

HUMAN RESOURCES FOR TREATING NEW CANCER CASES IN BOLIVIA

Executive Summary

The purpose of this report is to describe the human resources needed in Bolivia to treat new cancer patients. The population of Bolivia is approximately 10.25 million (5.11 million men and 5.13 million women) and the estimated number of new cancer cases in Bolivia for the year 2012, based on GLOBOCAN data for Bolivia as a whole (<http://globocan.iarc.fr/>) was 11286 (4380 in men and 6906 in women) (Table A).

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

Table A: The ten most frequently occurring cancers in Bolivia 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	11286		4380		6906	
Gynecological	2475	1			2475	1
Urological	1326	2	1209	1	117	11
Breast	807	3			807	2
Hematological	706	4	408	2	298	7
Head and Neck	699	5	293	4	406	4
Colorectal	673	6	302	3	371	5
Gallbladder	584	7	156	7	428	3
Stomach	581	8	277	5	304	6
Lung	380	9	188	6	192	8
Liver	276	10	128	8	148	9
Brain, nervous system	238	11	123	9	115	12
Melanoma of skin	191	12	71	11	120	10

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 Bolivia's 2 most populous cities based on 2012 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
Santa Cruz	1442396	1589	2 ^y	2	8	2 ^y	2 ^y	4
El Alto	846	933	2 ^y	2 ^y	5	2 ^y	2 ^y	2

^yAt 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 Bolivia's 2 most populous cities based on 2012 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
Santa Cruz	1589	27	2	8	12	4	30
El Alto	933	16	1	4	6	2	15

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 Bolivia’s 2 most populous cities based on 2012 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
Santa Cruz	1589	8	10	4	2 ^y	4
El Alto	933	5	6	2	2 ^y	2

^yAt least 2 are needed in each city.

Table E: Radiation Therapy Equipment needed for Bolivia’s 2 most populous cities based on 2012 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
Santa Cruz	1589	2	1	1	1	1
El Alto	933	1	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.