

PM-JAY: Projecting Updated Eligibility

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Background

The launch of Ayushman Bharat Pradhan Mantri Jan Arogya Yojana, commonly referred as AB PM-JAY, marks a milestone in India's path to Universal Health Coverage (UHC). Aimed at providing health insurance cover of INR 5 lakhs per family for secondary and tertiary care, PM-JAY targets bottom 40% of the poor and vulnerable populations.

As per the current form of the program, over 10.53 crore households are eligible for PM-JAY. This eligibility estimate is based on the Socio-Economic and Caste Census (SECC) of 2011. When the program was launched in 2018, the government ran an Additional Data Collection Drive (ADCD), however, there was no provision to (a) add new beneficiaries, who met the SECC criteria in 2018 but were not included in the list in 2011 or (b) remove those who were not eligible in 2018 but were in 2011.

The Indian economy has gone through massive transformation since 2011. As such, it is unclear how the current population of vulnerable citizens relates to the 2011 measurement. To meet the desired goal of providing insurance to the poor and vulnerable, PM-JAY may want to target those who meet the SECC criteria as per the Census 2021, which is currently underway, as opposed to 2011. But how would this change program enrollment – and costs?

Highlights

- We assess the population that would be eligible if current criteria were applied to 2018 data (as opposed to 2011)
- There has been a modest rise in the number of individuals who would be eligible
- Our results suggest significant variation in how eligibility would change among states, and across groups, with the current eligible population appearing to be younger and healthier

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Box 1: Methodology

- **Data Source:** To estimate the eligible population in 2018, we use two data sources. The first is summary data from SECC of 2011, which delineates the number of individuals who meet the relevant SECC criteria. We refer to this as the “eligible” population. The second is the 68th, 71st and 75th waves of National Sample Survey (NSS), fielded in 2011, 2014 and 2018, respectively.
- **Definition of PM-JAY Beneficiaries:** Current eligibility criteria into PM-JAY is defined by SECC 2011, which is defined in four criteria categories:
 - Six deprivation criteria (D1 to D7, excluding D6) defined on the basis of socio-demographic and household characteristics for rural areas
 - Urban households based on primary occupation
 - Automatic inclusion based on tribe, income etc.
 - Automatic exclusion based on ownership of different forms of assets
- **Approach:** Figure 1 illustrates our approach and is presented in the section below.

To support the National Health Authority (NHA), the apex body responsible for the smooth implementation of PM-JAY, we have developed a realistic model to estimate the underlying eligible population for PM-JAY as of 2018. In particular, the goal of this exercise is to (a) apply the SECC criteria to today’s population, and (b) identify the change in eligibility through population evolution of this period. This will play a significant role in assessing both PM-JAY’s reach among the vulnerable population – and the costs of reaching out to those who are missed.

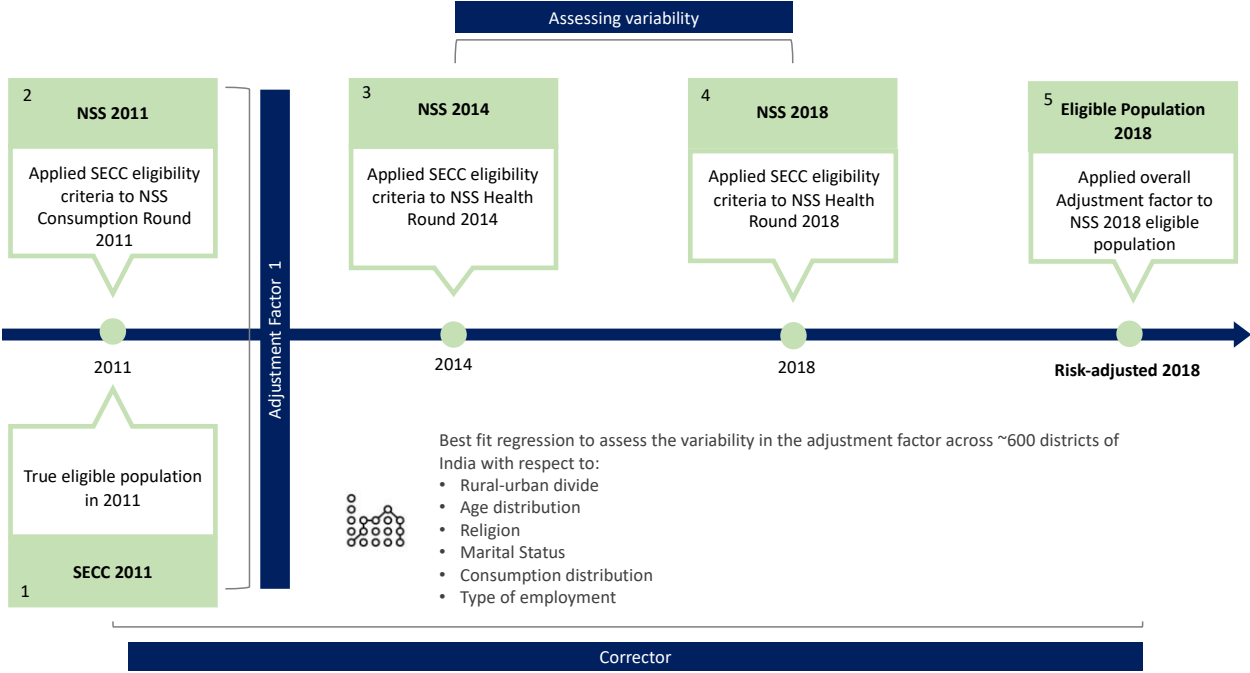
Detailed Approach

To begin with, as indicated in Figure 1, we make our best estimate of the eligible population using variables available in the 2011 NSS survey – we call this the “imputed eligible” population. The problem in doing so is that we cannot perfectly match SECC criteria in the NSS. While the NSS has a number of variables that correlate with SECC criteria, such as socio-demographic variables – age, gender, caste, and occupation – it doesn’t have information on household characteristics such as kucha walls and roofs, scavenger families, bonded labor, among others. As a result, if we simply impute eligibility in the NSS, we do not accurately measure the truly eligible population.

To address this, we use a mapping between the true eligible population based on SECC criteria in 2011 and our imputed NSS eligibility in 2011. In particular, we first estimate imputed NSS eligibility. We then divide the sample by urban/rural and then in addition by state. This allows us to compare among the resulting 67 cells the true SECC entitlement figures with our estimates from the NSS.⁴ We use this to form an adjustment factor in order to correct our imputed NSS estimates to match the true SECC results, i.e., ensure that the total number of eligible households is 10.54 crores.

Having done so, we then apply the same imputation methodology that we used for the 2011 NSS, to the rounds filed in 2014 and 2018 (Step 3 and 4 in Figure1). One issue of course is that the adjustment factor applied to the 2011 NSS may not still applies to those surveys in later years. To account for this, we use information on the evolving characteristics of districts across India to assess how changes in district demographics are impacting the gap between true and imputed eligibility.

Figure 1: Methodology to Estimate Eligibility in 2018



⁴ There are 35 states, times urban/rural, which makes 70 cells. But for three states (Andaman & Nicobar Islands, Daman & Diu and Lakshadweep Island), the sample is too small to split by urban/rural, so we simply provide a statewide estimate. In addition, information for Telangana is merged with Andhra Pradesh, as NSS 2011 collects aggregated information from both the states

In particular, we estimate an inflator which encapsulates the variability of the adjustment factor. To do so, we build a regression model across the 600 districts in India to estimate how this adjustment varies with district characteristics such as rural-urban divide, age distribution, religion, age distribution, consumption distribution, type of employment etc. We use regression analysis to identify the variables that best define the inflator. This allows us to ask: what features of areas are most associated with a high or low mismatch rate between imputation and eligibility imputation? Having estimated these relationships, we finally apply these – both the adjuster and the inflator – to arrive at our 2018 eligibility estimate at the state-sector level.

In addition to assessing how the size of the eligible population has changed from 2011 to 2018, it is critical to understand how the composition of that population has changed. The set of individuals who are eligible in 2018 may be distributed differently around the nation – which is important given the differential diffusion of PM-JAY around India. In addition, the eligible population may be growing sicker or healthier, which could lead to changing program costs. Therefore, the second step in our analysis is to assess how the mix of imputed eligible individuals has changed. We compare the eligible population across periods on several factors – including age, gender and other health related variables.

Key Findings and Implications

The overall results of our analysis are included in in **Appendix 1**. It features one row for each state, and for the division into urban/rural population within the state. The first column shows the entitled population in each area. The second and third columns shows our imputed eligibility from the NSS in 2011 and 2018, respectively. The fourth column computes our adjustment factor, the ratio of the actual entitled population to our imputed eligible population.

As the Appendix indicates, overall, we overstate entitlement through our imputation procedure. The truly entitled population nationally is 83% of the imputed eligible population. This varies by sector – in particular, our average adjustment factor for rural areas is 79% as compared to 101% for urban areas. Moreover, it is as low as 49% for the three less populous states – Lakshadweep and Daman & Diu. In addition to sector and population, our adjustment factor varies by region– with the adjustment being as high as 96% for northern India, compared to 73% for the southern region.

The fifth, sixth and seventh columns presents the inflator that captures the changes as we transition from 2011 to 2018, combines the two adjustment factors, and finally gives us the entitled population in 2018. **Table 1** summarizes our findings

Table 1: Summary of Findings

Description	Eligibility – in households		% Change
	SECC 2011	Estimated 2018	
National	105262526	110790298	5.25%
Rural - Urban			
Rural	81884398	85101537	3.93%
Urban	23378128	25688761	9.88%
North - South			
North	64938908	67931438	4.61%
South	40323618	42858860	6.29%

Table 1 indicates that the entitled population is now 11.07 crores, a 5.25% increase from the true eligible population in 2011 as per the SECC⁵. Appendix 1, which further elaborates these results indicates that some state-sector combinations experience a relatively higher change in the eligible population – for example, rural areas of Goa see a decline in eligible population by 55%, and rural area of Delhi experiences a 115% increase in the eligible population. Diving deeper into the changes suggest that the key contributing factor for such spikes is the change in population in NSS from 2011 to 2018. In addition, our inflator to the adjuster also varies across sectors and regions. It is estimated to be 5.09% for rural and 3.33% for urban; and 6.11% for the south and 3.39% for the north.

As noted above, in addition to the number of families eligible, the distribution of those families also matters for the NHA in terms of costs and impacts. For example, PM-JAY has different models of payment – and therefore potentially different costs – across states. In addition, some states are not yet enrolled in the program, and states are at different points in their process of enrolling entitled individuals, with states in the south much further along than states in the North. In fact, we find substantial variation in estimated eligibility growth around the country. For example, as illustrated in Table 1, the eligible population rose by 4% in rural areas, and 10% in urban areas; 4.61% in the northern region, and 6.29% in the southern.

As another example, the set of individuals who are eligible for PM-JAY may have gotten sicker or healthier, which would impact underlying program costs. Unfortunately, the 2011 NSS is a consumption round, not a health round, so we do not have health information that we can use to compare 2011 to 2018. We address this shortcoming in two ways. First, we compare the age and gender mix from 2011 to 2018. Second, we compare changes in health from the 2014 to

⁵ While NHA has discussed using the previous decadal growth rate of 18% (2001-2011), our analysis predicts population growth for a subset of the population (i.e., SECC eligible) and for the period 2011-2018

2018 NSS, to at least assess over this shorter time frame whether health measures among the imputed eligible population are changing.

Table 2 shows the distribution of age and gender among the imputed eligible population in the 2011 and 2018 NSS. There is a small change in age distribution, with more individuals below 35 and fewer age 36-50 in 2018 than in 2011. This suggests that the population may be getting somewhat healthier over time.

Table 2: Age and Gender Distribution of Eligible Population, 2011 & 2018

Description	Age				Gender
	Below 16	16 - 35	36 - 50	51 - 65	Female
NSS 2011	27.95%	35.18%	19.79%	12.53%	49.37%
NSS 2018	28.39%	36.51%	17.88%	13.19%	49.45%

Table 3 shows health indicators for the imputed eligible populations in the 2014 and 2018 NSS. There is a striking reduction in the share of the population that is chronically ill and are hospitalized. This confirms that there may be improvements in population health over time. Taken together, Tables 2 and 3 show that the composition of the population may be changing in important ways that impact program costs.

Table 3: Health Indicators, 2014 and 2018

Description	Share of Eligible Population	
	Chronically ill	Hospitalized in the last year
NSS 2014	3.12%	4.52%
NSS 2018	2.26%	3.67%

Conclusion

Our predictive model suggests that there will be a modest change in eligibility, in terms of overall numbers, as NHA adjusts its eligible pool to align with the Census of 2021. However, the change in composition of the eligible pool is expected to be significant – across geographies as captured by states and rural-urban sectors, and health profiles of the eligible as indicated by age and health indicators. This is expected to have serious ramifications for NHA and state authorities as the need for health services, health seeking behaviors, costs and impact of the program are expected to change with a changing eligible pool.

Appendix 1

Predicted PM-JAY Eligible Households, as per applied SECC Criteria

State	Region	Eligible			Corrector 1	Corrector 2	Overall	Estimate
		SECC 2011	NSS 2011	NSS 2018	Adjuster	Inflator	Adjuster	Adjusted 2018
A & N Island	Aggregated	21399	28882	39478	0.7409	0.0866	0.8051	31784
Andhra Pradesh	Rural	6193169	9925656	8994035	0.6240	0.0839	0.6763	6082950
Andhra Pradesh	Urban	1949089	2501088	3242667	0.7793	0.0602	0.8262	2679080
Arunachal Pradesh	Urban	17328	13149	15380	1.3178	0.1657	1.5362	23628
Arunachal Pradesh	Rural	71600	134263	187126	0.5333	0.0881	0.5802	108578
Assam	Urban	186225	273373	303939	0.6812	-0.0003	0.6810	206980
Assam	Rural	2515570	2054922	2954923	1.2242	-0.0885	1.1158	3297024
Bihar	Rural	10029655	8112191	8140801	1.2364	0.0168	1.2572	10234278
Bihar	Urban	865916	550727	995498	1.5723	-0.0341	1.5187	1511843
Chandigarh	Urban	68447	51172	58676	1.3376	-0.0586	1.2593	73889
Chandigarh	Rural	2831	3436	5274	0.8238	-0.0309	0.7984	4211
Chhattisgarh	Urban	589738	482840	463922	1.2214	0.0893	1.3305	617244
Chhattisgarh	Rural	3139401	3038678	3203582	1.0331	0.0632	1.0984	3518790
D & N Haveli	Rural	24529	34530	40964	0.7104	-0.1994	0.5687	23296
D & N Haveli	Urban	8085	8385	13416	0.9642	0.1589	1.1174	14991
Daman & Diu	Aggregated	10191	20261	9634	0.5030	0.0567	0.5315	5121
Delhi	Urban	514550	878317	1614042	0.5858	0.0077	0.5904	952874
Delhi	Rural	73876	51389	92085	1.4376	0.1997	1.7247	158820
Goa	Rural	21807	61536	23928	0.3544	0.1485	0.4070	9739
Goa	Urban	15168	36067	65405	0.4205	0.1701	0.4921	32184
Gujarat	Urban	1656436	2140464	1607598	0.7739	0.0012	0.7748	1245566

State	Region	Eligible			Corrector 1	Corrector 2	Overall	Estimate
		SECC 2011	NSS 2011	NSS 2018	Adjuster	Inflator	Adjuster	Adjusted 2018
Gujarat	Rural	2828894	3801767	3229525	0.7441	0.0048	0.7477	2414696
Haryana	Rural	925037	1430687	1239111	0.6466	0.0242	0.6622	820580
Haryana	Urban	626761	442445	494180	1.4166	-0.0048	1.4097	696660
Himachal Pradesh	Urban	41046	42922	44340	0.9563	0.0399	0.9945	44094
Himachal Pradesh	Rural	236628	701045	780078	0.3375	0.0544	0.3559	277640
Jammu & Kashmir	Rural	430954	652619	748836	0.6603	0.1323	0.7477	559934
Jammu & Kashmir	Urban	182743	195956	259351	0.9326	0.0347	0.9650	250266
Jharkhand	Rural	2451321	2823468	3353287	0.8682	-0.0238	0.8475	2842004
Jharkhand	Urban	354459	416464	491405	0.8511	-0.0061	0.8459	415695
Karnataka	Urban	1705983	1317566	1464264	1.2948	0.0069	1.3037	1908969
Karnataka	Rural	2428561	4199315	4450381	0.5783	0.0563	0.6109	2718583
Kerala	Rural	1475627	3290472	2439844	0.4485	0.0340	0.4637	1131373
Kerala	Urban	382471	843363	1121007	0.4535	0.0207	0.4629	518904
Lakshadweep	Aggregated	1465	6884	5326	0.2128	0.0605	0.2257	1202
Madhya Pradesh	Rural	6791110	6949109	6271441	0.9773	0.0237	1.0004	6273900
Madhya Pradesh	Urban	1601052	1115244	1432899	1.4356	-0.0245	1.4004	2006666
Maharashtra	Urban	2481588	3745059	3333368	0.6626	0.0189	0.6751	2250430
Maharashtra	Rural	5890733	7463648	6826429	0.7893	0.0951	0.8644	5900430
Manipur	Rural	232348	163526	232226	1.4209	0.0352	1.4709	341590
Manipur	Urban	44668	48092	82101	0.9288	-0.0311	0.8999	73880
Meghalaya	Rural	324874	396225	440344	0.8199	0.0539	0.8641	380515
Meghalaya	Urban	22139	16172	26501	1.3690	-0.0254	1.3342	35359
Mizoram	Rural	66857	100484	112996	0.6654	-0.0133	0.6565	74179
Mizoram	Urban	35023	26161	31549	1.3388	-0.0704	1.2446	39264
Nagaland	Urban	21631	32184	35667	0.6721	0.0585	0.7114	25374
Nagaland	Rural	180639	143267	238355	1.2609	0.1383	1.4353	342108

State	Region	Eligible			Corrector 1	Corrector 2	Overall	Estimate
		SECC 2011	NSS 2011	NSS 2018	Adjuster	Inflator	Adjuster	Adjusted 2018
Odisha	Urban	478974	584513	647927	0.8194	-0.0441	0.7833	507529
Odisha	Rural	5621119	5047754	5895512	1.1136	-0.0038	1.1094	6540355
Puducherry	Urban	64210	75761	49381	0.8475	0.1000	0.9323	46036
Puducherry	Rural	39224	62623	90715	0.6264	0.1823	0.7405	67176
Punjab	Urban	731995	828610	828901	0.8834	0.0252	0.9056	750671
Punjab	Rural	766070	2064403	1916261	0.3711	0.1340	0.4208	806383
Rajasthan	Urban	1357241	1168927	1151069	1.1611	-0.0172	1.1411	1313526
Rajasthan	Rural	4614255	5403648	5565589	0.8539	0.0170	0.8684	4833185
Sikkim	Rural	30121	60339	54213	0.4992	0.1461	0.5721	31016
Sikkim	Urban	9670	8310	14542	1.1637	0.2310	1.4325	20831
Tamil Nadu	Urban	3189345	3074207	2917329	1.0375	0.0553	1.0948	3193994
Tamil Nadu	Rural	4591742	6899400	6882189	0.6655	0.1045	0.7350	5058699
Tripura	Rural	425415	556816	532418	0.7640	0.0387	0.7935	422496
Tripura	Urban	69007	33134	62611	2.0826	0.0600	2.2076	138222
Uttar Pradesh	Urban	2602205	3101589	2935561	0.8390	-0.0196	0.8226	2414734
Uttar Pradesh	Rural	9204863	13663150	14514844	0.6737	0.0149	0.6838	9924813
Uttarakhand	Rural	395052	800831	546091	0.4933	0.0579	0.5218	284974
Uttarakhand	Urban	142669	140912	173947	1.0125	0.0981	1.1118	193386
West Bengal	Rural	9827461	10380860	9719690	0.9467	0.0410	0.9855	9579111
West Bengal	Urban	1362266	2254226	2463495	0.6043	-0.0018	0.6032	1485994
		105262526	126975485	128219469				110790298

Disclaimer:

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