GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
RAJYA SABHA
STARRED QUESTION NO. 197
ANSWERED ON 18.12.2025

RADIATION TECHNOLOGIES, RADIO-PHARMACEUTICALS AND CANCER-CARE INFRASTRUCTURE

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Will the PRIME MINISTER be pleased to state:

(a) whether the Department has developed or launched new radio-pharmaceutical products and medical isotopes since 2022 for diagnosis and cancer treatment;

(b) if so, the details thereof;

(c) whether steps have been taken to indigenise radio-pharmaceuticals and scale up their commercial availability across hospitals;

(d) if so, the details thereof;

(e) the number of DAE-supported cancer-care centres functioning across the country, along with the details of medical infrastructure at each centre; and

(f) the latest initiatives undertaken to expand cancer-care services, including collaborations with medical institutions and global recognition earned in cancer treatment?

ANSWER

THE MINISTER OF STATE FOR PERSONNEL, PUBLIC GRIEVANCES AND PENSIONS AND PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH)

(a)to (f) A statement is laid on the Table of the House.

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Government of India
Department of Atomic Energy

STATEMENT REFERRED TO IN REPLY TO PARTS (A) TO (F) IN RESPECT OF RAJYA SABHA STARRED QUESTION NO.197 FOR REPLY ON 18.12.2025 REGARDING "RADIATION TECHNOLOGIES, RADIO-PHARMACEUTICALS AND CANCER-CARE INFRASTRUCTURE" ASKED BY DR. PARMAR JASHVANTSINH SALAMSINH.

(a) The Board of Radiation & Isotope Technology (BRIT), an industrial unit under the Department of Atomic Energy is a major producer and supplier of sealed radioactive sources and radiopharmaceutical products to hospitals in the country for diagnosis and treatment of diseases including cancer. BRIT has launched several radiopharmaceutical products for diagnosis and cancer treatment since 2022.

(b) The list of radiopharmaceuticals and other radioisotope-based products for healthcare launched by BRIT along with their application is given in the following Table.

S. No.	Name	End Use
1	Kit for ^{99m}Tc-MAA Injection	Lung perfusion imaging
2	Kit for ^{99m}Tc-UBI Injection	Infection imaging
3	Kit for ^{99m}Tc-HYNIC-TATE Injection	Neuroendocrine tumour imaging
4	Kit for ^{99m}Tc-HYNIC-E[c(RGDfK)] Injection	Non-invasive monitoring of cancers over-expressing integrin $\alpha_v\beta_3$ receptors
5	Medical grade high specific activity Mo-99	For use in ^{99}Mo/^{99m}Tc generator to avail ^{99m}Tc, the most widely used diagnostic radioisotope
6	Kit for ^{68}Ga-PSMA-11 Injection	Staging, detection & monitoring of metastatic castration-resistant prostate cancer
7	[^{18}F]-DOPA	Early diagnosis of neurological disorders by PET imaging
8	[^{18}F]-Fluoro choline	Early diagnosis of cancers by PET imaging
9	[^{18}F]-FDG (BRIT Regional Centre Kolkata)	Early diagnosis of diseases incl. cancer by PET imaging
10	[^{18}F]-NaF (BRIT Regional Centre Kolkata)	Early diagnosis of bone malignancies by PET imaging
11	^{68}Ga-DOTATATE (BRIT Regional Centre Kolkata)	PET based diagnosis of neuroendocrine cancers
12	^{68}Ga-PSMA-11 (BRIT Regional Centre Kolkata)	PET based diagnosis of prostate cancers
13	^{201}TlCl (BRIT Regional Centre Kolkata)	Myocardial perfusion imaging by SPECT

14	^{177}Lu-DOTATATE (Carrier added)	Neuroendocrine tumour therapy
15	^{177}Lu-PSMA-617 (Carrier added)	Prostate cancer therapy
16	^{177}Lu-HA	Management of joint disorders
17	^{177}Lu-EDTMP	Bone pain palliation
18	^{90}Y-HA	Management of joint disorders
19	No carrier added ^{177}Lu-DOTATATE	Neuroendocrine tumour therapy
20	No carrier added ^{177}Lu-PSMA-617	Prostate cancer therapy
21	Bhabhasphere (^{90}Y glass microspheres)	Liver cancer therapy
22	^{106}Ru plaque	Treatment of eye cancers
23	Higher specific activity (200 – 225 RMM) Co-60 Teletherapy Sources	Cancer treatment
24	^{137}Cs based blood irradiator	Irradiation of blood products/components before transfusion in immune-compromised patients

(c) The production of radio-pharmaceuticals has been scaled up at BRIT over the years as per market demand. Apart from scaling up, several radiopharmaceuticals have been also launched for the benefit of the patients over the past decade, details of which are given in the Table above.

(d) BRIT launched ^{177}Lu-PSMA-617 for treatment of prostate cancers in Sept. 2019. Initially production was started with a batch size of < 1 Ci (one batch per month). Currently, production of ^{177}Lu-PSMA-617 is scaled up to > 10 Ci per batch (2-3 batches per month) to cater to increasing demand. Similarly, batch sizes of several technetium cold kits such as TCK-5 (sulphur colloid), TCK-33 (DMSA[III]), TCK-53 (HSA nano-colloid kit), TCK-56 (MAA) cold kit towards formulation of ^{99m}Tc radiopharmaceuticals for early diagnosis of diseases have been increased in the past decade to cater to increasing demand from the nuclear medicine centres.

(e) The Tata Memorial Centre (TMC) has established 9 hospitals, and is in the process of establishing 2 more hospitals, in seven States of India. These hospitals are located in Mumbai, Varanasi, Muzzafarpur, Visakhapatnam, Sangrur, New Chandigarh (Mullanpur), Guwahati and Bhubaneswar. The TMC and its units are fully equipped with the necessary human resources and infrastructure for the use of radiopharmaceuticals in diagnostic imaging (e.g., SPECT, PET-CT) and therapeutic purposes (e.g., iodine-based or lutetium-based radiopharmaceuticals). The details of the facilities available at TMC hospitals are given below:

Diagnostic and Therapeutic Treatment under TMC

	TMH Mumbai	ACTREC Kharghar	HBCH & MPMMCC Varanasi	HBCH & HBCH&RCPunjab	HBCH & RC Muzaffarpur	BBCI, Guwahati	HBCH & RC, Visakhapatnam
CT Scan	3	2	2	3	1	1	1

MRI	2	1	2	2	0	0	1
USG	14	17	5		1	6	1
Mammography	2	1	2	2		1	1
PET-CT	2	1	2	1		1	1
SPECT	1	3	1			1	1
Radiotherapy machines Linear Accelerator	6	3	4	3	3	2	2
Cobalt / Bhabhatron	3	0	1	1	0	2	1
Brachy therapy	2	1	1	2	1	1	
CT simulators	2	2	2	2		2	1

In addition to the above, ACTREC/TMC (Navi Mumbai, Maharashtra) has one of the world's largest therapeutic nuclear medicine facilities, with 42 "hot beds". Here, a large number of cancer patients receive radio-isotope-based treatment at an affordable cost.

(f) TMC has initiated to expand its facilities by establishing 3 more hospitals, namely, Platinum Jubilee Block, Mumbai, Integrative Centre for Treatment, Research and Education in Cancer (ICTREC) in Khopoli, Maharashtra (where indigenous medicinal plants and AYUSH will be integrated with allopathic treatments for cancer), and Homi Bhabha Cancer Hospital and Research Centre, Khurda, Bhubaneswar. In addition to above, TMC is constructing an Integrated Radiation Oncology Centre (IROC) in ACTREC with CSR funds which will provide radiotherapy treatment to a large number of the patients. A list of collaborations with medical institutions and global recognition earned in cancer treatment is as under

National and International collaborations:

1. **With BARC, Mumbai:** The collaboration is primarily for research cooperation to develop drugs and devices. Two important gains in the field of drug development include the launch of chlorophyllin as a nutraceutical for radioprotection following the successful completion of a phase 2 clinical trial in radiotherapy-induced hemorrhagic cystitis, and the completion of preclinical investigations of diselenodipropionic acid (DSePA) as a lung radioprotector.
   In addition, four task forces have been created involving scientists from TMC and BARC to spearhead development work in novel drugs, radiopharmaceuticals, biomarkers and AI/ML. The progress is being overseen by a steering committee comprising of senior scientists from both institutions.

2. **Stereotactic Neuronavigation System with BARC**

   A passive serial arm-based coordinate measuring mechanism was finalised, and the development for the same was initiated. Further, the scope of research work was extended to incorporate a robotic system which can be used for minimally invasive neurosurgical procedures (biopsy sample collection) with high accuracy. At this stage, the "Robot-assisted Neurosuit" was formulated.

3. **Collaboration with Institute for Plasma Research (IPR) for setting up a Bio-Medical Waste Treatment Facility at TMC at Varanasi**
   TMC has entered into an MoU for the setting up of a Bio-Medical Waste Treatment facility based on a 200 kgh plasma pyrolysis system at Varanasi. The facility involves an eco-friendly disposal technique. The technology has been approved by MoEF for biomedical waste disposal.

4. Tata Memorial Centre (TMC) collaboration research with the **Heavy Water Board (HWB), Department of Atomic Energy**, to investigate the potential anticancer effects of **Deuterium-Depleted Water (DDW)**.

5. **Collaboration with Govt. of Bihar for setting up of Palliative Care Facility:**

   Homi Bhabha Cancer Hospital Muzaffarpur has received INR 112 Cr Grant from Bihar Government to establish a Model Palliative Care Centre with 100 Beds facility & dedicated Academic Block to start Course's on Palliative Medicine for Medical & Nursing Students. It will be First such Centre of India Constructed & Managed by Govt. entity. The work is under progress.

6. **Strengthening Cancer Care in Arunachal Pradesh**

   A Memorandum of Understanding was signed between the Department of Health and Family Welfare, Government of Arunachal Pradesh, through the State Cancer Society of Arunachal Pradesh, and Tata Memorial Centre, Mumbai, through Dr. B. Borooah Cancer Institute (BBCI), Guwahati. The aim of this partnership is to strengthen the State Cancer Institute (SCI) and establish it as an autonomous, state-of-the-art, tertiary cancer care facility.

   Key Initiatives & Activities

   - ~ Cancer Screening Camps with SCI and TRIHMS, Arunachal Pradesh, Total 1266 persons were screened and Indian Medical Council, SCI and TRIHMS, Arunachal Pradesh, Total 1000 persons were screened.
   - ~ **Online District-wise training** for early detection of common cancers for **all Community Health Officers (CHOs)** in Arunachal Pradesh
   - ~ **Cancer Awareness program** for teachers across the state in collaboration with **Department of Education,** Government of Arunachal Pradesh – 800 participants

7. **Collaboration with Ministry of AYUSH**

   DAE/TMC is setting up a medicinal plant with cancer research facility at Khopoli, near Mumbai, in collaboration with the ministry of AYUSH to conduct research on AYUSH formulations and their utility in cancer management. The work is under progress.

International collaborations

1. **The International Collaboration for Research Methods Development in Oncology (CReDO) initiative is a collaboration between the National Cancer Grid (NCG) and many international organizations.**
2. **Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation** (BIMSTEC)

   Tata Memorial Hospital in Mumbai today launched a specialised cancer care training programme for BIMSTEC countries, aimed at strengthening regional cooperation in healthcare. The initiative will not only help improve cancer care but also help establish a network for further collaboration and research among BIMSTEC countries.

The four-week program at TMC focuses on Radiation Oncology, Nuclear Medicine, and Radiology, providing hands-on experience with advanced diagnostic and therapeutic techniques. The initiative is expected to have a lasting impact by improving cancer care, expanding the reach of cancer control activities, and strengthening the overall BIMSTEC partnership. The Tata Memorial Centre emphasizes a multidisciplinary approach to cancer care, which is also being shared with the participating BIMSTEC countries.

3. **The collaboration between IAEA and Tata Memorial Hospital (TMC) focuses on enhancing global cancer care, with TMC designated as an IAEA "Anchor Centre" under the IAEA 'Rays of Hope' Initiative.**
This partnership aims to train healthcare professionals, organize specialized training programs, and support radiotherapy and medical imaging facilities, particularly in low-and-middle-income countries (LMICs). The outcome includes strengthening cancer treatment and research capabilities, and expanding access to cancer care globally, leveraging TMC's expertise and resources. TMC has been recognized for its contributions to IAEA activities and its role as a leading cancer center in India and globally.

The list of global recognitions for cancer treatment includes the publication of important practice-changing findings in the world's top medical journals. These publications have been widely incorporated in guidelines and recommendations by the top professional cancer societies worldwide. A partial list of representative publications is as below:

1. Phase I/II Study of Palliative Triple Metronomic Chemotherapy in Platinum-Refractory/Early-Failure Oral Cancer. J Clin Oncol. 2019 Nov 10;37(32):3032-3041.
2. Evaluation of 1-Year vs Shorter Durations of Adjuvant Trastuzumab Among Patients With Early Breast Cancer: An Individual Participant Data and Trial-Level Meta-analysis. JAMA Netw Open. 2020 Aug 3;3(8):e2011777.
3. Prostate-Only Versus Whole-Pelvic Radiation Therapy in High-Risk and Very High-Risk Prostate Cancer (POP-RT): Outcomes From Phase III Randomized Controlled Trial. J Clin Oncol. 2021 Apr 10;39(11):1234-1242.
4. Prospective Phase II Open-Label Randomized Controlled Trial to Compare Mandibular Preservation in Upfront Surgery With Neoadjuvant Chemotherapy Followed by Surgery in Operable Oral Cavity Cancer. J Clin Oncol. 2022 Jan 20;40(3):272-281.
5. Prophylactic Use of Compression Sleeves Reduces the Incidence of Arm Swelling in Women at High Risk of Breast Cancer-Related Lymphedema: A Randomized Controlled Trial. J Clin Oncol. 2022 Jun 20;40(18):2004-2012.
6. Low-Dose Immunotherapy in Head and Neck Cancer: A Randomized Study. J Clin Oncol. 2023 Jan 10;41(2):222-232.
7. Results of Phase III Randomized Trial for Use of Docetaxel as a Radiosensitizer in Patients With Head and Neck Cancer, Unsuitable for Cisplatin-Based Chemoradiation. J Clin Oncol. 2023 May 1;41(13):2350-2361.
8. Effect of Peritumoral Infiltration of Local Anesthetic Before Surgery on Survival in Early Breast Cancer. J Clin Oncol. 2023 Jun 20;41(18):3318-3328.
9. Low-dose versus standard-dose olanzapine with triple antiemetic therapy for prevention of highly emetogenic chemotherapy-induced nausea and vomiting in patients with solid tumours: a single-centre, open-label, non-inferiority, randomised, controlled, phase 3 trial. Lancet Oncol. 2024 Feb;25(2):246-254.
10. Bevacizumab Erlotinib Switch Maintenance in Chemo-Responsive Advanced Gallbladder and Cholangiocarcinoma (BEER BTC): A Multicenter, Open-Label, Randomized, Phase II Trial. J Clin Oncol. 2024 Sep 20;42(27):3218-3227.
11. Addition of Carboplatin to Sequential Taxane-Anthracycline Neoadjuvant Chemotherapy in Triple-Negative Breast Cancer: A Phase III Randomized Controlled Trial. J Clin Oncol. 2025 Oct 20:JCO2501023. doi: 10.1200/JCO-25-01023.

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