

HUMAN RESOURCES FOR TREATING NEW CANCER CASES IN INDIA

Executive Summary

The purpose of this report is to describe the human resources needed in India to treat new cancer patients. The population of India is approximately 1.26 billion (649.47 million men and 608.88 million women) and the estimated number of new cancer cases in India for the year 2012, based on GLOBOCAN data (<http://globocan.iarc.fr/>) for India as a whole was 1014934 (477482 in men and 537452 in women) (Table A).

The five most common cancers in India are (1) gynecological (cervix uteri, corpus uteri and ovary), (2) head and neck (lip, oral cavity, nasopharynx, other pharynx, larynx and thyroid), (3) breast, (4) hematological malignancies (Hodgkin lymphoma, non-Hodgkin lymphoma, multiple myeloma and leukemia) and (5) lung.

Table A: The ten most frequently occurring cancers in India 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	1014934		477482		537452	
Gynecological	162003	1			162003	1
Head and Neck	158991	2	115393	1	43598	3
Breast	144937	3			144937	2
Hematological	71659	4	45445	3	26214	5
Lung	70275	5	53728	2	16547	7
Colorectal	64332	6	36917	6	27415	4

Stomach	63097	7	43386	4	19711	6
Urological	48324	8	42164	5	6160	12
Esophagus	41774	9	27152	7	14622	8
Liver	27416	10	17236	8	10180	10
Brain, nervous system	18831	11	11855	9	6976	11
Gallbladder	18787	12	7615	10	11172	9

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 India's 2 most populous cities based on 2011 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
Mumbai	18394912	14837	3	14	75	2	5	30
Delhi	16349831	13188	2	12	66	2	5	27

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 India's 2 most populous cities based on 2011 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
Mumbai	14837	248	11	44	66	30	165
Delhi	13188	221	10	40	60	27	150

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 India's 2 most populous cities based on 2011 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
Mumbai	14837	75	100	34	9	34
Delhi	13188	66	89	30	8	30

Table E: Radiation Therapy Equipment needed for India's 2 most populous cities based on 2011 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
Mumbai	14837	17	9	9	9	9

Delhi	13188	15	8	8	8	8
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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.