International Journal of Engineering Technology Science and Research
IJETSR
www.ijetsr.com
ISSN 2394 – 3386
Volume 4, Issue 8
August 2017

An Use Case of Smart cards in Rashtriya Swasthya Bima Yojana

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Abstract

The Rashtriya Swasthya Bima Yojana (RSBY) is a milestone project in ensuring the health care for the marginalised population. It is one of the largest publicly funded health insurance (PFHI) project in the world today with coverage for hospitalization being provided to the BPL populations in India. Most of the covered population are poor and live in rural India. It is a family floater policy wherein it provides annual hospitalisation coverage up to ` 30,000 for a family of five members. The RSBY program is based on a public private partnership model and is jointly funded by the central and the state government in a 3:1 ratio. RSBY is a unique project which is completely paperless and uses biometric enabled smart cards as a vehicle of delivery which minimizes the inconvenience to the policy holder and also speeds up the service delivery process, as most often the target audience are illiterate and faces a lot of difficulty in handling a paper based system.The usage of multi-level smart card key management in RSBY has been a game changer and has helped both the service provider in reducing leakages and pilferage in the system. The cost of treating medical condition both for inpatient and outpatient care are some of the major reasons of financial catastrophe and turmoil for the BPL population. The usage of biometric enabled smart cards as the delivery platform for RSBY has helped in protecting the scheme from pilferage and ghost users.

Introduction

RSBY is one of the largest publicly funded health insurance (PFHI) projectin the world today with coverage for hospitalization being provided to the BPL populations in India. Most of the covered population are poor and live in rural India. *More important than its scale, however, is the innovative approach for providing services to the poor which combines technology that can reliably identify beneficiaries and verify transactions with a public-private partnership where incentives for all stakeholders are appropriately aligned*(Palacios, 2010).

RSBY is a PFHI scheme which was initiated by the Ministry of Labour and Employment (MoLE) in 2008. The primary aim of the project was to provide health care cover to the under privileged Below Poverty Line (BPL) population. RSBY is one of the largest health insurance schemes undertaken globally. There are more than 60 million subscribers to the RSBY scheme. The aim of government of India (GOI) is to bring the entire BPL population under the scheme of RSBY population. The major beneficiaries of the scheme are the marginalised rural population of India. The RSBY is a unique project which is paperless and uses biometric enabled smart cards which minimizes the inconvenience to the policy holder and also speeds up the service delivery process. It is the largest PFHI project in the world based on numbers of beneficiaries covered(Ghosh & Gupta, 2017).

The smart card enabled e-governance projects undertaken by any of the state or central government or its related departments and organisations are the major vehicles of growth for smart cards. Smart cards are

International Journal of Engineering Technology Science and Research
IJETSR
www.ijetsr.com
ISSN 2394 – 3386
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increasingly being used in these projects as a delivery and identification tool because of its inherent security, portability and easy integration with biometrics.

According to planning commission (2007)the Government of India administers a number of subsidy/welfare programmes targeting the vulnerable sections of society. The degree of success in implementing these programmes is dependent on the level of efficiency of the delivery process. Adopting appropriate tools to achieve this objective should become part of the programme implementation strategy. However, as technological innovation invents new methods, adoption of tools becomes a dynamic criterion. Multi-Application Smart Cards (MASCs) is one of the technological breakthroughs of recent times. MASCs facilitate simplification of procedures and enhancing the efficiency in administering various schemes. The application of this technology cuts across usage; from government to citizens, government to other agencies and between agencies to citizens. The National e-Governance Policy fully recognises the significance of this technological revolution and the need for tapping its potential for various applications in the government to citizensinterface.

Smart cards are becoming increasingly popular for application in government projects starting from driving license to RSBY health cards. They are becoming irreplaceable facilitators for making the government-citizen interactions more simple and transparent. The issues relating to vendor lock in and interoperability of smart cards has been addressed by adoption of SCOSTA smart card standards.

The increased usage of smart card as a delivery vehicle can be seen both in the organised and the unorganised sectors. In the organised sector health cover like Employees' State Insurance (ESI), Provident Fund (PF) for the work force are being serviced and delivered by using smart cards.

The organised sectors have some social security cover like ESI, PF fund etc., however the unorganised sector does not have any form of social security. With a view of correcting this gross inequality the Government of India (GOI) has launched social re-engineering schemes like RSBY to correct the situation.

Objective and Purpose of the RSBY

A unique feature of the Indian economy is the lack of any universal social and healthcare security as is present in any developed nation like the USA, Canada etc. as a result medical expenses are largely financed through individual out-of-pocket payments[1]. National health accounts data show that the central government, the states and local governments together account for only 20% of total health expenditures in India: 78% take the form of un-pooled, out of pocket payments – one of the highest percentage in the world and a main reason for people falling into poverty. External aid to the health sector via government or NGOs accounted for a mere 2% of total health expenditure(Jain, 2010).

The affected population which include both the urban and rural population are often forced to borrow and resort to extreme measure like sell of their assets and valuables a fall out of poor healthcare security. The

[1] According to the world health organization (WHO), India has one of the highest rates of out of pocket health spending in the world at 78 percent of total health spending and 94 percent of private health spending.

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problem is even more multiplied in case of the underprivileged and BPL section of the population[2] as is evident from the table below.

Table 1: Out of Pocket Expenses and Indebtedness in India

Items	All India	Poorest
Average OOP Payments made per hospitalization in Govt. facilities	70	54
Average OOP Payments made per hospitalization in private facilities	158	115
Percentage of people indebted due to OP Care	23	21
Percentage of people indebted due to IP Care	52	64

Source: Swarup, 2010

Social security such as ESI, PF exists only in the organized sector which only accounts for the 6% of the 433 million people, thus 94% of the workforce exists in unorganised sector(Swarup, 2008) and contributes to around 50 per cent to the national Gross Domestic Product still they do not have any social security cover (NCEUS, 2008). Realising the growing social security needs of informal sector workers, the Indian Government is working towards an agenda of social protection, including employment security, old age pensions, life, disability and health insurance (Jain, 2010).

It is estimated that around 4% of BPL population requires hospitalisation every year and the cost per admission (at 1995-96 prices) was estimated at ` 2,100(Rajeev, 2004).

Funding and Salient Features of RSBY

The RSBY program is jointly funded by the central and the state government in a 3:1 ratio i.e. 75% of the cost is borne by the center while 25% is borne by the state government respectively.The only cost the beneficiary has to pay is that of a registration charges of `30 yearly. The cost of smart card is also borne by the central government. The insurance premium is determined at the state-level based on an open tender process. Average premium per beneficiary for active districts is around `560.

[2] The National Sample Survey Organization (NSSO) 2004 had reported that 65% of India's poor get into debt and 1% fall below the poverty line because of sickness.

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It is a family floater policy wherein it provides annual hospitalisation coverage up to ` 30,000 for a family of five members. Coverage extends to five members of the family which includes the head of household, spouse and up to three dependents. RSBY covers all pre-existing diseases and there is no age limit of the beneficiaries. The rates of most surgical procedures are fixed and the transportation charges are also covered up to a maximum of `1,000 with a limit of ` 100/- per hospitalization.

Table 2:Key Parameters of RSBY

Parameter	Description	Remarks
Benefits Covered	Cost of hospitalization for 725+ procedures at empaneled hospitals up to ` 30,000 per annum per household plus ` 100 transport cost per visit up to ` 1000.	Pre-existing conditions are covered; minimal exclusions;day surgeries covered;
Eligibility Criteria	Must be on the official state BPL list; limited to five members of the household including household head, spouse and three dependents	All enrolled members must be present to be enrolled; infants are covered through mother
Premium And Fees	` 30 registration fee per household per annum paid by household; Per household premium payment determined through competitive bidding process;	Average premium for active districts is around ` 560
Policy Period	One year starting the month after first enrollment in a particular district	Enrollment can take place over four months
Financing	75%/25% Government of India/State Government	The ratio is 90%/10% in Northeast states and Jammu & Kashmir

Source: Palacios, 2010

Service Delivery System Model of RSBY

Each state must establish an independent body, the State Nodal Agency, to implement the scheme in that state through insurance companies. The Government of India provides the overall regulatory framework and technical support.

The delivery of the health care takes place through a network of empanelled hospitals which have successfully met the empanelment criteria. There are more than 4,500 empanelled hospitals among which 70% are private hospitals. The empanelment is done at the state level by the state selected insurance company based on prescriber empanelment guidelines. Once a hospital is empanelled a nationally-unique hospital ID number is generated so that transactions can be tracked at each hospital it is automatically covered by all the insurers.

An empanelled hospital has to install necessary hardware and software to be able to process beneficiaries' smart card transactions. They have a dedicated RSBY desk with trained staff. Each empanelled hospital is connected with the district server of the insurance company for real-time data transfer.

The Stakeholders of RSBY

The conceptual framework of RSBY was developed by the central government with active support from agencies like World Bank and TechnischeZusammenarbeit (GTZ) GmbH.

The RSBY is a unique project which has a thriving public private partnership (PPP) model. There are many stakeholders involved in the entire scheme. The major ones being:

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- Central Government
- State Government
- State Nodal Agency
- Insurance Company
- Hospitals
- NGOs
- Smart Card Agencies

Once a state signs a memorandum of understanding with the central government to implement RSBY, a nodal department is assigned by the state government. The nodal agency selects the insurance company based on open tendering. The financial bid of the tender is essentially the annual premium per enrolled household that the insurer is willing to accept for the prescribed level of coverage and other conditions. The insurer is compensated on the basis of the number of verified smart cards issued, i.e., households covered. Each contract is specified on the basis of an individual district in a state and the insurer agrees to set up an office in each district where it operates. While more than one insurer can operate in a particular state, only one insurer can operate in a single district at any given point in time(Palacios, 2010).

The selected insurer must covers the benefit package as prescribed by The Ministry of Labour and Employment (MoLE) through a cashless facility that in turn requires the use of smart cards which must be issued to all beneficiary. It mandates a sub-contract to be arranged with a qualified Third Party Administrator/Smart Card Provider. The insurer also engages local NGO's with sufficient reach to provide grass root contact and aware of the RSBY.

RSBY Process Flow

RSBY is a Public-Private Partnership initiative that involves a set of complex but well defined processes. The process flow for RSBY is detailed below (Swarup & Jain, 2010):

a) Implementing state government set-up an independent "State Nodal Agency" for RSBY.
b) State Nodal Agency collects and prepares BPL data in the specified RSBY format.
c) Insurance company is selected through an open bidding process.
d) Annually, an electronic list of eligible BPL households is provided to insurers by the state. An enrollment schedule for each village is prepared by them and the process has to be completed within four months.
e) It is the Insurance Companies obligation to hire intermediaries to reach out to the beneficiaries before the enrollment.
f) Insurer has to set up a 24-hour call center to provide help line services where information and guidance about the scheme and its usage can be obtained free of cost.
g) Insurance company is also obligated to start a district kiosk at the district headquarters, where any post-issuance modification in the smart card can be done.
h) Mobile enrollment stations are established at local centers (e.g., public schools) at each village at least once a year. These stations are equipped by the insurer with the hardware to collect biometric information (fingerprints) and photographs of the members of the household covered and a printer to print smart cards.
i) State government set up District Key Management Authority (DKMA) and appoints Field Key Officer (FKO) for smart card encryption and provides them with DKMA & FKO cards.
j) FKO from the district needs to be present at the camp and must insert his or her own government-issued smart card and provide his or her fingerprint to verify the legitimacy of the enrollment. This way each enrollee can be tracked to a particular official. In addition to the FKO, an insurance company/smart card agency representative is present at the enrollment camp.
k) At the end of the enrollment camp, a list of enrolled households is sent to the state nodal agency by the insurer. The list of enrolled households is maintained centrally.

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l) Before commencement of the enrollment process, insurance company empanels both public and private hospitals. Each empaneled hospital is provided with a smart card which also contains a national unique ID.

m) A beneficiary, after receiving the smart card and after the commencement of the insurance policy, can visit any empaneled hospitals across the country to get the treatment.

n) A patient comes to a provider to receive care and goes straight to the RSBY help desk at the designated hospital where the patient's identity is verified via fingerprints.

o) Assistant at RSBY help desk checks whether procedure is in the list of pre-specified packages. Procedures are priced, paid to the provider on a case-based payment system.

p) If procedure is on list, appropriate prescribed package is selected, patient is scheduled for procedure and the amount to be paid out is blocked.

q) If not on list, help desk checks with insurer to price and get approval to conduct procedure, patient is schedule for procedure and the pre-determined amount to be paid is blocked.

r) In patient treatment is provided to the beneficiary.

s) Upon release of beneficiary from hospital, smart card is swiped again with fingerprint verification.

- Beneficiary is paid by the hospital `100/- as transportation expense at time of discharge.
- The pre-specified cost of procedure is deducted from the amount available on the card.

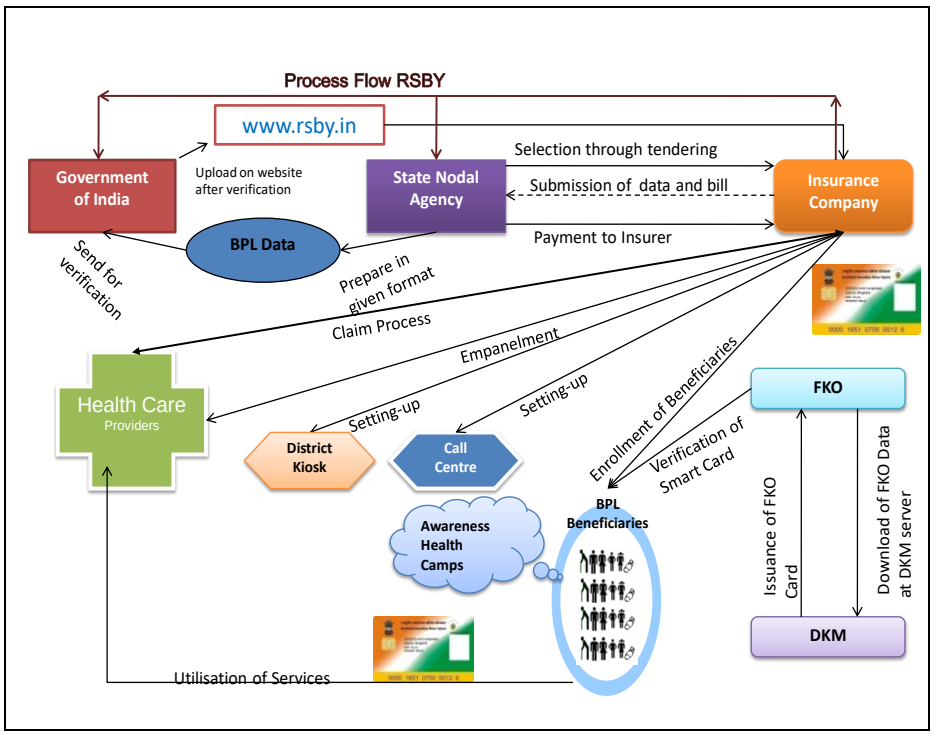
t) After rendering service to patient, hospital sends an electronic report and claim to the insurer.

u) The insurer/TPA reviews the records and information and makes payment to the hospital (electronically) within a specified time period (mutually agreed between insurer and hospital).

v) Insurance company submits the claim for premium on monthly basis for the enrolments done in that particular month from the nodal agency.

w) The nodal agency settles the claim of the insurance company.

Figure 1 : RashtriyaSwasthyaBimaYojana Process flow



Source: (Vishy, 2012)

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www.ijetsr.com
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Technology Framework of RSBY

RSBY employs innovative approach to provide services to the poor which combines technology that can reliably identify beneficiaries and verify transactions with a public-private partnership where incentives for all stakeholders are appropriately aligned (Palacios, 2010, p. 1). The RSBY deploys a technology platform cantered on smart card, which is used for both identification and as a vehicle for service delivery.

Smart Card Technology in RSBY

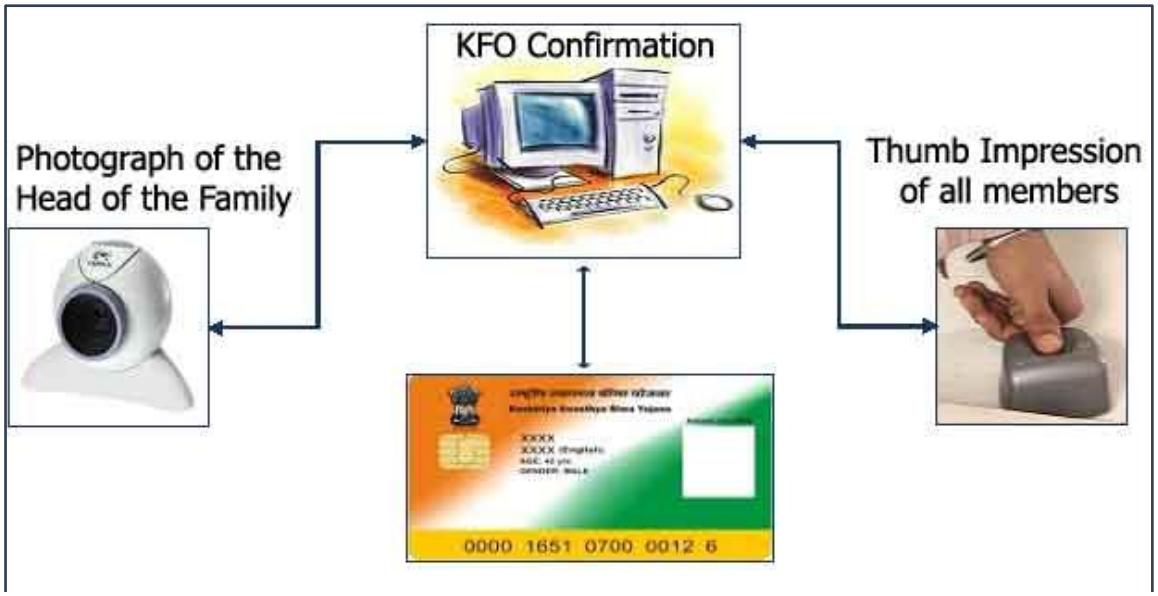
Smart card is central delivery vehicle of RSBY, which provides cashless transaction as well as inter-operability in network hospitals throughout the country. Biometric technology along with elaborate key management system is used to validate the beneficiary and minimise fraud and leakages in the system.

The entire technology backbone to the system is provided by the National Informatics Centre (NIC). SCOSTA complaint smart cards are used in the project which have become the de facto standard for most of the large smart card based project in India.

The smart cards are normally issued by the smart card service provider on behalf of the insurance company to the beneficiary. The ownership of the card throughout remains with the central government.

The smart card issued in RSBY is for an entire family having maximum of five members. It is not issued in the absence of head of the family as his photograph has to appear on the face of the card. In case one of the applying members other than the head of the family is absent his or her record can be added at the district kiosk, to be maintained by the insurance companies.

Figure 2:RSBY Registration Process Flow



Source: RSBY, 2017

Card Splitting Provision

A unique feature of the RSBY policy is the option of card splitting keeping in view with the migratory nature of the target population. The RSBY cards can be split at the time of first issue or subsequently at the district kiosk. Split value can be decided by the head of the family, provided the total amount on both the cards is equivalent to the total amount available on the primary card before the split. The insurance company will authorise issue of these cards. A new card can be issued in case of loss of smart card. However, the

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beneficiary will have to bear the cost of the duplicate card. As the details of the family would be available in the database, the card could be issued at the district kiosk.

The hospitals are mandated to possess necessary hardware of predetermined specifications to read and operate the data on the smart card. Transaction software, based on the specifications, is to be prepared by the service provider for use in the hospitals.

A back-end data base management is put in place for transmission from hospitals to a designated server and for electronic settlement of claims to make the scheme not only cashless but also paperless. An elaborate MIS is developed for close supervision and monitoring at various levels.

Biometric and Key Management Framework

The biometric technology is the fulcrum of delivery in RSBY. Fingerprints of all beneficiaries are collected during enrolment at the village level. Two fingerprints of each of the family member being enrolled captured. The primary fingerprints to be captured would be right and left thumb. One thumb impression of each of the household beneficiaries is stored in the smart card. The smart card in turn is protected from tampering by multi-level Key Management System (KMS)

The KMS is a unique feature of the entire system which helps in reducing fraud and leakages in the system and also injects accountability into the system. It has been developed by NIC, the implementation process is quite complex and it involves the generation of master keys cards.

The KMS will consist of three levels of operation for generation and Management of Keys and related Cards:

- Central Key Generation Authority(CKGA)
- District Key Manager
- Field Key Officer
  - Issuer(A district-level, state government officer)
  - Kiosk
  - Hospital

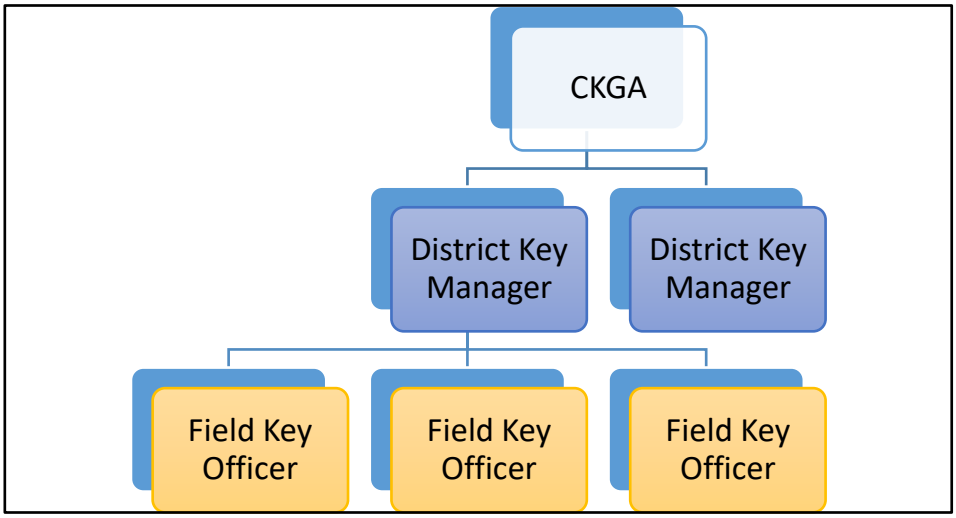
The master key cards generated at the FKO levels are used for field operations:

Issuer >Issuance Card (MIC)

District Kiosk > Kiosk Card (MKC)

Hospital > Hospital Card (MHC)

Figure 3: RSBY Key Management Hierarchy



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A Central Key Generation Authority (CKGA) has been set up for creating root keys and to manage the entire key management system at the central level. The district keys are generated by CKGA. Thereafter, the keys for field key officers (FKOs) are generated at the district level. The district keys will be transferred by the CKGA to the district key managers. The DKMA is responsible for distribution of Master Key cards among various FKOs within the district. It also maintains the database of all the Master Key cards issued to various FKOs.

Issuance of RSBY Cards

RashtriyaSwasthyaBimaYojna Cards are generated with the help of Master Issuance Cards (MIC). At the camp organised for RSBY Enrolment, The issuer FKO who is a district-level, state government officer identifies every beneficiary in the presence of the insurance companies representative based on the hard copy of the beneficiary list he then insert his or her own, centrally-issued, smart card to verify the legitimacy of the enrolment. In such a way, each enrolee can be tracked to the particular state government official that was present. After enrolment, the list of households issued smart cards is downloaded from the FKO's card and centralized at the district level and eventually state level(Palacios, 2010, p. 5).

The concerned issuing FKO is responsible for safe keeping and safe usage of these cards, while they are in use. They are also their responsibility to ensure that all the defined security parameters are strictly being followed at the field by various trusted authorities which are using authority cards for various functionalities.

This elaborate key management system essentially minimizes the chances of fraud and bogus enrolment since the beneficiary cards can only be generated after the MIC cards are put into the system by the FKO. Thus each beneficiary is tagged with the FKO who is in turn tagged with the DKM just in case of bogus cards or any disputes related to the card issuance can be the concerned also bogus claims at the hospital end.

Online Paperless System

RSBY has been able to operationalise a paperless scheme with the help of technology. Claims are submitted online by hospitals and so insurers can make online payments to hospitals. The aim of the scheme is to use technology not only for controlling fraud and monitoring utilization, but also to find innovative solutions to insurance-related problems. The enrolment software has been designed to ensure that male heads of households must insure their spouses. In addition, since the scheme aims to provide quality treatment to all beneficiaries, technology has been implemented to ensure that every beneficiary receives needed treatment. If the patient is not in a condition to validate his/her identity at the hospital then any family member who is on the RSBY smart card can validate the identity of the patient by providing his/ her finger print.

A robust backend data management system is being developed for RSBY which will ensure smooth flow of data from across India to both the state and central governments in real time. Apart from the central server three levels of state level of servers need to be in operation. They are the following(Ministry of Labour and Employment, 2010, p. 15) :

- **State Server by State Nodal Agency:** State server located at the state capital which is used to store enrolment and hospitalization data from all over the state. It also stores the fingerprints and photographs data of the RSBY beneficiary.
- **DKM Server by District Authorities:** District authorities needs to set up a DKM server at the district, which will be used to issue FKO and other cards and to download the data from the FKO cards. The same server which is being used for BPL population by the DKM shall be used for other targeted beneficiaries also.
- **Insurance Company Server:** Insurer set up a server where data related to enrolment and hospitalisation is stored, also ensuring that the data is available to the district kiosk as and when required.

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Present Status of RSBY

As per the latest data there are approximately 41.3 million BPL families that have been enrolled in RSBY out of the 72.7 million registered BPL families. Thus the coverage of RSBY stands at around 43.2% of BPL families are still not under the umbrella of RSBY as per the latest data from RSBY website.

Table 3 : RSBY Registration Process Flow

State	Number of Districts		Total BPL Families	BPL Families Enrolled Till Date
	Enrolment Completed	Enrolment in Progress		
Andhra Pradesh	1	1	-	-
Arunachal Pradesh	10	10	-	-
Assam	23	23	2371950	1421104
Bihar	38	38	13822582	6899144
Chandigarh	1	1	-	-
Chhattisgarh	27	27	3724030	3442749
Delhi	1	1	-	-
Goa	2	-	-	-
Gujarat	26	26	4396654	1876628
Haryana	21	21	1229850	437850
Himachal Pradesh	12	12	877763	480588
Jammu and Kashmir	2	2	-	-
Jharkhand	24	24	3607741	1682894
Karnataka	30	30	11346934	6731881
Kerala	14	14	2221283	2021572
Madhya Pradesh	9	-	-	-
Manipur	6	5	120237	70925
Meghalaya	11	11	479743	256138
Mizoram	8	8	212572	152983
Nagaland	11	-	-	-
Orissa	30	30	6158498	4462959
Pondicherry	1	1	-	-
Punjab	22	22	452979	232352
Rajasthan	33	33	3829760	2769097
Tamilnadu	2	-	-	-
Tripura	8	8	771225	492022
Uttar Pradesh	75	75	5301377	1464242
Uttarakhand	13	13	728216	285229
West Bengal	21	21	11100347	6150716

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www.ijetsr.com
ISSN 2394 – 3386
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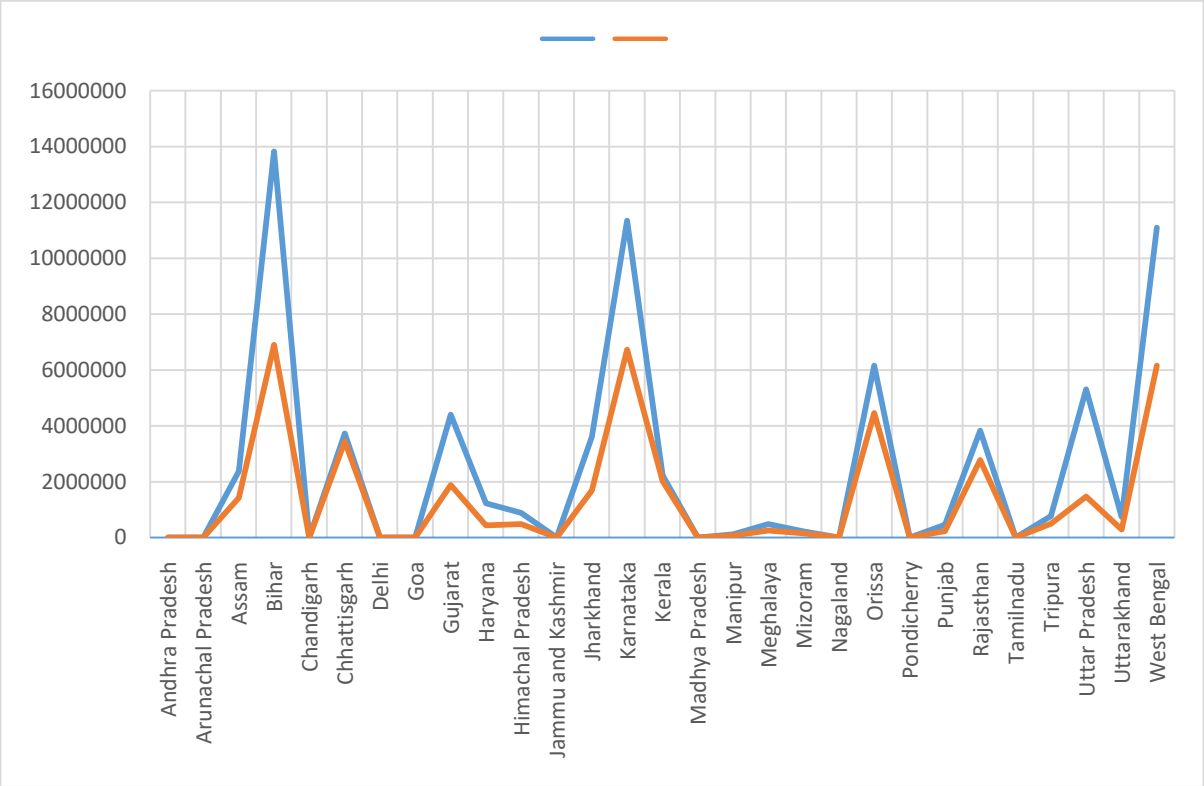
Source:(RSBY, 2017)

Figure 4 : RSBY State wise BPL Families Vs Enrolment



Source:(RSBY, 2017)

Since the inception of RSBY there has been a number of studies which have provided a mixed outlook of the efficacy of RSBY in reducing the cost burden on the BPL families**(Ghosh & Gupta, 2017; Prinja, et al., 2017)**. The scheme has resulted in the increase of hospitalisation among the beneficiaries especially in the rural areas but surprisingly as most of the recent studies have pointed out it had negative to zero impact on the out of pocket(OOP) expenditures.

The usage of biometric enabled smart card has been a game changer and has helped both the provider and the beneficiary in targeting and delivery of the scheme. As evident from various studies on the usage of smart card in e-governance projects(Muralidharan, et al., 2014; Maitra, 2016; Azam, 2016).

Conclusion

The cost of treating medical condition both for inpatient and outpatient care are some of the major reasons of financial catastrophe and turmoil faced by the BPL populace. The RSBY is a milestone PFHI project which ensures that health care services reach themarginalised population. The usage of biometric enabled smart cards as the delivery platform for RSBY has helped in protecting the scheme from pilferage and ghost users. The usage of a paperless and biometric based system has helped the beneficiaries as most often the target audience are illiterate and faces a lot of difficulty in handling a paper based system. It also provides a level of transparency to the system which is not possible in a traditional insurance system.

Presently the seeding of RSBY beneficiaries with Aadhaar is being undertaken and it will help the government in mapping the beneficiaries.RSBY which was under the Ministry of Labour and Employment has been transferred to the Ministry of Health and Family Welfare and has been renamed as National Health Protection Scheme (NHPS) wherein the coverage amount is being raised from`30,000 to `1,00,000. The NHPS was launched in the 2016-2017 year budget by the finance minister of government of India. NPHS was slated to replace the RSBY by the month of April 2017. But the scheme could not be rolled out as the cost sharing between the center and the state government could not be worked out. The NHPS if properly implement with smart card and Aadhaar will be step forward from RSBY and will help in providing 400 million BPL population with healthcare benefits.

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