

DEPARTMENT OF RADIATION ONCOLOGY

The Department of Radiation Oncology initially started with a Theratron 780c Cobalt Teletherapy machine which was inherited from the erstwhile railway cancer hospital, in August 2018.

Later on, the department was upgraded with the planned installation of 3 Linear Accelerators (TrueBeams with capability for higher technique treatments such as IMRT, Rapid Arc, IGRT, Large field treatment and SBRT/SRT), a fresh Cobalt Teletherapy machine and Brachytherapy. The Radiation Oncology Information System (ROIS) is already functional at HBCH and MPMMCC which enhances the safety of treatment delivery with multiple checks and counter checks. For accurate transfer of planning data from the planning systems to the treatment units, the department is equipped with ARIA networking System and PACS systems has enabled the department to seamlessly integrate with Dept. of Radiology and Dept. of Nuclear Medicine.

The following has been the timeline of growth of the HBCH and MPMMCC:

- The first Varian **TrueBeam Linac** (1st TrueBeam in Eastern UP & Bihar) was commissioned on 6th August 2018 at HBCH with 1st patient started on treatment on 28th August 2018. With this installation, all the latest technology and radiotherapy treatment modalities like 3DCRT, IMRT, Rapid Arc, SRT with Image Guidance were available at HBCH.
- Two other Varian **Truebeam Linacs** were commissioned at MPMMCC on 24th October 2019 and 11th November 2019 and the 1st patients were treated on 27th November 2019 and 1st January 2020, respectively.
- The Department also has a dedicated **CT Simulator – Siemens Somatom Confidence** at MPMMCC that was commissioned on 18th December 2019.
- The new **Bhabhatron Telecobalt** Unit procured under the “Make in India” Program with first clinical treatment starting on 28th August 2020.

- The **High Dose Rate (HDR) Flexitron Brachytherapy System** (Cobalt based) was commissioned in May 2020. The first patient treatment was done on 28th August, 2020.

The current staff members of the Department includes 8 Radiation Oncology faculty, 7 Senior Residents, 7 Medical Physicists and 17 technological officers and other support staff members.

List of care facilities presently available at Dept of Radiation Oncology, HBCH & MPMCC, Varanasi:

- High precision 3D-CRT, IMRT, IGRT, Rapid Arc teletherapy and Electron beam therapy with FFF TrueBeam Linear Accelerator.
- Frameless SRT / SBRT teletherapy.
- Teletherapy with Cobalt-60 Teletherapy unit (Bhabhatron).
- CT-Simulation with 20 slice CT-Simulator.
- Brachytherapy: Intra-cavitary, Intra-luminal, Interstitial & Mould therapy using an Elekta Flexitron Cobalt-60 Brachytherapy Unit.
- Both Day Care & Inpatient facilities.
- Large field irradiations.

Achieved Statistics:

The following are the departmental broad statistics reflecting its growth:

1. Daily Teletherapy fractions of about 190-210 patients.
2. The first Brachytherapy application was done on 4th July, 2000. Interstitial brachytherapy was started on 3rd October 2020. So far 305 cases of vaginal cylinder brachytherapy, intracavitary brachytherapy, surface mould brachytherapy and interstitial brachytherapy have been performed in the department.
3. The Department of Radiation Oncology has treated 3050 new patients in the year 2021.
4. The footfalls in Radiation Oncology OPD were more than 17,000 in 2021.

Table 1: Department of Radiation Oncology at TMC, Varanasi since 1st May 2018

NUMBER OF NEW PATIENTS RECEIVING RADIOTHERAPY PER YEAR	2018	2019	2020	2021
		532	1153	2090
NUMBER AND TYPE OF FUNCTIONAL MACHINES	1 Cobalt-60 teletherapy	Telecobalt Unit decommissioned in May 2019, 1 True beam LINAC functioning.	3 True Beam LINACs (2 in MPMCC and 1 in HBCH).	3 True Beam LINACs (2 in MPMCC and 1 in HBCH)
	1 True beam LINAC added in August in HBCH.	2 True Beam LINACs added in MPMCC in December 2019 and January 2020.	1 Bhabhatron Teletherapy Unit commissioned in September 2020 in MPMCC. 1 HDR Cobalt Brachytherapy Unit commissioned in May 2020 and OT started in August 2020 in MPMCC.	1 Bhabhatron Telecobalt Unit Head changed undergoing recalibration.

Table 2A: Brachytherapy Applications since 4th July, 2020

Month	Brachytherapy Applications		Brachytherapy Patients	
	New	Cumulative	New	Cumulative
July-20	7	7	2	2
Aug-20	5	12	2	4
Sep-20	25	36	11	15
Oct-20	38	74	22	37
Nov-20	52	126	18	55
Dec-20	56	182	30	85
Jan 2021	48	230	19	104
Feb-2021	44	274	22	126
Mar-2021	50	324	17	143
Apr-2021	31	355	18	161
May-2021	30	385	14	175
June-2021	37	422	15	190
July-2021	28	450	17	207
Aug-2021	43	493	16	223
Sept-2021	47	540	24	247
Oct-2021	27	567	13	260
Nov-2021	31	598	18	278
Dec-2021	63	661	27	305

Table 2B: Type of Brachytherapy Applications since 4th July, 2020

TYPE OF BRACHYTHERAPY	Nos. SINCE 4 th JULY, 2020
INTRA CAVITARY APPLICATION (ICA)	167
ICA + ISBT GYNE	12
CVS	96
ISBT- SARCOMA	4
ISBT - BREAST	3
ISBT - GYNEC	14
CUSTOM DES. APPLICATOR - GYNEC	1
SURFACE MOULD BRACHYTHERAPY	8

Table 3: Total OPD Patients in Hospital and Radiation Oncology - 2018-2021

Sl. No.	Year I (2018)	Year II (2019)	Year III (2020)	Year IV (2021)
OPD Visits (All Departments)	Total: 41821	Total: 137680	Total: 133355	Total: 213434
OPD Visits* (Radiotherapy)	HBCH: 2207 MPMMCC: not started Total: 2207	HBCH: 13727 MPMMCC: 3482 Total: 17209	HBCH: 5094 MPMMCC: 5730 Total: 10824	HBCH: 3786 MPMMCC: 13439 Total: 17225
Total New OPD Registrations (All Departments)	6250	12292	14438	18658

*Both New and Follow-up cases

Table 4: Total New Cases in Radiation Oncology OPD: Jan – Dec 2021

Month	No. of Cases
January 2021	280
February 2021	333
March 2021	459
April 2021	354
May 2021	222
June 2021	420
July 2021	386
August 2021	445
September 2021	350
October 2021	426
November 2021	417
December 2021	537
Total	4629 *

*Palliative Cases not included

Table 5: Radical Radiotherapy Simulations in 2021

MONTH	MPMMCC	HBCH	Total
JAN 2021	136	66	202
FEB 2021	170	70	240
MARCH 2021	204	37	241
APRIL 2021	137	56	193
MAY 2021	148	51	199
JUNE 2021	186	72	258
JULY 2021	206	58	264
AUG 2021	209	74	283
SEPT 2021	259	58	317
OCT 2021	198	69	267
NOV 2021	191	69	260
DEC 2021	189	92	281
TOTAL	2233	772	3005

Total Simulation Scans done in 2021 at MPMMCC were 3004 and at HBCH were 895. This figure includes Radical, Palliative and Brachytherapy cases also.

Education:

Faculty from the Department have been invited as Invited Faculty at major regional and national conferences throughout the year.

1. **M.D. in Radiation Oncology:** Letter of Intent and Letter of Permission has been received from National Medical Commission (NMC) for 4 seats from Academic Year 2021-2022.
2. **B.Sc in Radiation Therapy Technology Course:** Under Process of Application.

3. **Medical Physics Internship:** Students who have completed their Diploma Radiological Physics (Dip. RP)/MSc (Medical Physics) have been allowed by AERB to undergo their compulsory 1-year internship in Dept of Radiation Oncology, MPMMCC and HBCH, Varanasi. The first 2 interns had joined in October 2020. 4 interns have completed their courses and currently there are 3 interns.

Research:

All the faculty and staff are encouraged to do basic and clinical research and to publish their works in the peer-reviewed journals. The Departmental faculty have submitted independent projects in Head and Neck and Brain Tumours to the IEC for approval. The department is also presently doing / has applied for IEC clearance as a part of the several studies in collaboration with other departments in HBCH and at TMH Mumbai.

Study Name	IEC Approval	Remarks
TRISUL Study in Oral Cancers	Received	Waiting for CTRI registration; TMH Collaboration
RAPPAL Study in Cervical cancers	Received	Study underway; TMH Collaboration
POLCA study in Gall Bladder cancers	Received	TMH Collaboration
DOBL study on Non-Hodgkin's Lymphoma	Received	TMH Collaboration
MSS study on mould brachytherapy	Received	Study underway
CRESH Study in High grade Gliomas	Received	Waiting for CTRI registration
Stress Levels in radiation health workers during Covid-19	Received	TMH Collaboration
Compliance to treatment according to NCG Protocol	Received	TMH Collaboration
BART Study in bladder cancers	Received	TMH Collaboration
EPIC Study in Cervical cancers	Received	Waiting for CTRI registration

The Medical Physicists from Department of Radiation Oncology are collaborating with institutions like IIT BHU and have fabricated a 3D Phantom for Commissioning of Brachytherapy Applicators and a patent has been filed.

Staff Members:

Radiation Oncologists	
Professor	Dr. Satyajit Pradhan Dr. Ashutosh Mukherji
Assistant Professor	Dr. Ajay GV Dr. Lincoln Pujari Dr. Sambit Swarup Nanda Dr. Prashant Giridhar Dr. Ajay Choubey Dr. Abhishek Shinghal
Medical Physicists	
Scientific Officer (D) & RSO	Ms. Priyanka Aggarwal
Scientific Officer (C) & RSO	Mr. Epili R Dandapani Mr. Narender Kumar Ms. Sanju Mr. Vinay Saini Ms. Alka Kataria Mr. Sanjay Barman
Radiotherapy Technologists	
Scientific Assistant (B)	Mr. Anurag, Dosimetrist Mr. Fayaque Ahmad Mr. Nitish Kumar Mr. Duke Nandi Ms. Trisha Srivastava Mr. Pankaj Singh Mr. Kalpesh Jagannath Bhavsar Mr. Neeraj Upadhyay Mr. Ayush Kumar Mr. Sanjai Kumar Mr. Pratap Narain Singh Mr. Sunny Shashank Sundaram Mr. Kamal Kaushik Mr. Jay Prakash Verma Mr. Pramod Mr. Chandrapal Chauhan
Other	
LDC	Ms. Neha Jaiswal

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