

# Early trends from Utilization of Oncology services: insights from Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY)

Authors:

Sukhvinder Kaur, Dr. Nishant Jain, Dr. P.C. Bhatnagar



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## Executive Summary

Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY) is India's government-funded health insurance scheme that covers more than 10.74 crore poor and vulnerable families. Since the launch of the scheme in September 2018 till July 2019, PM-JAY had issued more than 10 crore e-cards and 50 lakh claims for hospitalizations through public and private empaneled hospitals across India. There is no cap on family size and age under the scheme to ensure that nobody is left out (especially women, children and the elderly). A total of 1,393 treatment packages for 25 specialties are available for beneficiaries under the scheme.

This working paper presents highlights of broad trends of the oncology services utilization and demand-supply scenario for the first 11 months under the scheme. The paper describes patterns from dynamic data available for 26 States/UTs from the PM-JAY dashboard from September 2018 to July 2019 and attempts to compare trends of cancer burden with global cancer observatory “GLOBOCAN 2018” and “Global burden of disease statistics” (though direct comparisons are not possible due to difference in methodologies of data collection and analysis).

Oncology comprised nine percent of claims submitted, and 34% percent of all tertiary claims submitted till date across 26 States/UTs. Two States (Tamil Nadu and Maharashtra) generated 60% of all Oncology claims. The primary type of Oncology service included Medical oncology, except in Manipur. Top hospital catering claims under oncology are Tata Memorial Hospital and Research Centre, Maharashtra followed by Govt. Super Specialty Radiology, Omandur, Tamil Nadu. Overall, slightly more than 7 out of 10 of all the claims submitted for oncology were in the private sector, except in six States/UTs - Andaman and Nicobar Islands, Arunachal Pradesh, Chandigarh, Kerala, Mizoram and Sikkim generating no oncology claims at private hospitals. Noticeably, females are accounting for higher number of claims submission in all the age-categories as compared to men, highest in the age group of 45-50 years. The top category of procedures utilized for oncology services is unspecified regimen. Ovary, Breast, Cervix and Radical hysterectomy are some of the common cancer types among females; and Terminally Ill palliative, Colon Rectum and head and neck cancers are among males for which maximum claims are generated during the period.

Migration for cancer care is most prominent in Madhya Pradesh followed by five states Uttar Pradesh, Bihar, Jharkhand and Maharashtra. These States accounted for 80% of the beneficiary movement for cancer care services to States like Gujarat and at NHCPs (which mainly includes pioneer institutes like AIIMS Delhi and PGIMCER Chandigarh). Kamrup district in Assam is the preferred destination

for most of the North-eastern states including Arunachal Pradesh, Manipur, Meghalaya, Mizoram and Tripura, due to notable apex institutions like Dr. B.Borooach Cancer institute. However, Surat, Valsad, Vadodra are ideal in Gujarat for the beneficiaries from Dadra and Nagar Haveli, Daman and Diu and Madhya Pradesh for cancer care.

The paper reviews implications of these trends on health system and continuum of care, given that prevention by early screening and diagnose through union between Health and wellness centers and PM-JAY benefits [intensifying screening through HWCs in high endemic areas identified under PM-JAY]. We also identified that migration for cancer care can be reduced by linking empaneled hospitals with National Cancer Grid (NCG) and educating states to be part of for Virtual tumor board of NCG, to discuss the diagnosed cases with eminent experts

The recommended next steps are: revision of packages to deal with unspecified regimen and better regulate packages; improve data quality and conduct deeper review at state level for particular kind of services utilized under oncology; develop a single cancer burden repository across India for effective monitoring of cancer incidence and mortality and encourage multi-stakeholder involvement including private institutions, allied Ministries and departments to strengthen NCD framework and convergence under PM-JAY.

## 1. Background

Noncommunicable diseases (NCDs) kill 41 million people each year, equivalent to 71% of all deaths globally<sup>1</sup>. So Universal Health Coverage (UHC), without a strong focus on NCDs as a part of package of care, will not meet the health needs of any country. Evidence is emerging that the poor are at heightened risk of acquiring NCDs, and a persistent need remains for government to fully cover the financial burden of NCDs especially for this stratum.

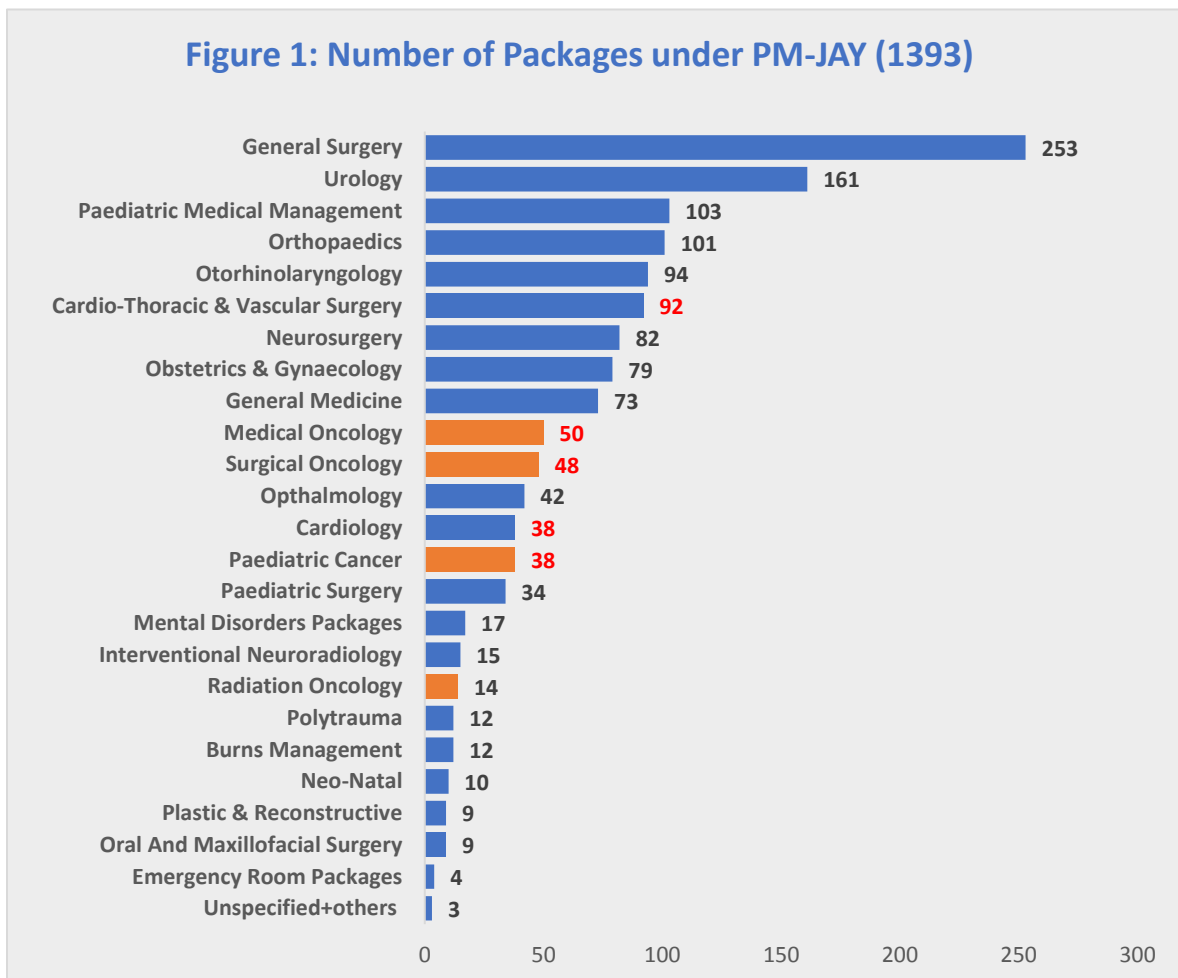
Among NCDs, the odds of incurring catastrophic hospitalization expenditures are highest for cancer. India has around 2.25 million cases with over 1 lakh new cases being registered every year, according to **Cancerindia.org**. As per **WHO**, between 30-50% of all cancer cases are preventable, but the percentage of patients undergoing cancer treatment in India are much lower than international standards for multifactorial reasons – lack of awareness, late stage of presentation, geographical remoteness, financial hardship and fear of the disease treatment and consequences. Providers ratio are also low, there is one oncologist for each 700 affected people in the country<sup>2</sup>

Cancer is the second leading cause of death after cardiovascular diseases<sup>3</sup>, but there is no single source of data which gives the comprehensive picture of cancer burden. However, two major trusted data sources for cancer ‘GLOBOCAN 2018’ and ‘Global Burden of disease (GBD)-2016 based on cancer incidence and mortality statistics’ revealed the burden of cancer at global and country level. Both the sources relied on cancer registers for India estimates.

**Indian Council of Medical Research (ICMR) initiated a national network of cancer registration and instrumented two types of registrations a) Population based cancer registry (PBCR) b) Hospital based cancer registry (HBCR). PBCRs systematically collect data on all new cases of cancer occurring in a defined population from multiple sources of registrations and HBCRs records information on cancer patients seen in a hospital irrespective of the residential status of the patient. The data collected under HBCRs also contribute to respective PBCRs falling within the same region (ICMR, Cancer Samiksha).**

There are gender disparities across Globe in cancer disease burden. **ICMR** depicted that “One woman dies of cervical cancer every 8 minutes in India” while “for every 2 women newly diagnosed with breast cancer, one woman dies of it in India”<sup>4</sup>. Also, as per the evidence form **World Cancer report, 2012**, 5.37 lakh women were diagnosed with cancer as compared to 4.77 lakh men.

Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY)- a most promising investment for human capital by government of India; is a commitment towards the less advantage in the society by insuring them against major diseases. The PM-JAY insurance scheme launched in September 2018 aims of providing a cover of up to Rs 5 lakhs per family per year, for secondary and tertiary care hospitalization. The scheme envisages coverage of 10.74 crore vulnerable entitled families (approximately 50 crore beneficiaries) as per SECC 2011 and includes around 1393 benefits packages including 275 packages for NCD management (shown in figure 1)



**Note: Orange bars represents Oncology packages; all other packages under PM-JAY are represented by blue bars**

This working paper highlights the State-wise variation in utilization of the Oncology/Cancer services through PM-JAY analytics dashboard. Oncology has emerged as an area of interest, due to its wider usage among the top five tertiary care packages across the States during first eleven months of implementation of the scheme.

Apart from curbing the financial hardship; owing to multidisciplinary nature of care required to battle cancer, National Health Authority (NHA) implementing PM-JAY has inked a Memorandum of understanding (MoU) with National Cancer Grid (NCG) for standard roadmap for prevention, diagnosis and treatment of cancer. NCG formed in 2012, with a mandate of linking cancer centers across India, and establishing uniform standards of patient care for prevention, diagnosis and treatment of cancer.

For oncology services, pre-authorization is mandatory for around 150 benefits packages under 4 specializations included under the scheme (Package enhancement by adding two or more packages can be combined for same beneficiaries)

### **Oncology, the broader heading under PM-JAY is bifurcated among four specialties**

**Medical Oncology:** Medical Oncology is a modality of treatment in cancer care which uses Chemotherapy, Immunotherapy, Hormonal Therapy and Targeted Therapy to treat cancer in an effective manner. Medical Oncology usually works in conjunction with Surgical Oncology or Radiation Oncology to give the best clinical outcomes.

**Radiation Oncology:** Radiation oncology is a medical specialty that involves the controlled use of radiation to treat cancer either for cure, or to reduce pain and other symptoms caused by cancer

**Surgical Oncology:** Surgical oncology is the use of surgery to remove tumors that are cancerous.

**Pediatric Cancer:** Pediatric cancer is cancer among children 0-14 years

## **2. Objectives**

The paper focuses on insurance claims patterns for oncology services under PM-JAY scheme. The aim of the initial review of the scheme is to examine broad patterns from supply and demand side; and identify further areas for monitoring and analysis. The paper utilizes administrative data to:

- Examine State-wise trends in claim utilization pattern for oncology services
- Age-gender dimensions in oncology service utilization
- Identify areas of supply strengthening and continuum of care
- Examine Patient movement to access cancer care

## **3. Methods**

The analysis draws from PM-JAY's analytics dashboard, compiled at the district, state and national level by NHA (to conduct descriptive analyses of pre-authorizations, claims submissions and claim amount) from September 2018 to July 2019 in 26 states/UTs (22 States and 4 UTs) by state and implementation category (states with earlier schemes and new states). Data available at the state level are: pre-authorization and claim submissions for specific services/packages, gender and age of

claimant, claim amount, sector utilization (private/public) and portability for access of necessary care. Unless noted where pre-authorizations are also presented, we utilized data for claims submission as a base throughout the analysis.

## 4. Findings

The findings of the paper are presented in two sections

- I. Utilization of Oncology Services/Packages
- II. Areas of demand and supply

### I. Utilization of Oncology Services/Packages

#### a. Oncology a proportion of all claims

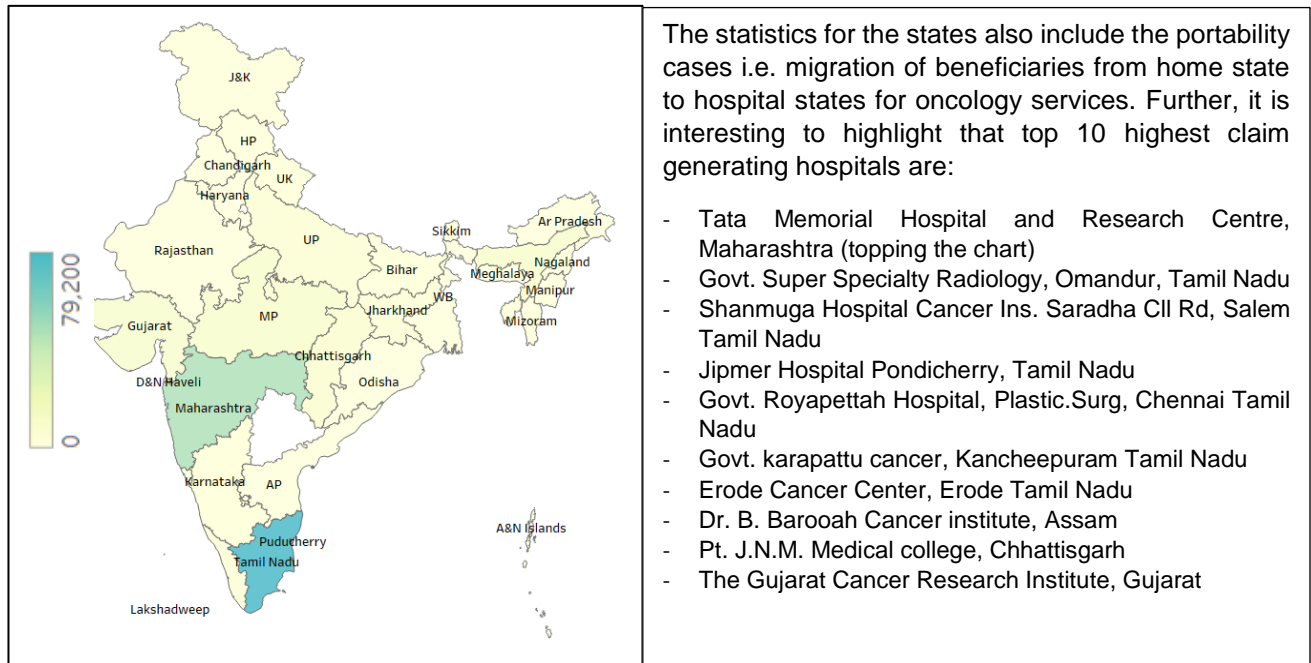
From September 2018 to July 2019, 26,52,871 pre-authorizations were raised for all packages/services under PM-JAY. Of these, 2,43,259 (9.2%) were for Oncology services. There was a total of 1,88,409 claims submitted for oncology, comprising 8.5% of claims submitted for all packages; with 8.7% claim amount contribution. It was observed that oncology services accounted slightly more than 30% of tertiary cases administered under scheme during the period and accounted for 18% of total tertiary package amount.

S. No.	Sept'18-July'19	Pre auths	Claim submitted	Claim amount (Cr.)
1	All Packages/service utilization under scheme	26,52,871	22,22,324	29,27,20,66,541
2	All Oncology Specialties/Services utilization	2,43,259	1,88,409	2,56,03,37,498
3	All Tertiary Specialties	7,01,778	5,50,509	14,14,21,69,819
1a.	% all Oncology services to all specialties/services	9.2	8.5	8.7
2a.	% all Oncology services to all Tertiary specialties	34.7	34.2	18.1

Note: Gujarat data is from NHA's TMS only; AP data at package level was not available for analysis

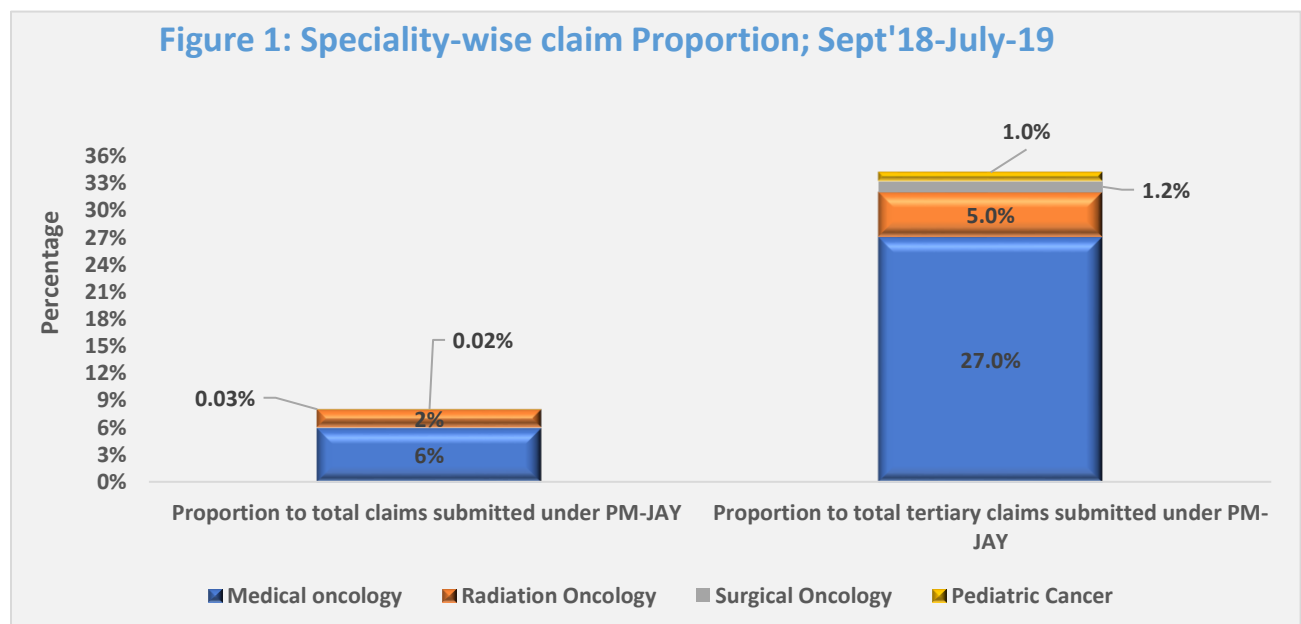


In terms of overall oncology service utilization across states, over 60% of all oncology claims under PM-JAY have been generated by 2 states: Tamil Nadu (42.0%) and Maharashtra (24.7%) depicted in map below.



### b. Specialty-wise claims proportion

Overall, Medical oncology is the most commonly used specialization followed by Radiation and Surgical oncology. Figure-1 below also highlights substantial high proportions of medical oncology to total as well as tertiary claims submitted during Sept-18 to July-19.



Eminent researchers examining various aspects of oncology has indicated that given the late stage of disease at diagnosis, the vast majority of the patients in India are treated with palliative therapy, and therefore, need to see a Medical Oncologist<sup>5</sup>, however this requires to be validated under PM-JAY via more detailed review at the state level.

The similar trend of higher medical oncology is also observed across the states. Manipur is the only state showing significantly high proportion for radiation oncology, which may be attributed to Adjuvant Therapy (Radiation therapy after surgery or chemotherapy), however the beneficiary cancer history/stage of cancer to be validated before making conclusions from PM-JAY dynamic dataset.

**Table 2: Specialty wise claim proportion to the total claims submitted for Oncology Service Utilization across States**

States/UTs	Medical Oncology	Radiation Oncology	Surgical Oncology	Pediatric cancer
Andaman & Nicobar Islands	100.0	0.0	0.0	0.0
Arunachal Pradesh	77.8	11.1	11.1	0.0
Assam	85.8	9.5	4.6	0.2
Bihar	84.2	9.9	5.4	0.5
Chandigarh	92.6	3.7	3.7	0.0
Chhattisgarh	75.3	16.4	6.1	2.1
Dadra And Nagar Haveli	63.4	16.8	19.9	0.0
Daman and Diu	65.4	25.0	9.6	0.0
Gujarat	82.5	8.4	9.1	0.0
Haryana	79.2	16.7	2.9	1.1
Himachal Pradesh	89.8	9.0	0.6	0.6
Jammu And Kashmir	97.9	0.3	1.6	0.3
Jharkhand	84.2	11.2	4.6	0.1
Karnataka	22.3	35.3	39.2	3.2
Kerala	80.6	15.7	3.6	0.0
Madhya Pradesh	74.2	17.9	5.7	2.3
Maharashtra	88.3	10.0	1.7	0.1
Manipur	6.8	<b>88.8</b>	0.4	4.0
Meghalaya	87.8	10.7	1.3	0.2
Mizoram	95.1	4.7	0.3	0.0
Nagaland	72.3	24.1	2.4	1.2
Sikkim	81.8	0.0	18.2	0.0
Tamil Nadu	77.0	15.3	2.2	5.6
Tripura	88.8	11.2	0.0	0.0
Uttar Pradesh	76.3	18.8	4.0	0.9
Uttarakhand	79.9	12.9	5.8	1.4
<b>Overall</b>	<b>80.2</b>	<b>13.8</b>	<b>3.3</b>	<b>2.7</b>

However, specialty-wise proportion of claims submitted by top five high scorer states categorized based on oncology services is depicted in picture below.

States Utilizing specialty-wise (Top-5) oncology Services Sept'18-july'19			
<b>Medical Oncology</b> 1. Tamil Nadu 2. Maharashtra 3. Assam 4. Madhya Pradesh 5. Gujarat	<b>Radiation Oncology</b> 1. Tamil Nadu 2. Maharashtra 3. Madhya Pradesh 4. Chhattisgarh 5. Uttar Pradesh	<b>Surgical Oncology</b> 1. Tamil Nadu 2. Karnataka 3. Maharashtra 4. Gujarat 5. Madhya Pradesh	<b>Pediatric Cancer</b> 1. Tamil Nadu 2. Madhya Pradesh 3. Chhattisgarh 4. Karnataka 5. Uttar Pradesh

### c. Public-private utilization under PM-JAY

Overall, 72% of all the claims submitted for oncology were in the private sector. At the same time, it is also observed that no claims have been submitted for oncology at private hospitals for the six States/UTs - Andaman and Nicobar Islands, Arunachal Pradesh, Chandigarh, Kerala, Mizoram and Sikkim during the 11 months since the initiation of the scheme, but all these states/UTs represent extremes on a small base.

The proportional distribution varies by state indicating the utilization of services at public sector in orange and the opposite trend in green **may be** attributed to

- a. The differences in waiting time, distance, equipment's and type of specialization delivered
- b. The number of days between diagnosis and treatment
- c. Multifaceted cancer centers, including the development of the full spectrum of patient care

However, sector wise (public/private) differentials need to be validated within States

**Figure 3: Public-Private oncology services utilization (The proportions of all the specialties are calculated form Public and Private totals respectively)**

States/Uts	Medical Oncology		Paediatric cancer		Radiation Oncology		Surgical Oncology		Total	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
Andaman and Nicobar Islands	100%								100.0	0.0
Arunachal Pradesh	67%						33%		100.0	0.0
Assam	85%	80%		1%	10%	13%	4%	7%	87.2	12.8
Bihar	88%	79%	1%	0.1%	7%	12%	4%	9%	47.7	52.3
Chandigarh	95%				5%				100.0	0.0
Chhattisgarh	53%	75%	26%	2%	3%	18%	19%	6%	1.0	99.0
DNH	11%	67%			89%	12%		21%	7.7	92.3
D&D		59%			100%	31%		10%	7.9	92.1
Gujarat	37%	80%			51%	8%	12%	11%	1.0	99.0
Haryana	84%	64%	3%		9%	32%	3%	3%	60.6	39.4
HP	90%	90%	5%	0.1%	5%	9%		1%	7.4	92.6
J&K	93%	100%	0.4%		1%		5%		41.5	58.5
Jharkhand	65%	89%		0.1%	31%	4%	5%	7%	44.5	55.5
Karnataka	15%	11%	4%	1%	37%	57%	43%	31%	37.5	62.5
Kerala	77%		0.1%		21%		3%		100.0	0.0
Madhya Pradesh	84%	69%	1%	3%	13%	20%	2%	9%	24.0	76.0
Maharashtra	92%	83%	0.1%	0.1%	6%	12%	2%	4%	22.1	77.9
Manipur	8%		3%		89%		0.3%	100%	99.7	0.3
Meghalaya	65%	89%		0.4%	27%	9%	8%	1%	5.1	94.9
Mizoram	60%	96%			40%	4%		0.4%	0.4	99.6
Nagaland	89%	67%		4%	11%	21%		8%	27.3	72.7
Sikkim	50%						50%		100.0	0.0
Tamil Nadu	16%	2%	27%	18%	41%	74%	15%	6%	39.8	60.2
Tripura	83%	1%			17%	98%		1%	3.6	96.4
Uttar Pradesh	77%	71%	2%	0.1%	16%	25%	5%	3%	47.3	52.7
Uttarakhand	79%	67%	1%	3%	9%	24%	10%	7%	46.8	53.2

#### d. Average claim size

Average claim size refers to the cost of a claim paid per beneficiary. There are variations in proportion of average claim size across states and with-in the states (between Public and Private) for oncology services utilization. The major reason for the differentials in any of the categories may reflect 1) case mix (two more packages combined) and 2) two or more packages claimed for same beneficiaries. However, the variance across states may be due to 1) context of extensive geographies (terrains, remote areas etc.) 2) Revisions in package rates by the states. The stark variations between private and public hospitals with-in the states raises issues like cost of health product (covering treatment, surgeons fees, physiological care etc.) or the provider induced demand.

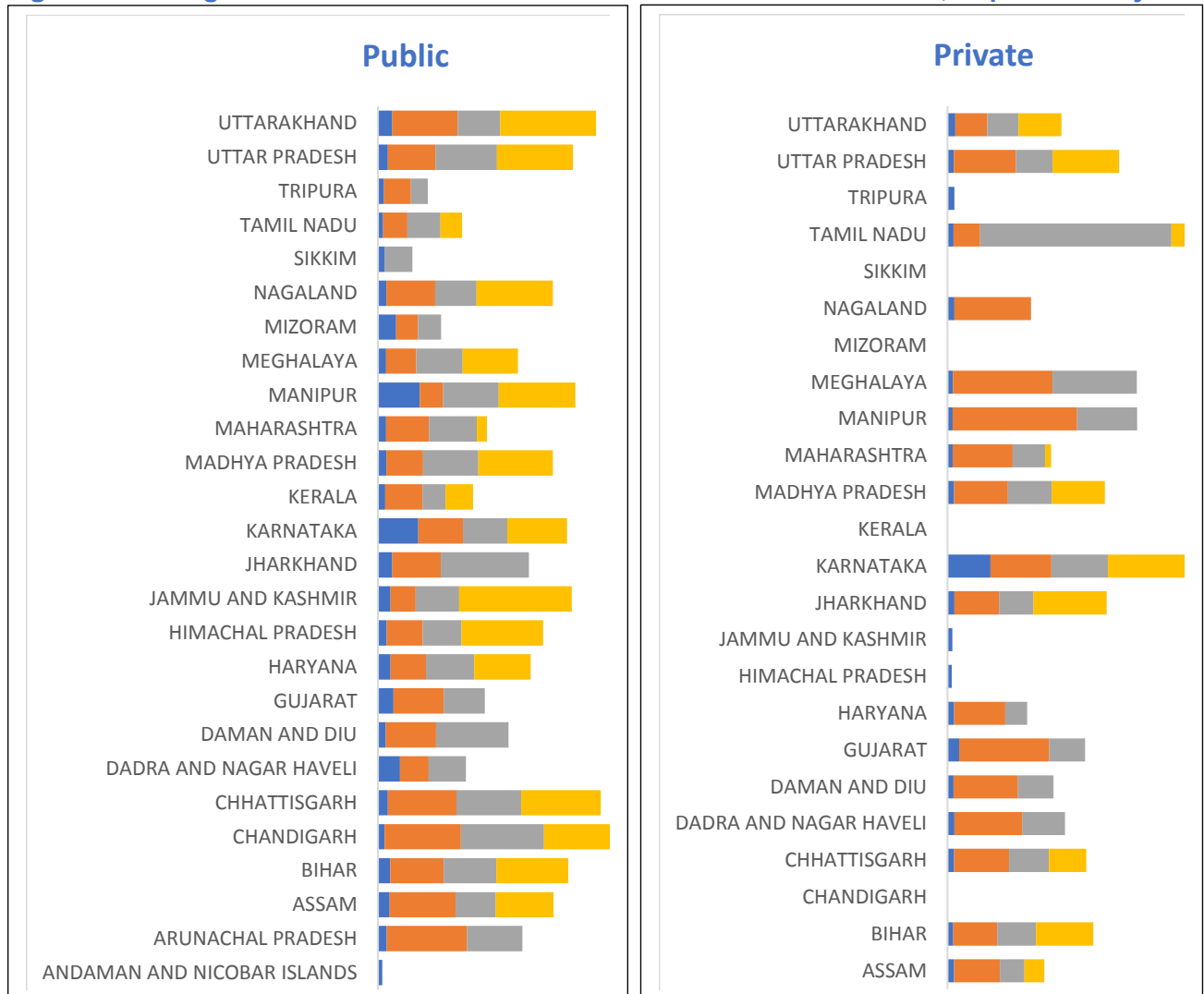
#### Public Hospitals

Medical oncology: INR 3,000 to 30,147  
 Radiation oncology: INR 15,998 to 58,063  
 Surgical oncology: INR 12,000 to 63,700  
 Pediatric Cancer: INR 7,226 to 88,000

#### Private Hospitals

Medical oncology: INR 5,000 to 50,101  
 Radiation oncology: INR 30,994 to 1,45,200  
 Surgical oncology: INR 25,550 to 2,23,244  
 Pediatric Cancer: INR 6,963 to 90,172

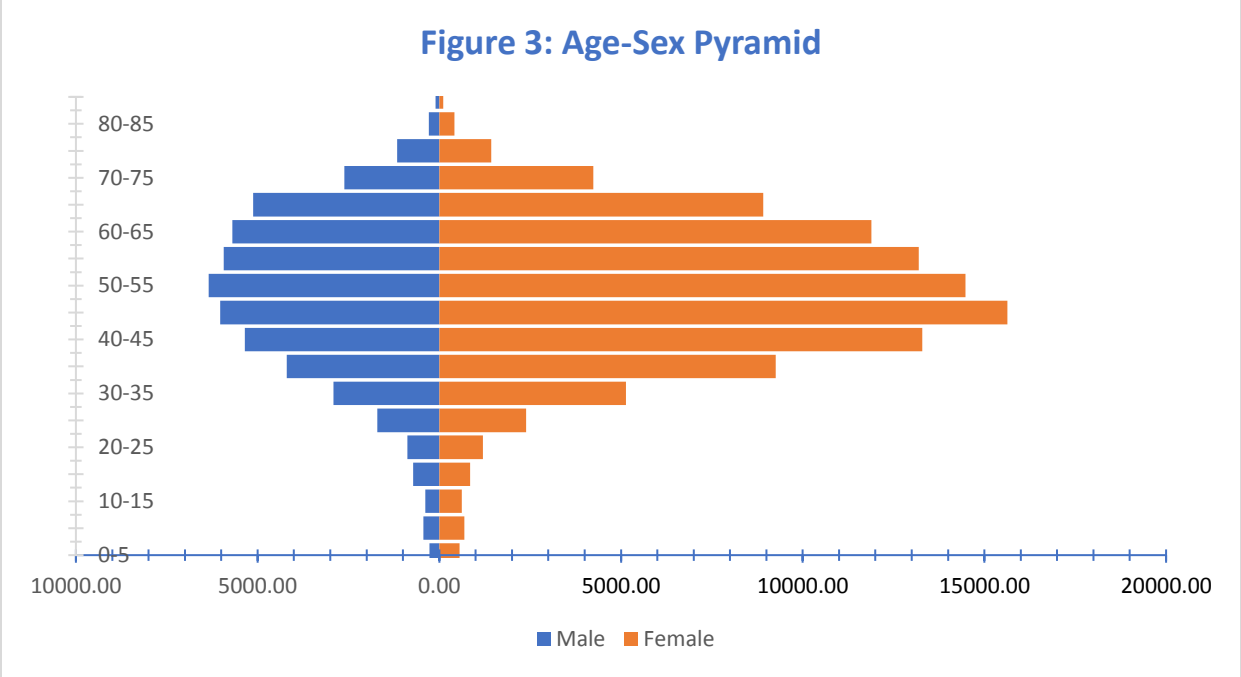
**Figure 2: Average claim size at Public and Private facilities across states, Sept'18 to July'19**



**e. Age and gender dimensions as per claim submitted for top procedures**

In present Analysis with male female ratio for claim submission across the states indicates female predominance in the age group of 45-50 years, however, majority of the claims for men were submitted in the category of 50-55 years.

Noticeably, females are accounting for higher number of claims submission in all the age-categories as compared to men; and so is a sub-group at a higher risk for preventive actions.




According to GLOBOCON and GBD top cancers that affect Indian population are Breast, Oral, Cervical, Gastric, lung cancers; and lip and oral, breast, lung, and stomach respectively. A perusal of the trend indicated by PM-JAY below (total for males and females) enlists Ovary, Breast, brain tumors, head and neck cancers and blood cancers as the top categories for oncology services utilization during Sept'18 to July'19. However, it is urgent to emphasize here that Unlisted regimen\* is the primary category for claim submission, which require more detailed analysis and review at the state-level. Further, the section below highlights the gender based oncology package utilized (top 5 in each category) under the scheme.

Medical Oncology	Radiation Oncology	Surgical Oncology	Pediatric Cancer
<ul style="list-style-type: none"> <li>-Unlisted Regimen Palliative CT- Max 6 cycles (Per cycle)</li> <li>- Ovary Taxol+ carboplatin Max 6 Cycles</li> <li>-Breast paclitaxel weekly *12 weeks</li> <li>-Cervix Cisplatin/Carboplatin (AUC2) along with RT- max 6 cycles (Per cycle)</li> <li>-Terminally Ill palliative and supportive therapy-Per month</li> </ul>	<ul style="list-style-type: none"> <li>-Cobalt 60 external beam Radiotherapy(Radical/adjvant/Neoadjuvant)</li> <li>-Linear accelerator external beam radiotherapy Imrt (Intensity Modulated Radiotherapy)(Radical/Adjuvant/Neoadjuvant)</li> <li>-Linear Accelerator External Beam Radiotherapy IGRT (Image Guided radiotherapy) (Radical/Adjuvant/ Neoadjuvant)</li> <li>-Brachytherapy high dose radiation (Intracavitary)-Per Fraction Maximum of 4 sessions</li> </ul>	<ul style="list-style-type: none"> <li>-Composite resection with reconstruction (excluding microvascular)</li> <li>- Unspecified Surgical</li> <li>-Composite Resection Anytype and Pedicle Flap reconstruction</li> <li>-Radical Hysterectomy + Bilateral pelvic lymph node dissection + bilateral salpingo oophorectomy (BSO)/ ovarian transposition</li> <li>- Mastectomy any type in Malignant Conditions</li> </ul>	<ul style="list-style-type: none"> <li>-Acute lymphoblastic leukemia (chemotherapy including diagnostics): Induction</li> <li>-Bone tumors/soft tissue Sarcomas: Chemotherapy including diagnostics</li> <li>-Acute Lymphoblastic Leukemia (Chemotherapy including diagnostics): Consolidation</li> <li>-Acute Lymphoblastic Leukemia (Chemotherapy including diagnostics): Induction</li> <li>-Non-Hodgkin Lymphoma: chemotherapy including diagnostics</li> </ul>

\* As per the NHA guidelines, if any inpatient treatment is not available in the packages defined, then hospital to provide that treatment (up to Rs. 100,000) to the beneficiary only after the same gets approved by the Insurance company/ trust; and is reflected as unspecified package.

## Females

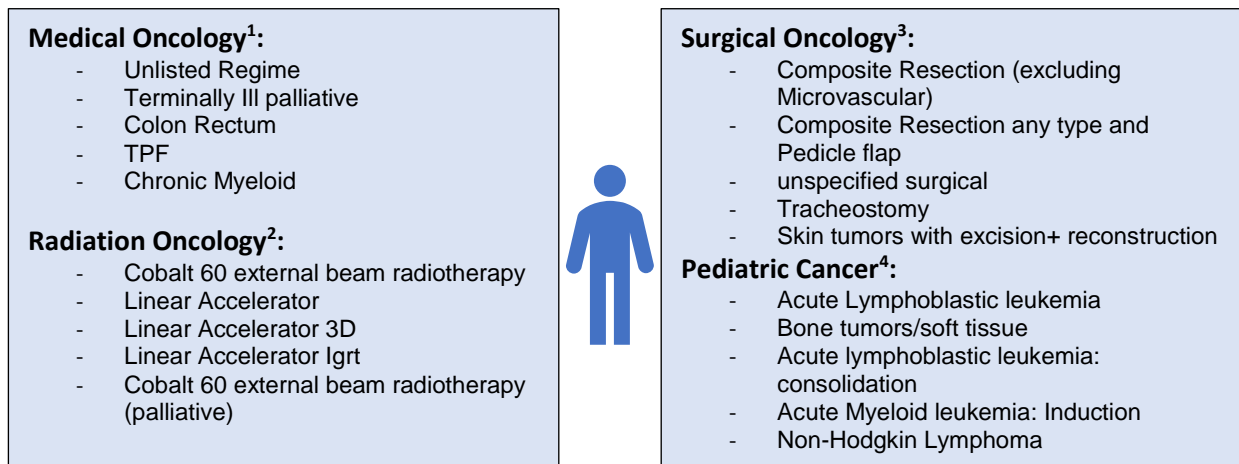
<p><b>Medical Oncology<sup>1</sup>:</b></p> <ul style="list-style-type: none"> <li>- Unlisted Regime</li> <li>- Ovary Taxol</li> <li>- Breast Paclitaxel weekly</li> <li>- Cervix</li> <li>- Breast Adriamycin</li> </ul> <p><b>Radiation Oncology<sup>2</sup>:</b></p> <ul style="list-style-type: none"> <li>- Brachy therapy</li> <li>- Cobalt 60 external beam</li> <li>- Linear Accelerator 3D crt/2D</li> <li>- Linear Accelerator Imrt</li> <li>- Linear Accelerator Igrt</li> </ul>		<p><b>Surgical Oncology<sup>3</sup>:</b></p> <ul style="list-style-type: none"> <li>- Radical Hysterectomy</li> <li>- Unspecified surgical</li> <li>- Mastectomy any type in malignant conditions</li> <li>- Breast conserving surgery</li> <li>- Mastectomy-Any type</li> </ul> <p><b>Pediatric Cancer<sup>4</sup>:</b></p> <ul style="list-style-type: none"> <li>- Acute Lymphoblastic leukemia</li> <li>- Bone tumors/soft tissue sarcomas</li> <li>- Acute Myeloid Leukemia: Induction</li> <li>- Acute Myeloid leukemia: Consolidation</li> <li>- Acute lymphoblastic leukemia: Consolidation</li> </ul>
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**Note: the complete terminology of the procedures are as below:**

1. Unlisted regime; Ovary Taxol++ carboplatin Max 6 Cycles; Breast paclitaxel Weekly \*12 weeks; Cervix Breast Adriamycin/Cyclophosphamide (AC)-Per Cycle
2. Brachy therapy high dose radiation (Intracavitary)-Per Fraction Maximum of 4 sessions; Cobalt 60 external beam Radiotherapy (radical/Adjuvant/Neoadjuvant); Linear accelerator external beam radiotherapy 3D CRT2D Planning (Radical/Adjuvant/Neoadjuvant); Linear accelerator external beam radiotherapy IMRT (Intensity Modulated Radiotherapy) (Radical/Adjuvant/Neoadjuvant); Linear accelerator external beam radiotherapy IGRT (Image Guided Radiotherapy) (Radical/Adjuvant/Neoadjuvant)

3. *Radical Hysterectomy + Bilateral Pelvic Lymph Node dissection+ bilateral Salpingo oophorectomy (BSO/Ovarian Transposition; Unspecified Surgical Packages; Mastectomy any type in Malignant Conditions; Breast conserving Surgery (Lumpectomy+ Auxiliary Surgery); Mastectomy-Any type*  
 4. *Acute lymphoblastic leukemia (Chemotherapy including diagnostic): Introduction; Bone tumors/soft tissue Sarcomas: Chemotherapy including diagnostics; Acute Myeloid Leukemia (Chemotherapy including diagnostics): Induction; Acute Myeloid Leukemia (Chemotherapy including diagnostics): Consolidation; Acute lymphoblastic leukemia (Chemotherapy including diagnostic): Consolidation*

## Males



**Note: the complete terminology of the procedures are as below:**

1. *Unlisted regime; Terminally Ill palliative and supportive therapy-Per month; Colon Rectum 5-FLurouracil-Oxaliplatin-Leucovorin (Folfox)-Max 6 cycles; TPF (Docetaxel, Cisplatin,5-Fu)[Head and Neck]; Chronic Myeloid Leukemiaimatnib (Per Month)*
2. *Cobalt 60 external beam Radiotherapy; Linear accelerator external beam radiotherapy (Radical/Adjuvant/Neoadjuvant); Linear accelerator external beam radiotherapy 3D Crt/2D Planning (Radical/Adjuvant/Neoadjuvant); Linear accelerator external beam radiotherapy Igrt (Image Guided Radiotherapy) (Radical/Adjuvant/Neoadjuvant); Cobalt 60 external beam Radiotherapy (Palliative)*
3. *Composite Resection with Reconstruction (Excluding Microvascular); Composite Resection any type and Pedicle Flap Reconstruction; unspecified surgical package; Tracheostomy; skin tumors wide excision + reconstruction*
4. *Acute lymphoblastic leukemia (Chemotherapy including diagnostic): Introduction; Bone tumors/soft tissue Sarcomas: Chemotherapy including diagnostics; Acute lymphoblastic leukemia (Chemotherapy including diagnostic): Consolidation; Acute Myeloid Leukemia (Chemotherapy including diagnostics): Induction; Non-Hodgkin Lymphoma: chemotherapy including diagnostics*

## II. Areas of demand and Supply

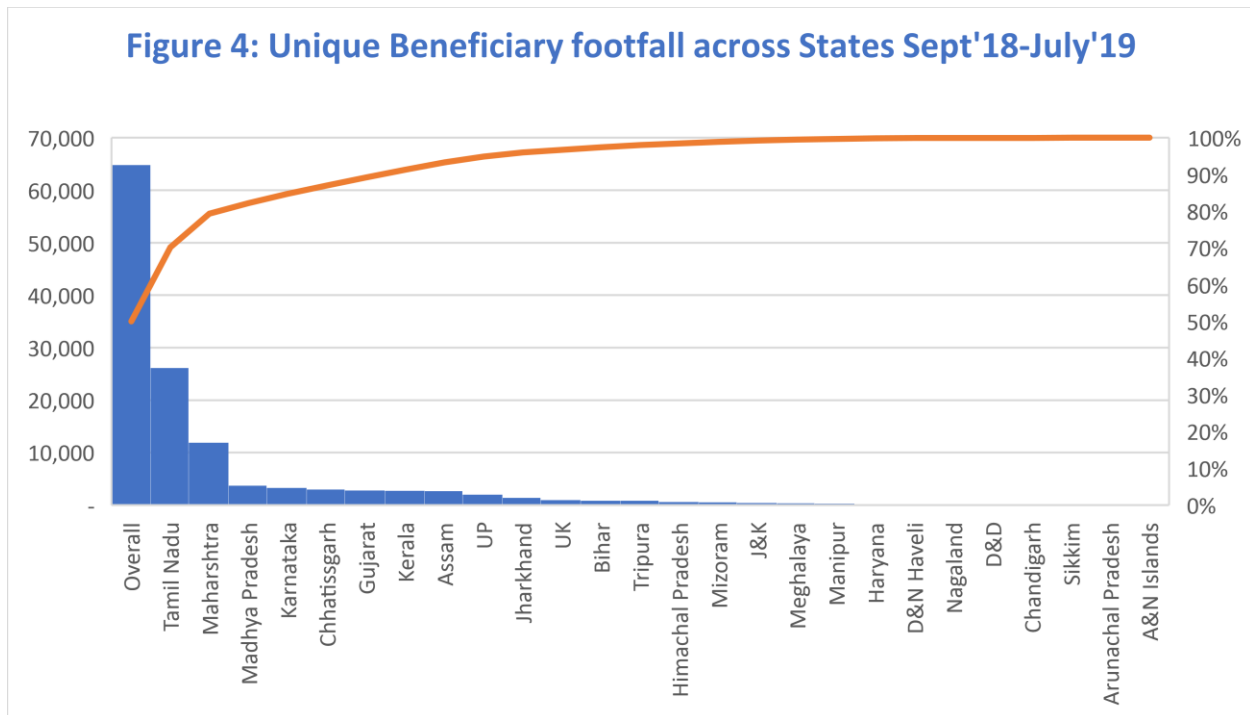
### a. Unique Patient Footfall

The World Health Organization (WHO) indicates that only 14% of people who need palliative care worldwide currently receive it <sup>6</sup>. However, less than 1% of India's 1.2 billion population has access to Palliative care<sup>7</sup>. In India 1 million new cancer cases are diagnosed every year and up to 70-80% of them present with Stage IV disease diagnosis where options of cancer directed treatment are very limited<sup>8</sup>



PM-JAY besides providing the disease based financial assistance to poor and vulnerable, also provides person-based care to patients suffering from cancer; and has included a package on Palliative care under Unspecified regime.

It is interesting to highlight from the PM-JAY data across States that out of all the oncology claims submitted during the period, 35% are unique footfalls (with Tamil Nadu attaining the highest position) and may have visited hospitals for pain management during last stages. However, the further patient and State-wise analysis associated with Cancer grading and Cancer Stage may validate this.



### b. Distribution of Hospitals that offer Cancer Treatment under PM-JAY

As per the current data till July-19, there are around 917 hospitals empaneled under scheme for oncology care catering to slightly less than 2 lakh beneficiaries. But, these 900+ hospitals include quite a range of hospitals from multi-modal treatment facilities to initial diagnosis nursing homes.

Furthermore, as on July 2019, NCG a network linking hospitals dealing with complex cancer cases currently includes 181 hospitals and only 64 (here out of 147) are empaneled under PM-JAY. Oncologists estimate that about a quarter of cancers diagnosed each year in India might be labelled “complex cases”, where treatment is not obvious or straightforward<sup>9</sup>. So, this needs to be studied further that how equipped are the hospitals in terms of diagnosis and treatment infrastructure empaneled under the scheme to address complex cases for the PM-JAY beneficiaries, especially those hospitals which are not partnered with NCG.

Table 4: Empanelment under PM-JAY (September 2018 to July 2019)

States/UTs	Hospitals with Cancer facility empaneled under PM-JAY	Hospitals under cancer grid*	Hospitals empaneled under PM-JAY out of hospitals included under cancer grid
Andaman & Nicobar Islands	1	1	1
Arunachal Pradesh	1	1	1
Assam	23	3	3
Bihar	4	3	2
Chandigarh	1	1	1
Chhattisgarh	69	3	1
Dadra And Nagar Haveli	-		
Daman and Diu	-		
Goa		2	0
Gujarat	60	6	2
Haryana	10	5	1
Himachal Pradesh	4	1	1
Jammu And Kashmir	14	3	1
Jharkhand	17	1	0
Karnataka	51	10	5
Kerala	22	15	4
Madhya Pradesh	39	7	4
Maharashtra	167	55	16
Manipur	4	1	1
Meghalaya	6	2	2
Mizoram	4	1	1
Nagaland	4	1	1
Sikkim	1	-	-
Tamil Nadu	413	14	9
Tripura	1	1	1
Uttar Pradesh	42	8	4
Uttarakhand	4	2	2
NHCP	9		
<b>Overall</b>	<b>971</b>	<b>147</b>	<b>64</b>

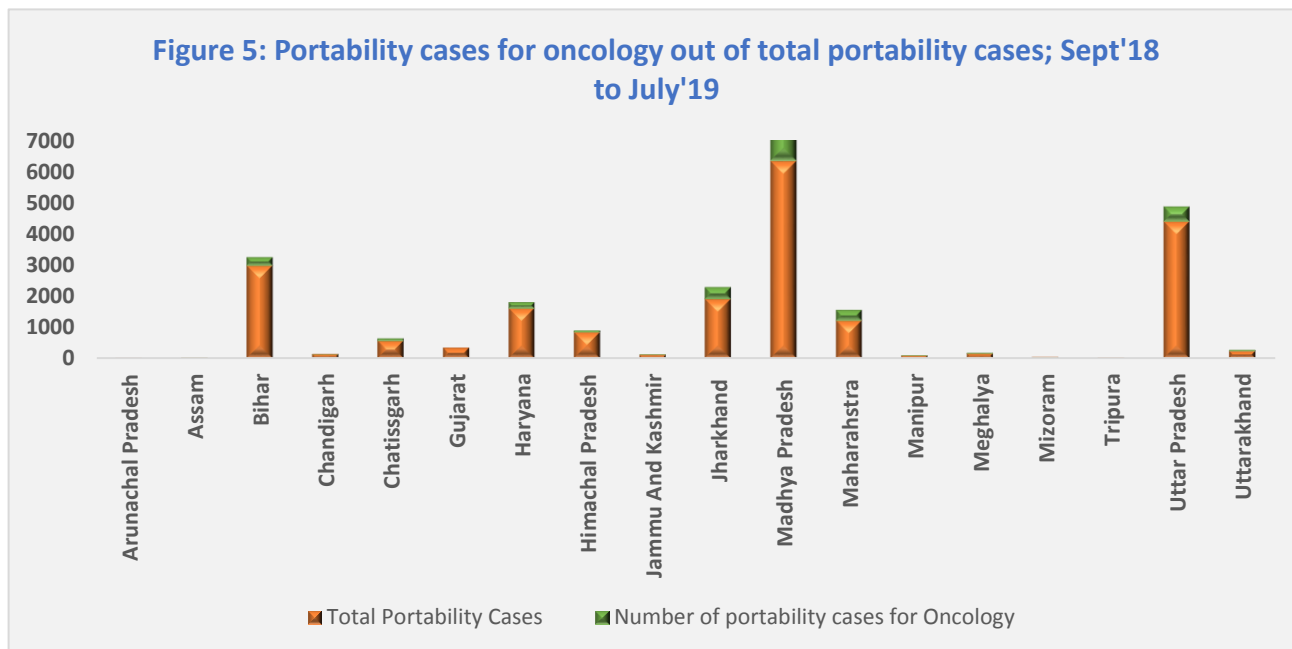
Note: There are total 181 hospitals under cancer grid as on July, 2019; but for comparison under PM-JAY-Delhi, Punjab, Rajasthan, Odisha and West Bengal are not included  
<https://tmc.gov.in/ncq/index.php/list-of-centers>

### c. Patient movement for access of care

The patients make long and desperate journeys to other states to obtain diagnosis and treatment needed for cancer. But evidence from review of literature reveals that travel burden delays the treatment and diagnosis procedures. The role of travel burden influencing cancer stage at diagnosis was analyzed in 12 retrospective studies which involved 401,775 patients. In 10 of these 12 studies, analyzing 387,639 patients, the travel burden conditioned the stage at diagnosis<sup>10</sup>

Figure 4 highlighted below, compares the proportion of all portability claims generated by a specific state to proportion generated for oncology cases under PM-JAY. Overall, five states Madhya Pradesh, Uttar Pradesh, Bihar, Jharkhand and Haryana have not only accounted for 80% of the

patient movement for cancer care services; but also contributed noticeably higher patient movement for any service utilization under PM-JAY.



**Note: Kerala and Karnataka showing small number of portability cases for oncology only, so not included in stacked graph above**

In contrast, Gujarat and Tamil Nadu (100%) have fully managed their oncology cases at their own comprehensive cancer hospitals/centers in the States [Sikkim and Andaman and Nicobar Islands are also in this category but number of claims for oncology are very less 1 and 2 respectively]. However, around 99% oncology claims were also managed within in the states of Kerala, Karnataka, Maharashtra and Assam. The In-house (within state) management of cancer care can be due to good number of cancer facilities (multi modal as well) empaneled under the scheme (table 5).

It is interesting to highlight that apart from anchoring delivery of oncology services to the beneficiaries of their own States, Gujarat, Assam and Maharashtra are also catering to the beneficiaries across the country (Gujarat mainly from D&NH, Daman & Diu, Madhya Pradesh and Uttar Pradesh; Assam from all the north-eastern states except Sikkim, Maharashtra mostly form Madhya Pradesh, Chhattisgarh, Jharkhand and Bihar, as highlighted in table below). Moreover, the contribution form National Health Care Providers (NHCP) (8%) which includes pioneer institutes like AIIMS, Dr. RML Delhi, PGIMER Chandigarh, AIIMS Uttarakhand etc. for portability cases cannot be ignored though. Many tertiary care hospitals in some states opting to remain out of the scheme, often poses a challenge for beneficiaries for access of care and compels them to travel for treatment.

Table 5: Portability under Oncology packages

Patient State/UT	Hospital State/UT																										
	Andaman And Nicobar Islands	Andhra Pradesh	Arunachal Pradesh	Assam	Bihar	Chandigarh	Chhattisgarh	Gujarat	Haryana	Himachal Pradesh	Jammu and Kashmir	Jharkhand	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Manipur	Meghalaya	Mizoram	Nagaland	NHCP	Sikkim	Tamil Nadu	Tripura	Uttar Pradesh	Uttarakhand	
Andaman And Nicobar Islands	100.0%																										
Arunachal Pradesh			33.3%	66.7%																							
Assam				99.5%						0.0%										0.0%	0.0%						
Bihar					78.7%			0.5%				0.8%		0.1%	0.5%	0.8%										6.8%	0.2%
Chandigarh						94.7%																					5.3%
Chhattisgarh		0.1%			0.1%		98.3%	0.1%				0.1%	0.1%		0.1%	0.2%										0.5%	
D&N Haveli								99.0%																		0.9%	
D&D								100.0%																			
Gujarat								100.0%																			
Haryana						10.1%			32.0%													50.1%				5.3%	2.9%
Himachal Pradesh										92.7%												6.9%					0.4%
Jammu And Kashmir								0.2%			98.0%											1.7%					
Jharkhand					8.8%		0.0%	0.5%				86.7%				0.7%										3.1%	
Karnataka					0.1%								99.6%			0.4%											
Kerala														99.8%												0.2%	
Madhya Pradesh					0.1%		0.5%	16.4%							79.4%	2.2%						0.1%				1.3%	0.1%
Maharashtra							0.0%	0.1%	0.0%			0.3%				99.6%										0.1%	
Manipur				2.6%												0.1%	97.2%										
Meghalaya				5.7%																							
Mizoram				0.4%																						0.2%	
Nagaland				27.3%																							
Sikkim																							100.0%				
Tamil Nadu																								100.0%			
Tripura				4.8%																				95.2%			
Uttar Pradesh					0.5%	0.2%	0.1%	1.4%	0.2%		0.1%				5.8%	0.4%										85.0%	4.5%
Uttarakhand																										1.2%	97.3%

Note: The light orange highlights are oncology services claims settled within own States; dark green represents NHCP contribution and light green as portable cases

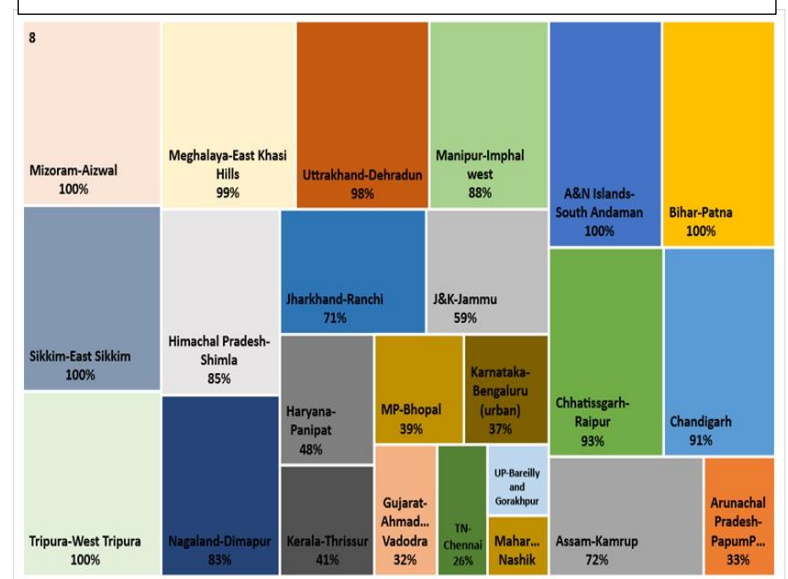
Table 6: Inter State portability

Patient State	Hospital States-Districts
Andaman And Nicobar Islands	-
Arunachal Pradesh	Assam- Kamrup (66.7%)
Assam	NHCP-AIIMS Delhi, Nagaland-Dimapur, J&K-Srinagar (0.02% each)
Bihar	NHCP- Safdarjung Hospital (52.8% out of total contribution of 11.9% of NHCP)
Chandigarh	Uttarakhand- AIIMS (5.3%)
Chhattisgarh	UP-Varanasi and Mathura (0.52% each)
D&N Haveli	Gujarat- Surat (46 % out of total contribution of 99% of Gujarat)
D&D	Gujarat- Valsad (22% out of total contribution of 100% of Gujarat)
Gujarat	-
Haryana	NHCP-Chandigarh PGIMER (95% out of total contribution of 50% of NHCP)
Himachal Pradesh	NHCP-Chandigarh PGIMER (6.9%)
Jammu And Kashmir	NHCP- Chandigarh PGIMER ( 88% out of total contribution of 1.7% of NHCP)
Jharkhand	Bihar-Patna (8.8%)
Karnataka	Maharashtra- Wardha (0.4%)
Kerala	UP-Sitapur (0.2%)
Madhya Pradesh	Gujarat-Vadodara (56% out of total contribution of 16.4% of Gujarat)
Maharashtra	Jharkhand-Bokaro, Ranchi (50% each out of total contribution of 0.27% of Jharkhand)
Manipur	Assam- Kamrup (88% out of total contribution of 2.6% of Assam)
Meghalaya	Assam-Kamrup (69% out of total contribution of 5.7 % of Assam)
Mizoram	Assam-Kamrup (60% out of total contribution of 0.4% of Assam)
Nagaland	Meghalaya- East Khasi Hills (36.4%)
Sikkim	-
Tamil Nadu	-
Tripura	Assam-Kamrup (75% out of total contribution of 4.8% of Assam)
Uttar Pradesh	MP-Gwalior (89% out of total contribution of 5.8% of MP)
Uttarakhand	NHCP-Chandigarh PGIMER (89% out of total contribution of 1.5% of NHCP)

The figure 6 represents the highest claims submitted in the home districts (Hospital district) from Patient home State.

Majority of the beneficiaries traveled from home State to other States for medical oncology services. The table 6 depicts the maximum claims submitted for portability cases from Patient States to the districts in the hospital states. Kamrup district in Assam is the preferred destination for most of the North-eastern states including Arunachal Pradesh, Manipur, Meghalaya, Mizoram and Tripura, due to notable apex institutions like Dr. B.Borooach Cancer institute. However, Surat, Valsad, Vadodra are ideal in Gujarat for the beneficiaries from Dadra and Nagar Haveli, Daman and Diu and Madhya Pradesh. Apart from Pioneer institutes like AIIMS and Safdarjung Delhi, PGIMER Chandigarh equipped to treat unresectable cancers with all ablation modalities (all under one roof) is catering to the oncology needs from Northern States including Haryana, Himachal Pradesh, Jammu and Kashmir, and Uttarakhand

Figure 6: Intra State portability



## Summary of findings:

**Proportion to Tertiary Claims:** Oncology accounts for 9% of all the claims and 35% of total tertiary claims submitted

**Claim Pattern:** Medical oncology is the foremost specialization utilized; Manipur is the only state generated highest claims for radiation or clinical oncology. Around 72% claims submitted are in the private sector; and Average claim size is on higher side in the private sector

**Geography:** Tamil Nadu and Maharashtra are the highest claim generators for oncology services during the period

**Top Hospitals:** it interesting to highlight that Tata Memorial Hospital and Research Centre, Maharashtra is the top hospital in the claims submission category despite the fact that TN tops the cart with highest claims submission.

**Top Procedures Utilized:** Unlisted regimen is the top category for which oncology services are utilized

**Gender and age pattern:** Females are predominant over men for the oncology claim's submission; and most of the claims for females are in the age-group 45-50; whereas 50-55 years for men

**Portability:** Five states Madhya Pradesh, Uttar Pradesh, Bihar, Jharkhand and Haryana have accounted for 80% of the patient movement for cancer care services

## The above findings will have following implications on PM-JAY:

### a. Data:

Cancer care is gender neutral under PM-JAY, but the cancer burden is found to be more skewed towards females than males under PM-JAY based on claims submitted pattern across States. This can be further quantified by comparing the incidence rates based on the accurate, reliable and standard data sources across states. Unless cancer prevention and screening intervention effectively implemented **based on incidence rates**, the new cancer cases will keep on emerging with more and more burden on curative care rather than prevention.

### b. Continuum of care:

Prevention by early screening and diagnosis could lessen the burden on the curative part and this is achievable through union between Health and Wellness Centers (HWC) and PM-JAY. Early stages screened patient of SECC population can be referred to take PM-JAY benefits; and PM-JAY data trends based on package utilization can be used by HWC management for intensifying screening in the high endemic pockets/districts.

### c. Health System

While the current data is not enough to draw any conclusions but looking at the volume of oncology cases, a nation-wise gap analysis w.r.t human resources mapping (oncologists),

available infrastructure and support is critical need of an hour for efficient delivery of cancer care. But without exact data on oncologists 'present and proposed positions' at state level, it is very difficult to assess the current burden.

#### **d. Equitable cancer care to cater demand side:**

Major inequalities occur in terms of access of cancer care due to skewed distribution of well equipped (in all spheres including trained human resources, infrastructure and advancement in technology) cancer care facilities. Majority of the patients still covers miles to get treatment in premier hospitals, though PM-JAY covers the treatment cost but **a)** Man-days/work loss to the patient and family members during treatment and recovery period **b)** travel in case of portability, and **c)** recurrent cost beyond 5 lakhs hit them hard financially. We identified key areas to address these issues under PM-JAY:

1. Strengthening multimodal cancer facilities empanelment under PM-JAY
2. Linkage with NCG, educating states to be part of Virtual tumor board of NCG, discuss the diagnosed cases with eminent experts and provide treatment accordingly.
3. Provision of financial assistance under Rashtriya Arogya Nidhi (RAN) schemes\* to tackle recurrent and travelling cost

#### **Next steps/Recommendations:**

- Revision of packages to deal with unspecified cases
- Improvement in terminology mapping of Oncology procedures nomenclature under PM-JAY database i.e. context-sensitive spelling correction in Oncology procedure database.
- Deeper review at state level for particular kind of package utilization
- Periodic conduct of data quality assurance to keep check on quality, timeliness, correctness and completeness of data
- Multi-Stakeholder Involvement including Private institutions, allied Ministries and departments to strengthen NCD framework and convergence under PM-JAY.  
Moreover, some areas can be utilization of cancer registry, National Cancer Control Program, National Cancer Screening Program addressing gaps in infrastructure and manpower, are beyond the scope of this study and need further research in conjugation with PM-JAY.
- Operational research studies at PM-JAY to map the disease burden of cancer with Packages/services utilization
- Relating cancer care with cancer grading and stage of cancer to estimate burden of disease
- Further research on Palliative care under PM-JAY

## Limitations:

- The categories of highest claim submission may change with maturity of the scheme; and also with inclusion of States like Punjab, Rajasthan and Andhra Pradesh
- NHA decision of inclusion of State Schemes beneficiaries through Application Program Interface integration may change the denominators in some cases
- Cancer Stage at the time of diagnosis has huge implications for both type of treatment as well as place for treatment, this issue is not highlighted in analysis

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