pharmacy is centralised, computer-supported preparation of antitumor drugs for patients. We provide safe, high-quality, and efficient treatment with medicines within clinical pharmacy, report on adverse drug reactions, participate in all clinical trials, cooperate with other health workers, and participate in trainings and counselling.

Key professional and technological achievements

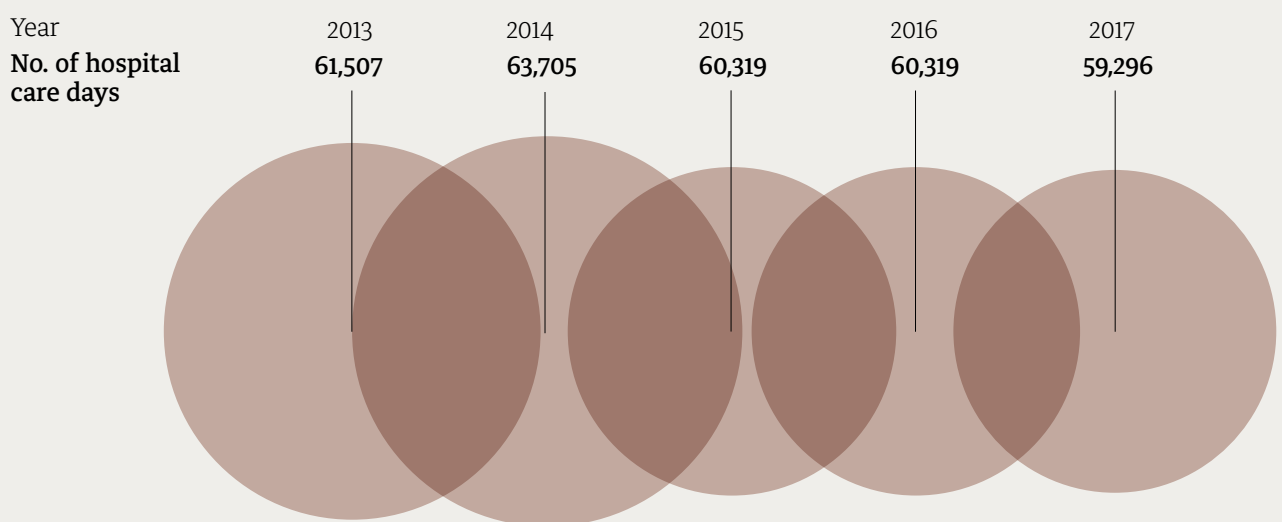
Recently, the pharmacy has acquired new facilities for the aseptic preparation of antitumor drugs that enable the preparation of drugs in accordance with the newest guidelines for good manufacturing practice (GMP). In the professional field, they strive for a better recognition and the development of oncology pharmacy. They educate and inform pharmacy students, clinical pharmacy residents, and other health workers about the novelties in the field of oncological pharmacotherapy, and they actively participate in Slovenian and international professional associations. They cooperated on the establishment of the system for e-reporting on adverse drug reactions, and on the international EPIC project that is establishing a continuous programme for educating pharmacists and a database with information on oral antitumor drugs for better cancer treatment results.

IO in numbers

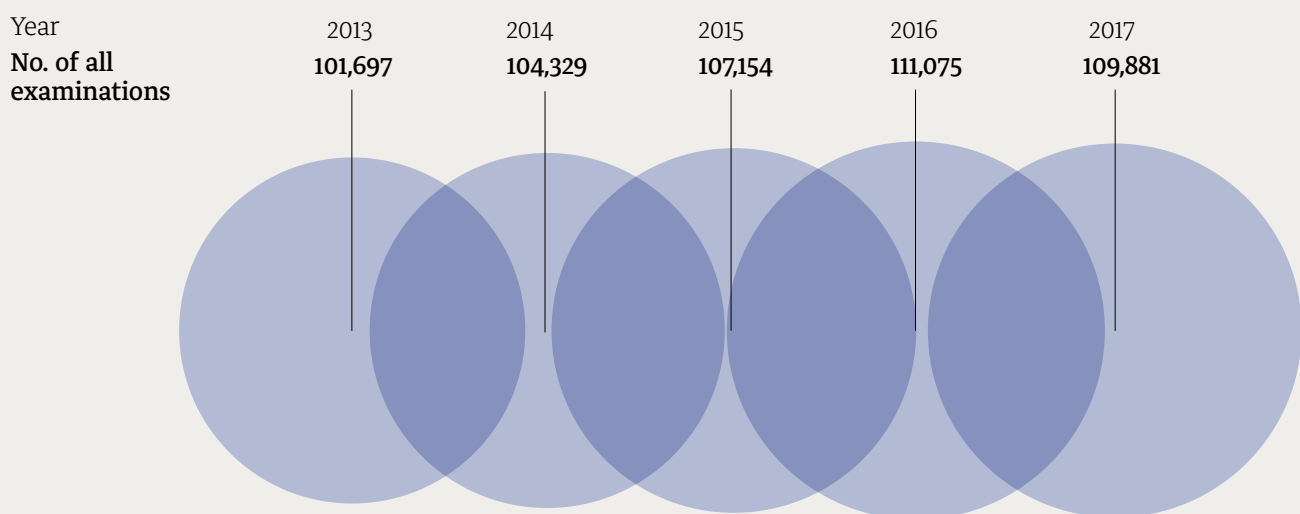




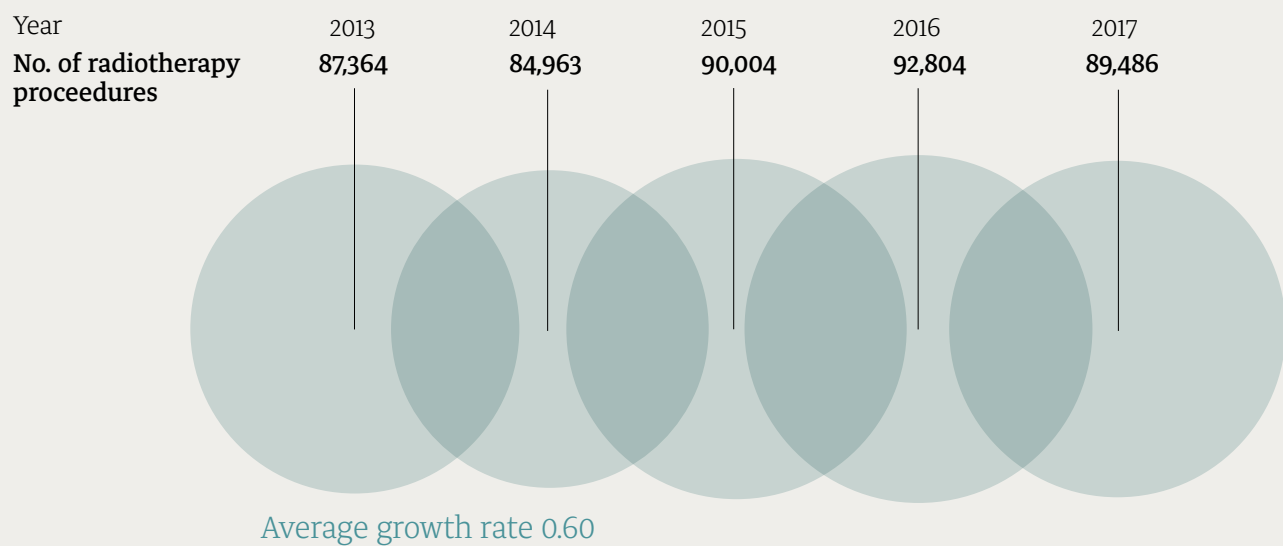
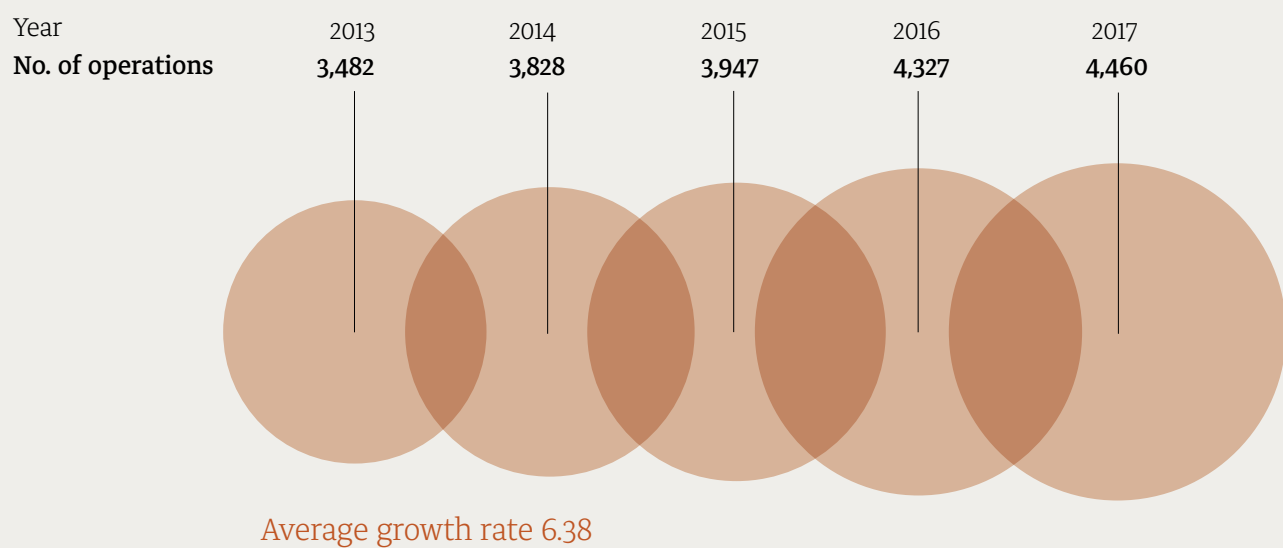
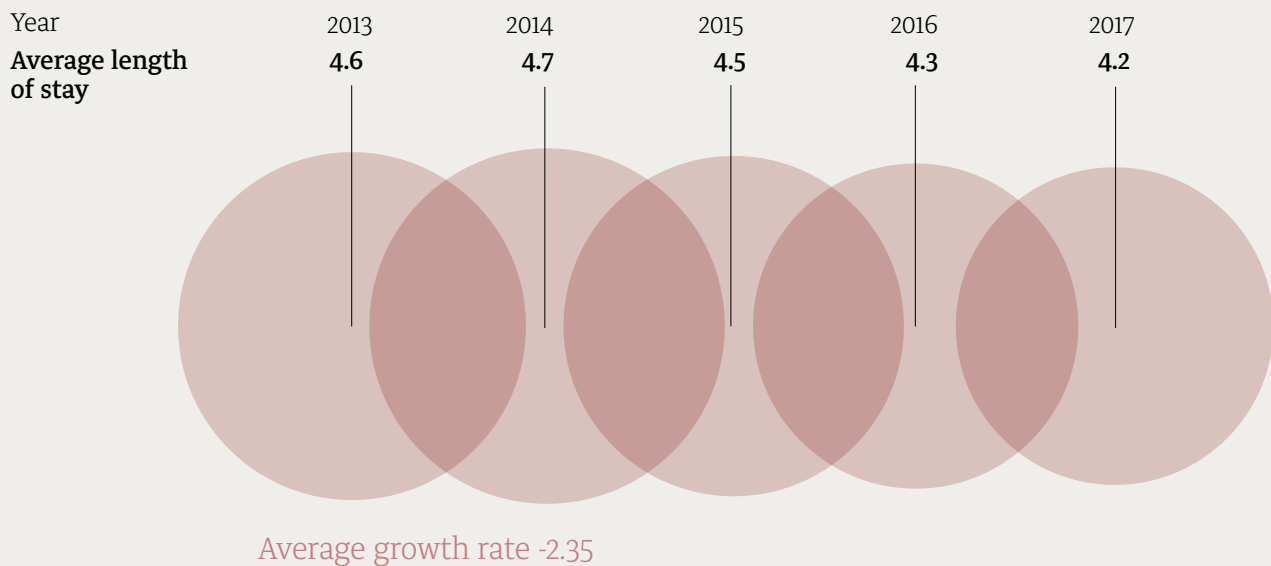
Average growth rate 1.47%

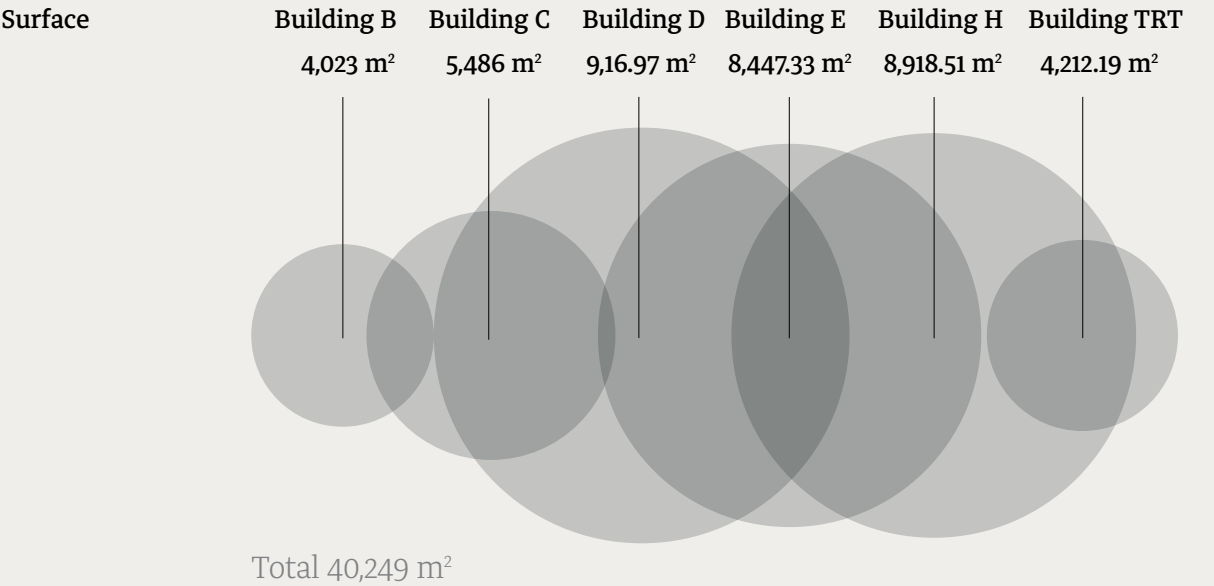


Average growth rate -0.91



Average growth rate 1.95





Number of employees

	31. 12. 2013	31. 12. 2017
Specialists	127	147
clinical services	89	103
diagnostic services	29	35
other services	9	9
Residents	23	33
young MDs without specialization	0	9
Young researchers - PhD students	6	7
Other health workers	277	315
Nurses in medical care	317	356
Health administration	60	74
Hospital attendants	55	57
Other service workers	48	55
Management employees	48	58
Total	961	1111

Golden sponsor



Silver sponsor



Bronze sponsor



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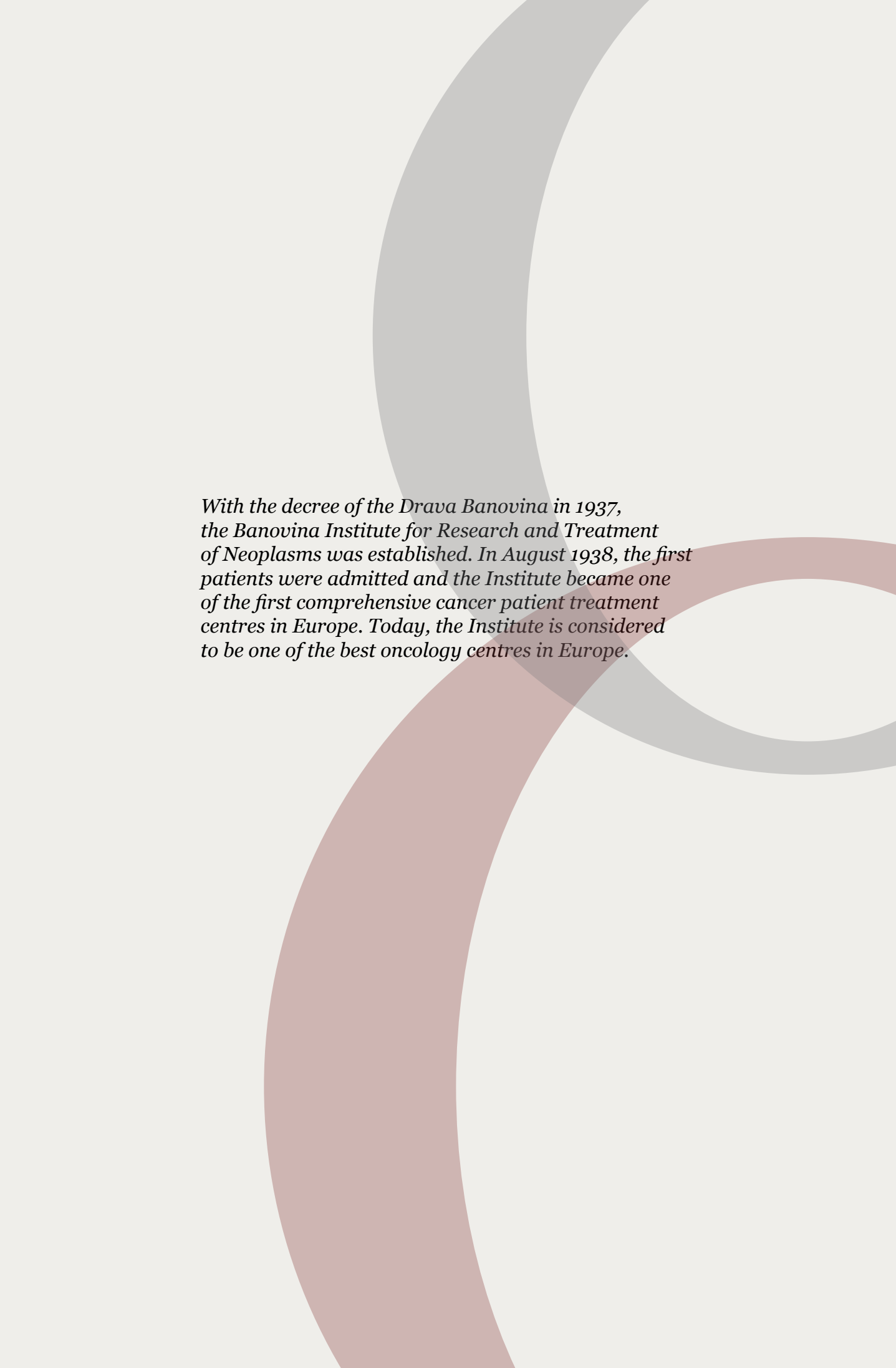
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With the decree of the Drava Banovina in 1937, the Banovina Institute for Research and Treatment of Neoplasms was established. In August 1938, the first patients were admitted and the Institute became one of the first comprehensive cancer patient treatment centres in Europe. Today, the Institute is considered to be one of the best oncology centres in Europe.