

## HUMAN RESOURCES FOR TREATING NEW CANCER CASES IN BELARUS

### Executive Summary

The purpose of this report is to describe the human resources needed in Belarus to treat new cancer patients. The population of Belarus is approximately 9.53 million (4.43 million men and 5.1 million women) and the estimated number of new cancer cases in Belarus for the year 2012, based on GLOBOCAN data (<http://globocan.iarc.fr/>) for Belarus as a whole was 32422 (16441 in men and 15981 in women) (Table A).

The five most common cancers in Belarus are (1) urological (bladder, kidney, prostate and testis), (2) lung, (3) colorectal, (4) breast and (5) gynecological (cervix uteri, corpus uteri and ovary).

Table A: The ten most frequently occurring cancers in Belarus for men and women based on 2012 GLOBOCAN data.

Cancer	BOTH SEXES		MEN		WOMEN	
	Incidence	Rank	Incidence	Rank	Incidence	Rank
All cancers excl. non-melanoma skin cancer	32422		16441		15981	
Urological	4927	1	4072	1	855	7
Lung	4012	2	3419	2	593	8
Colorectal	4004	3	1888	3	2116	3
Breast	3781	4			3781	1
Gynecological	3202	5			3202	2
Stomach	2961	6	1769	5	1192	4
Head and Neck	2886	7	1801	4	1085	5
Hematological	2111	8	1060	6	1051	6
Pancreas	809	9	442	7	367	9
Melanoma of skin	576	10	212	10	364	10
Brain, nervous system	501	11	240	9	261	11
Esophagus	451	12	410	8	41	14
Liver	327	13	201	11	126	13
Gallbladder	218	14	79	12	139	12

Kaposi sarcoma	15	15	12	13	3	15
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Newly diagnosed cancer patients need pathology, surgery, chemotherapy and/or radiation therapy. The number of oncologists needed is based, therefore, on the number of patients requiring pathology, surgery, chemotherapy and radiation therapy (Table B). This number is estimated from the percentage of patients requiring surgery, chemotherapy and/or radiation therapy for the top ten cancers in both men and women.

For developing countries the International Atomic Energy Agency (IAEA) recommends training Radiation/Clinical Oncologists who can prescribe both radiation and chemotherapy for the common solid cancers, instead of separate medical and radiation oncologists. Hematological malignancies are treated primarily by hematologist-oncologists. The number of specialists needed is based upon the number of cancer patients but each city, in order to ensure coverage if one person leaves or goes on vacation, must have at least 2 surgical oncologists, 2 radiation/clinical oncologists, 2 hematologist oncologists, etc.

Table B: Number of Oncologists needed for Belarus's 2 most populous cities based on 2014 population estimates (<http://citypopulation.de/>) and 2012 GLOBOCAN data for new cancer cases.

	Population	New Cancer Cases	Hematologist Oncologists	Surgical Oncologists	Radiation / Clinical Oncologists	Urologic Oncologists	Gynecologic Oncologists	Pathologists
Minsk	1921807	6541	2	7	33	3	2	14
Homel	512314	1744	2 <sup>¥</sup>	2	9	2 <sup>¥</sup>	2 <sup>¥</sup>	4

<sup>¥</sup>At least 2 are needed in each city.

In addition to oncologists, support staff such as onco-pharmacists, pharmacy technicians, oncology nurses and palliative care specialists is also needed. Many cancer patients require hospitalization for diagnosis, treatment and/or complications, therefore an adequate number of oncology beds will be needed. The number of oncology nurses, onco-pharmacists and pharmacy technicians needed is based upon the number of beds occupied daily by cancer patients while the number of palliative care specialists is based on the number of new cancer cases per year (Table C). The oncology nursing staff for each 24-bed oncology unit (operating 24 hours a day, 7 days a week) comprises of one head nurse and a nurse specialist as well as 13 nurses working 8 hour shifts, 5 days per week.

Table C: Number of Oncology Units, Nursing and Pharmacy Staff needed for Belarus's 2 most populous cities based on 2014 population estimates and 2012 GLOBOCAN data for new cancer cases.

	New Cancer Cases	Maximum # of beds/day	# of 24 bed oncology wards	Onco-Pharmacists	Onco-Pharmacy Technicians	Palliative Care Specialists	Oncology Nursing Staff other than Radiation Oncology Nurses
Minsk	6541	116	5	20	30	14	75

Homel	1744	31	2	8	12	4	30
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Since many cancer patients require radiotherapy, appropriately equipped facilities will be needed along with radiation oncology staff (Tables D and E). Radiation oncology staff includes radiation therapy technicians, medical physicists, Linac engineers and radiation oncology nurses in addition to radiation/clinical oncologists. The minimum radiation therapy equipment requirements are at least one of each: Linac, brachytherapy unit, CT simulator, treatment planning computer and dosimetry/quality assurance package.

Table D: Radiation Therapy Staff needed for Belarus’s 2 most populous cities based on 2014 population estimates and 2012 GLOBOCAN data for new cancer cases.

	New Cancer Cases	Radiation / Clinical Oncologists	Radiation Therapy Technicians	Medical Physicists	Linac Engineers	Radiation Oncology Nurses
Minsk	6541	33	44	15	4	15
Homel	1744	9	12	4	2 <sup>y</sup>	4

<sup>y</sup>At least 2 are needed in each city.

Table E: Radiation Therapy Equipment needed for Belarus’s 2 most populous cities based on 2014 population estimates and 2012 GLOBOCAN data for new cancer cases.

	New Cancer Cases	Linacs / Co 60 Megavolt Units	# of Brachytherapy units	# CT simulators	# of treatment planning computers	# of dosimetry/ QA package
Minsk	6541	8	4	4	4	4
Homel	1744	2	1	1	1	1

NOTE: Guidelines from the IAEA of the United Nations were used to calculate the radiation therapy equipment and staff needed in the setting of a developing country. Guidelines from the Oncology Nursing Society were used to calculate the number of nurses needed. Several other specialty societies were also requested to provide guidelines but in most cases there were none, therefore colleagues active in those fields were consulted for estimating the number of staff needed.