

HUMAN RESOURCES FOR TREATING NEW CANCER CASES IN BRAZIL

Executive Summary

The purpose of this report is to describe the human resources needed in Brazil to treat new cancer patients. The population of Brazil is approximately 198.36 million (97.55 million men and 100.80 million women) and the estimated number of new cancer cases in Brazil for the year 2012, based on GLOBOCAN data for Brazil as a whole (<http://globocan.iarc.fr/>) was 437592 (223077 in men and 214515 in women) (Table A).

The five most common cancers in Brazil are (1) urological (bladder, kidney, prostate and testis), (2) breast, (3) head and neck (lip, oral cavity, nasopharynx, other pharynx, larynx and thyroid), (4) lung and (5) colorectal.

Table A: The ten most frequently occurring cancers in Brazil 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	437592		223077		214515	
Urological	90588	1	85217	1	5371	9
Breast	67316	2			67316	1
Head and Neck	37755	3	20939	2	16816	4
Lung	34280	4	20235	3	14045	5
Colorectal	33949	5	16368	4	17581	3
Gynecological	30673	6			30673	2
Hematological	23369	7	12572	6	10797	6
Stomach	19690	8	12606	5	7084	7
Esophagus	12907	9	9713	7	3194	12
Brain, nervous system	11737	10	6129	8	5608	8
Pancreas	9871	11	4646	10	5225	10
Liver	9678	12	5766	9	3912	11

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 Brazil’s 2 most populous cities based on 2010 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	Neuro-Oncologists	Pathologists
São Paulo	11152344	24603	3	27	124	11	4	2	50
Rio de Janeiro	6320446	13944	2	16	70	6	2	1	28

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 Brazil’s 2 most populous cities based on 2010 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
São Paulo	24603	477	20	80	120	50	300
Rio de Janeiro	13944	271	12	48	72	28	180

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 Brazil's 2 most populous cities based on 2010 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
São Paulo	24603	124	189	63	16	63
Rio de Janeiro	13944	70	108	36	9	36

Table E: Radiation Therapy Equipment needed for Brazil's 2 most populous cities based on 2010 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
São Paulo	24603	32	16	16	16	16
Rio de Janeiro	13944	18	9	9	9	9

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.