The Online Referral System in the state health insurance scheme of Karnataka, India

A digital tool to contribute to strategic purchasing

Country studies series on digital technologies for health financing

World Health Organization

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(Country studies series on digital technologies for health financing)

ISBN 978-92-4-010734-2 (electronic version)
ISBN 978-92-4-010735-9 (print version)

Suggested citation. The Online Referral System in the state health insurance scheme of Karnataka, India: a digital tool to contribute to strategic purchasing. Geneva: World Health Organization; 2025 (Country studies series on digital technologies for health financing). Licence: CC BY-NC-SA 3.0 IGO.

Cataloguing-in-Publication (CIP) data. CIP data are available at http://apps.who.int/iris.

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Acknowledgements

The publication was prepared by Swati Srivastava (Heidelberg Institute of Global Health, Medical Faculty and Teaching Hospital, Heidelberg University, Heidelberg, Germany), Manuela De Allegri (Heidelberg Institute of Global Health, Medical Faculty and Teaching Hospital, Heidelberg University, Heidelberg, Germany), Sudha Chandrasekhar (Advisor, Health Systems Transformation Platform, New Delhi, India) and Inke Mathauer (Senior Health Financing Specialist, World Health Organization [WHO] headquarters, Geneva, Switzerland). Valuable inputs were provided by Maarten Oranje (Consultant, WHO headquarters, Geneva, Switzerland).

WHO gratefully acknowledges the support received to conduct this case study from Anil Kumar (Principal Secretary Health, Government of Karnataka, Indian Administrative Service, Bengaluru, India), the inputs provided by Randeep Devendiran (Commissioner Health and Family Welfare, Government of Karnataka, Indian Administrative Service, Bengaluru, India) as well as the review and comments from Sangappa (Executive Director, Suvarna Arogya Suraksha Trust, Indian Administrative Service, Bengaluru, India), Suresh Shastri (Director Medical, Suvarna Arogya Suraksha Trust, Bengaluru, India), Spoorthy Sagar (Project Manager, Suvarna Arogya Suraksha Trust, Bengaluru, India) and Murugesh Jayaprakash (AB-ArK Cell, Commissionerate of Health and Family Welfare Services, Bengaluru, India). Moreover, WHO is grateful to Rajeev Sadanandan (Chief Executive Officer, Health Systems Transfomration Platform, New Delhi, India) for his support provided to undertake this study.

WHO also thanks Grace Achungura (Technical Officer, WHO Regional Office for South-East Asia, New Delhi, India), Jaidev Anand (National Professional Officer, WHO Regional Office for South-East Asia, New Delhi, India), Fahdi Dkhimi (Technical Officer, WHO headquarters, Geneva, Switzerland), Bruno Meessen (Senior Health Financing Advisor, WHO headquarters, Geneva, Switzerland), and Karthik Adapa (Regional Advisor Digital Health, WHO Regional Office for South-East Asia, New Delhi, India) for their helpful peer review comments.

Moreover, thanks is extended to Valeria Cruz de Oliveira (Regional Advisor Health Financing, WHO Regional Office for South-East Asia, New Delhi, India) for the overall support as regional health adviser for health financing, as well as to Tsolmon Tsilaajav (Technical Officer, WHO Regional Office for South-East Asia, New Delhi, India).

Finally, WHO gratefully acknowledges financial support received for this project from the WHO-European Universal Health Coverage (UHC) Partnership as well as from the Government of Canada.

Ethical approval for the study was obtained from the Ethics Commission at the Medical Faculty, Heidelberg University. Approval to conduct the study was obtained from the Suvarna Arogya Suraksha Trust and the Department of Health, Government of Karnataka.

List of abbreviations

AB PM-JAY	Ayushman Bharat Pradhan Mantri Jan Arogya Yojana
AB PM-JAY CM's ArK	Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana Chief Minister's Arogya Karnataka
ABDM	Ayushman Bharat Digital Mission
ABHA	Ayushman Bharat Health Account
APL	Above Poverty Line
BIS	Beneficiary Identification System
BPL	Below Poverty Line
CHC	Community Health Centers
HEM	Hospital Empanelment Module
NIC	National Informatics Centre
OOPE	Out-of-pocket expenditure
ORS	Online Referral System
PFHI	Publicly Funded Health Insurance
PHC	Primary Health Centers
SAST	Suvarna Arogya Suraksha Trust
TMS	Transaction Management System
UHC	Universal Health Coverage
UIDAI	Unique Identification Authority of India
WHO	World Health Organization

Executive Summary

India has a pluralistic health system, with a multiplicity of public (primary, secondary, tertiary, specialized) and private healthcare providers. Referral pathways between these facilities, although specified in theory, have not been routinely followed, leading to poor quality of care, inefficiencies and escalating costs. Ideally, a referral system plays an important role in health service organization, by specifying the conditions of access for explicitly defined benefits. It facilitates access to specialized (mostly inpatient) health services, while directing patient pathways and health care seeking behaviour, promoting efficiency and quality. This is particularly important in mixed health care systems, where "gatekeeping" is needed to curtail the use of expensive private health services which could have been more economically provided in public facilities. Thus, one of the aims of a referral system is to make purchasing more strategic and to align health service purchasing with available government revenues and available health services.

This case study focuses on the Indian state of Karnataka and a particular digital technology, the "Online Referral System" (ORS), which came into use in 2022 to support the referral system. This digital tool seeks to overcome the limitations of the previous manual referral process and aims to optimize the patient referral function for health services covered by the state health insurance scheme, the Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana Chief Minister's Arogya Karnataka (AB PM-JAY CM's ArK). This paper examines how the use of this digital technology, the ORS, supports health financing tasks and how this would ultimately contribute to progress in the UHC objectives. The study was conducted using a qualitative-dominant mixed-methods theory-based approach, including a rapid review of documents, in-depth interviews and quantitative analysis of secondary data.

Prior to 2018, there were no standard pathways to be followed in the public health system of Karnataka. Therefore, the Government of Karnataka first introduced a mandatory, manual (paper-based) referral system in 2018, for patients seeking specialized care at higher level facilities. Yet, various inefficiencies in the manual referral system persisted, including a lack of accurate information about the capacities of public healthcare facilities and the practice of informal or even retroactive referrals to the private sector (for rent-seeking purposes). The aims of the ORS were thus to (i) streamline referral pathways, ii) increase the capabilities of government hospitals to provide health services of appropriate quality in order to increase the use of public health services; (iii) improve compliance with the referral rules and limit the use of private health services.

The ORS was developed in collaboration between the AB PM-JAY CM's ArK Cell, the purchasing agency, called Suvarna Arogya Suraksha Trust (SAST), Karnataka's Department of Health, the Commissioner, and the National Informatics Centre. It was piloted in 2019-20 and fully implemented in June 2022. The ORS enables certain tasks which the manual system could not operationalize: the real-time assessment

of service availability within the public network of hospitals, and referrals of patients for specific procedure codes to a choice of geographically nearby hospitals, thereby enhancing service utilization within public hospitals empaneled within the AB PM-JAY CM's ArK. Each referral is now entered into the ORS, which checks the availability of the service in the same facility, in other public facilities or in private facilities, and either suggests admission or approves the referral. In the latter case, the patient receives a referral letter (on paper) and a list of hospitals. Provided that the patient has presented a valid referral letter, the receiving hospital is paid by SAST for the services.

The introduction of the ORS was accompanied by other policy reforms, including a reclassification of treatment procedures in the benefit package and changes in the provider payment system, granting more financial autonomy to health facilities and introducing performance-based "team incentives".

Based on the qualitative and quantitative data collected, it is possible to identify the beneficial effects of the ORS on a range of health financing tasks, contributing positively to the UHC objectives:

- **A better understanding of entitlements and obligations by users** (in a way that has not exacerbated existing digital divides), helping to direct patient flows towards the public sector and preventing the oversupply and over-use of the private sector for health services;
- **An increase in the number and share of referral cases to public hospitals** (from 60% of the total referrals in 2018 to 92% in 2023), leading to cost-savings for the purchasing agency SAST, and an increase of the financial revenue as well as a more stable cashflow for government hospitals;
- **Better data for monitoring and planning of hospital capabilities**, which helped to identify which public health services in which districts needed to be strengthened, and will enable further policy adjustments, now that more detailed data on referral practices become available.

At the same time, the current design and implementation of the ORS do not yet allow to realize its full potential as an instrument for strategic purchasing, due to multiple challenges, most notably related to:

- Incomplete digitalization of the ORS and a lack of communication channels between referring and receiving facilities, leaving referring doctors without information about the treatment followed;
- Persisting loopholes and misuse of the ORS software;
- Cumbersome ORS procedures and multiple control mechanisms, leading to increased administrative workload at the SAST and a need for additional human resources;
- Shortages in digital skills and digital infrastructure at government hospitals;
- Lack of interoperability between ORS and other digital platforms used by the AB PM-JAY CM's ArK for purchasing related tasks, as well as between ORS and other national digital health initiatives.

Policy options to address these caveats are shared for consideration, including (i) expansion and completion of the digitalization of the referral system, such as including primary care providers; (ii) a shift towards automated generation of health insurance claims; (iii) closing loopholes to prevent the misuse of the ORS software; (iv) a revision of the ORS procedures and alignment with the available human resources at both the SAST and the government hospitals and (v) ultimately the creation of an interoperable national digital health system.

In conclusion, the ORS has demonstrated remarkable achievements and has realized its envisaged objective of streamlining referral pathways while monitoring and strengthening the capabilities of public hospitals in Karnataka under the AB PM-JAY CM's ARK scheme. As such, the ORS has contributed to making purchasing of health services more strategic. The ORS achievements and implementation experience also provide some lessons that may be useful for other Indian states or other countries. For one, it proved possible to use digital technologies to support health financing tasks without exacerbating digital divides. However, in contrast to beliefs that digitalization will always imply a reduction of manpower, the case of Karnataka also revealed that digitalization requires new skills as well as more human resources to operate a digital system. Lastly, it is critical to take on a holistic system perspective and to carefully consider the sequence in which new digital systems are introduced, rather than pursuing a stand-alone approach.

1. Introduction

1.1. Study focus

Digital technologies can contribute to attaining Universal Health Coverage (UHC) and the related health objectives postulated as part of Sustainable Development Goal 3, as acknowledged by the World Health Assembly Resolution on Digital Health in May 2018 *(1)*. In particular, digital technologies hold a lot of promise in the area of health financing, where they can support the health financing functions of revenue raising, pooling and purchasing, and enhance efficiency and effectiveness by improving the interactions between the different stakeholders involved across these functions *(2,3)*. In low- and middle-income countries (LMICs), digital technologies have been used in publicly funded health insurance (PFHI) schemes to facilitate scheme processes including data management and interactions among different end users, such as patients and beneficiaries, healthcare providers, the purchasing agency, and program administrators *(4,5)*. For instance, digital technologies for health financing (DTHF) can support the identification and enrolment of beneficiaries into PFHI, contribution payments, pre-authorization, billing and claims submission and reimbursement, financial incentive schemes for healthcare providers, or a patient referral system, the latter being the focus of this report.

A referral system plays an important role in health service organization, by enabling patient access to appropriate specialized health services, while simultaneously directing patient pathways and health care seeking behaviour, thus promoting both efficiency and quality *(6)*. This is particularly crucial when mixed health care markets are weakly regulated. A referral system specifies the conditions of access for explicitly defined benefits and defines how these (publicly funded) health services in the benefit package can be accessed using explicit decision criteria. It thus creates a gatekeeping function for the referring facilities *(7)*. Thus, one of the aims of a referral system is to make purchasing more strategic and to align health service purchasing with available government revenues and available health services *(8)*.

This case study focuses on a particular digital technology that was put in place to support the referral system used in the Indian state of Karnataka. This digitalized

referral system is called the "Online Referral System" (ORS), which was launched by the Government of Karnataka in April 2022. This digital tool seeks to overcome the limitations of the previous manual referral process and aims to optimize the patient referral function for health services covered by the state PFHI, the Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana Chief Minister's Arogya Karnataka (hereafter referred to as AB PM-JAY CM's ArK).

This paper examines how the ORS supports health financing tasks and how this may be contributing to progress in the UHC intermediate objectives (equity in resource distribution, efficiency, transparency and accountability) and final goals (utilization relative to need, financial protection, quality of care) *(9)*. In the remaining part of Chapter 1, an overview of the health financing system in Karnataka and in India is provided, as well as relevant health financing and digitalization reforms pertinent to the ORS. Hereafter, the study methodology is presented (Chapter 2), followed by a presentation of the ORS objectives, and its design and implementation (Chapter 3). Chapter 4 looks at the referral trends since the introduction of ORS, the effects on health financing and core challenges. Chapter 5 presents a conclusion with some policy options and broader lessons.

This case study adds to the evidence on electronic/digital referral systems in other countries, such as Estonia, France, Indonesia, Saudi Arabia, United Kingdom, United States *(10–20)*, even though the rationale and objectives for their introduction varied from country to country.

1.2. The health financing system in India and Karnataka

India has a pluralistic health system, with a multiplicity of healthcare providers (public, private, single-provider clinics and nursing or paramedical practitioners) providing services rooted in biomedical or traditional systems of medicine. The government health system consists of a tiered organization of primary, secondary, tertiary and higher-specialized health facilities. However, referral pathways between these facilities, although theoretically specified, have not been routinely followed, leading to poor quality of care, inefficiencies and escalating costs *(21)*.

Healthcare is financed through direct and indirect taxes collected at the state and national levels, and almost 50% of total health spending is out-of-pocket expenditure (OOPE) in 2022, as per the latest health accounts *(22)*. However, government health spending as a share of total health spending has increased over the last decade, and stood at 34.3% in 2021 *(22)*. Total health spending out of general government expenditure was 3.7% in 2021 *(22)*. In our focus state, Karnataka, total health spending stood at 4.9% of the total expenditure in 2022-23, declining from 6.0% in 2021-22 *(23)*. National and state governments have tried to reduce the high OOPE and to improve financial protection through the introduction of PFHI.

The most recent and largest Indian PFHI is the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY, often just referred to as PM-JAY). The AB PM-JAY was established in 2018 by developing a standardized model of PFHI from previous state experiences, which however were implemented at state level in diverse ways

across the country. It provides inpatient service coverage to approximately 400 million poor or vulnerable individuals identified using different socio-economic deprivation criteria. The scheme provides an annual household cover of INR 500,000 (approx. 5,500 USD in 2024) for listed benefit package procedures, which can be used in public and empaneled private hospitals. AB PM-JAY guidelines give individual states flexibilities to adapt the eligibility criteria, benefit package, provider empanelment, and other aspects of the scheme.

In 2018, the Government of Karnataka introduced the Arogya Karnataka PFHI by merging seven different state schemes to provide inpatient care up to an annual coverage of INR 200,000 (about USD 2,200 in 2024) for poor households. Later in 2018, this was integrated with the national AB PM-JAY, as the national scheme provided a higher coverage amount, to form the AB PM-JAY CM's ArK PFHI. This PFHI is the state's scheme adapting AB PM-JAY national guidelines, with the state health agency, the Suvarna Arogya Suraksha Trust (SAST), overseeing implementation and undertaking the purchasing function *(24)*. AB PM-JAY CM's Ark is a universal scheme for the whole population. Below poverty line (BPL) households, which represent about 80% (12.7 million) of households in Karnataka *(25)*, are entitled to inpatient health services free at the point of use. Inpatient services can be received in public facilities or empaneled private hospitals. Above the poverty line (APL) households are also entitled to health services under the scheme and have to pay 70% of the defined payment rates (referred to as "package costs"), while 30% are borne by the scheme, up to a benefit cap of INR 150,000 (approx. USD 1650 in 2024) annually per household.

1.3. Health financing and digitalization reforms in India

In 2009, the national government established the Unique Identification Authority of India (UIDAI), which issues unique identification numbers to all Indian citizens, called the "Aadhaar", which seeks to enable easier targeting for government development and social programs *(26)*. Especially since 2016, there have been rapid developments in digital health policies and the digital health ecosystem in India. The National Health Policy of 2017 recognized the potential of digital health technologies and the need to create an interoperable digital health ecosystem across the country *(27)*.

The National Digital Health Blueprint, a policy guidance document issued in 2019, provides guidance to Indian states and health stakeholders on developing a national digital health ecosystem connecting all digital health architecture in the country, including how interoperability of data collected through digital interventions can be achieved, with unique patient health identifiers and standardized electronic health records being critical components of the blueprint *(28)*. Yet, the operationalization of the national guidance faces several challenges, including fragmentation between digital systems used across different states, a lack of interoperability across different systems, such as hospital management systems and national programmes, as well as poor data portability issues. Low digital health literacy, primarily among women in lower income quintiles and rural population pose other challenges *(29)*.

The AB PM-JAY provides national guidelines in relation to scheme operation, including the implementation of digital technologies in health and health financing, which can be flexibly adapted by the individual states as per their operational requirements. These national guidelines cover digital public infrastructure and processes such as beneficiary identification (through the Beneficiary Identification System or BIS digital platform), hospital empanelment (through the Hospital Empanelment Module (HEM), digital platform), claims submission and provider payment (through the Transaction Management System digital platform, TMS) and decision support data systems for monitoring and evaluation *(30)*. In fact, many states use their own systems for each of these processes, with limited or no interoperability across states or state-national levels. Notably, these platforms are not fully interoperable even within some states.

After the implementation of AB PM-JAY, the Ayushman Bharat Digital Mission (ABDM) was launched in 2021 "to develop the backbone necessary to support the integrated digital health infrastructure of the country" *(31)*. ABDM aims to create several key elements, inter alia: 1) an electronic health record for beneficiaries, called the "Ayushman Bharat Health Account (ABHA) Number" (a personal health record number accessible through an app); 2) an online registry of all health facilities and healthcare professionals in the country; and 3) an open-source United Health Interface as an open protocol of digital applications. The ABDM also includes a Digital Health Incentives Scheme, under which financial incentives were provided to hospitals, diagnostic laboratories and providers of hospital and health management information systems for the installation of digital health infrastructure in order to incentivize the use of these digital infrastructure *(32)*. Further, in early August 2023, the Digital Personal Data Protection Bill was signed into law with the purpose of safeguarding personal digital data *(33)*. These examples show that there is considerable interest and activity in advancing digital health interventions in the country. These initiatives are summarized in Table 1 as a summary of the main health-related digital initiatives in India.

Table 1: Summary of the main health-related digital initiatives in India

Initiative	Year	Purpose
National Health Policy, 2017	2017	Policy guidance on the potential of digital health technologies and interoperable digital health technology ecosystem
National Digital Health Blueprint	2019	Policy guidance on developing a national digital health ecosystem
Ayushman Bharat Digital Mission (ABDM)	2021	Developing nationally integrated digital health infrastructure
Ayushman Bharat Health Account (ABHA) Number (under ABDM)	2021	Providing a 14-digit unique health identifier for a patient health record, linked to a web-based application known as ABHA App
Healthcare Professionals Registry (HPR) (under ABDM)	2021	Comprehensive registry of healthcare professionals in the country
Health Facility Registry (HFR) (under ABDM)	2021	Comprehensive registry of verified health facilities in the country
Unified Health Interface (UHI) (under ABDM)	2021	Web interface enabling interoperable exchange of information across all ABDM components
Digital Health Incentives Scheme (DHIS) (under ABDM)	2022	Financial incentive scheme for healthcare providers for installation of digital equipment
The Digital Personal Data Protection Bill, 2023	2023	Legislation to safeguard personal digital data

2. Methodology and conceptual approach

A case study was conducted using a qualitative-dominant mixed-methods theory-based approach *(34)* to document and assess the evidence and context around which the Karnataka online referral system was designed and implemented and the results it produced. First, a rapid review of available documents was undertaken, including published peer-reviewed and grey literature, government policies and orders, implementation and evaluation reports, meeting minutes and other relevant documents.

This information was used to develop an initial theory of change of the ORS, utilizing the orientation provided in the World Health Organization's (WHO) guide to assess the effects of digital technologies on health financing and UHC objectives *(2)*.

A referral system specifies the conditions of access, coupled with the benefits specification *(2,35)*. The ORS is a digital tool to support the optimization of referral practice within the AB PM-JAY CM's ArK. Specifically, the digitalization of a referral system is supposed to make it more effective by supporting the gatekeeping mechanism to provide access to a defined benefit package of services at appropriate levels of care. This would enhance access to quality health services. System efficiencies are expected through the enhanced control over service utilization and the associated costs and thus the scheme's expenditure, thus also strengthening accountability. Overall, this would contribute to make purchasing more strategic.

Derived from the indicator examples presented *(6)*, some possible indicators to assess the effects of the ORS could include: the number of referral letters generated by facilities at different levels of care; the number of referrals that can be traced to the receiving facility; the average time taken between generation of referral in the referring facility and start of treatment in the receiving facility, etc., and the differences in these before and after introducing this digital technology. It is important to note however that some of these data were not available for this assessment.

The initial theory of change and information from the desk review was used to then develop qualitative interview guides, including questions on the manual (paper-based) referral system pre-dating the ORS, ORS design and development, ORS interoperability and operational features, ORS implementation experiences, challenges, effects of ORS for health financing and UHC objectives, and regulatory issues and future prospects. Twelve in-depth interviews (IDIs) or group IDIs in Karnataka (in the cities of Bengaluru and Mysuru) were undertaken between 5-7 February 2024, using a combination of English and/or the local language (Kannada), with detailed note taking. Interview partners included SAST officials, officials from the Health and Family Welfare Department, district consultants of AB ArK, and medical officers from public and private hospitals. Interviews were not recorded to promote free conversation and to uphold the anonymity of respondents.

The SAST provided quantitative data, such as information on referral numbers over the years, and the number of different referral procedures in both public and private facilities. In accordance with Indian legal and data privacy requirements, these data were descriptively analyzed by SAST officials directly responsible for the respective databases and provided to the study team in a fully anonymized and aggregated form. Findings from qualitative and quantitative data were triangulated and synthesized together.

A thematic analysis of interview notes was conducted based on the WHO guide *(2)*, with themes interpreted and synthesized to understand the design and implementation process, to explore the effects of the ORS, including unintended effects, as well as to identify challenges. It is important to note the difficulty in attributing potential changes to the ORS alone, as the ORS supports a referral policy that itself has also effects on the UHC objectives, and contextual and potentially confounding factors can also play a role *(2)*. Moreover, unintended effects and challenges were explored.

3. The Online Referral System: objectives, design and implementation

3.1. The previous manual (paper-based) referral system

Prior to 2018, there were no standard pathways for health seeking to be followed in the public health system of Karnataka. This was one of the reasons for escalating costs associated with bypassing lower-level for specialist facilities, especially escalating costs for the government. Therefore, the Government of Karnataka introduced a mandatory, manual (paper-based) referral in 2018 *(36)*, for patients seeking specialized (usually inpatient) care[1] at higher level facilities, including private facilities, under the scheme. The objective of the referral system was to curtail escalating costs to the PFHI through a gatekeeping function, especially for the use of more expensive private health services which could have been more economically provided in the government system. At the same time, the idea was to increase awareness among patients about the health services and provider network available under the scheme. Consequently, beneficiaries requiring specialized services under the Arogya Karnataka Scheme were required to obtain paper referral letters from public healthcare facilities, either at the sub-district hospital (called Taluka hospital) or the district hospitals.

These referral-based specialized health services could be provided in public hospitals (district hospitals, public medical colleges)) or in private hospitals (referred only from district hospitals), depending upon health service availability *(36)*. This was expected to increase utilization in public facilities and contribute to efficient use of resources, but also improve accessibility to affordable health services by purchasing health services unavailable in the public system from the private sector. This must also be seen in light of the context in which dual practice is permitted for medical doctors, i.e., a doctor can work in both public and private facilities at the same time. Hence, there may be incentives (financial or otherwise) to self-refer patients from public hospitals to their own private practice.

[1] Some specialized care procedures may also be provided without hospital admission.

Under the manual referral system, procedures in the benefit package were classified into tiers: simple secondary (named "2A"), complex secondary ("2B"), tertiary ("3A"), and emergency ("4A"). A referral could be made for 2B or 3A services. Simple secondary procedures (2A) were to be performed only by government hospitals, and these were not eligible for referral or provider payments through the Arogya Karnataka Scheme; public healthcare facilities were expected to finance these services for all patients (scheme and non-scheme) through their line budgets. Moreover, only district hospitals could refer patients to private hospitals, and patients who presented first to lower-level facilities had to travel to district hospitals to obtain referrals to private hospitals *(37)*. This was reported to be cumbersome for patients – they had to travel to multiple facilities, and as there is only one district hospital per district, patients often had to travel long distances.

Yet, various inefficiencies in the manual referral system persisted. First, while the available capacities of public healthcare facilities to provide health services within the benefit package were known to the SAST in principle, these data were not regularly updated, sometimes leading to referrals to hospitals where services could not be provided. Second, the issued referral letters did not have any "expiry" period and patients could present themselves to hospitals as and when they felt the need, and these referral letters did not specify to which hospital the referral was being made. While these issues could have been addressed in the paper-based system, they were thought to be too complicated to address, or easily manipulated by patients or doctors even if addressed. Third, there were frequent informal requests from patients, often in collusion with private hospital doctors, to provide referrals for specific services. In other words, patients would first go to a private facility, and a doctor would inform them to ask for a referral for a specific package code from a government facility, that would be financially more advantageous to the private facility doctor, irrespective of the actual medical need and the assessment of the specialist doctor in the referring hospital. Also, there were requests for retroactive referrals, after patients had already gone to private hospitals or been admitted in a private hospital. Government hospital doctors perceived these requests to be made by politically or socially influential patients or private sector doctors and usually felt obliged to comply.

3.2. Objectives of the online referral system

These weaknesses motivated a revision of the referral policy and the development of the digital elements, culminating in the ORS in order to strengthen the referral system and to re-evaluate how referral health services could be effectively purchased from public and private providers. The ORS was thus designed with the intention to address the weaknesses of the manual referral system *(37)*. Table 2 outlines the main differences between the previous manual referral system and the ORS. The digital features are presented in further detail in Section 3.4.

Table 2: Differences between the manual and online referral system

	Manual system	Online system
Data entry	A referral case is not captured in the system; only the aggregate numbers of referrals is maintained (based on manual hospital registers)	Each referral is entered into the system
Referral pathway	Sub-district hospitals can only refer to a (public) district hospital The (public) district hospitals can only refer to medical colleges (i.e. public university hospitals) or private hospitals Referral is made to a higher-level facility	Sub-district hospitals can refer to facilities in the private sector No referral to private sector, if the service can be provided within the same facility Referral is made for a specific treatment procedure
Retrospective referral allowed	No	No
Retrospective referral practiced	Yes, easily manipulated	More difficult
Linkage with pre-authorization at receiving facility	No	Yes: pre-authorization is only granted on the basis of having a referral. However, pre-authorization and patient admission/payments tracking are not linked with the referral patient due to lack of a common identifier
Control mechanisms	None	Various control mechanisms built in to ensure compliance with referral rules The Nodal Officer confirms a referral through their signature and stamp on referral slip
Connection to hospital management system	No	The ORS was linked to the inpatient admissions management system under the scheme (and hence, indirectly, provider payments) for the receiving facility.

The aims of the digitalized referral system, the ORS, were to:

i) streamline referral pathways (i.e., refer patients to specific providers for specific procedures) to be offered with the appropriate level of quality care;
ii) increase the capabilities of government hospitals to provide the health services at the appropriate level of quality care covered in the benefit package, hence, increasing the number of purchased services from the government sector and channeling more scheme funds into it for sustainability;
iii) reduce deviations from the referral rules and improve compliance through the digital elements, including the control mechanisms.

It would be very difficult to achieve these objectives under the manual system. As such, the ORS has a greater potential to actually realize key desirable health financing attributes related to specifying benefits and conditions of access to services, as outlined in the WHO Health Financing Progress Matrix *(35)*:

- It helps the population to more clearly understand the scheme's entitlements and obligations;
- A set of priority health service benefits is made available;
- Defined benefits are better aligned with available resources and health services, and mechanisms to allocate funds to providers.

This would lead to progress in the intermediate UHC objectives, foremost increased system efficiency.[2] SAST respondents also stated that the government wanted to further enhance transparency and accountability within the health system. Ultimately, this would contribute to progress towards the UHC final goals of utilization in line with need, better service quality and improved financial protection of patients.

3.3. Other policy changes accompanying the ORS

Reclassification of treatment procedures in the package

As a key step in the development of the ORS, information to understand the system capacities of public sector hospitals was gathered through the "Hospital Capability Gap Assessment Module", a checklist sent to all public health facilities to assess available human, technical and infrastructural resources and abilities to perform the 1,650 procedures listed in the AB PM-JAY CM's ArK benefit package. During the one-year preparatory stage, this information on hospital staff and infrastructure to provide coverage for the benefit package was collected on a quarterly basis. Findings from this assessment were used to reclassify the benefit package into groups of services and code them accordingly into various tiers (see Table 3), as listed in a Government Order *(38)*. It also served to identify and demarcate service codes which could be referred to private health facilities. These tiers were developed to account for the level of care and availability of services in the public system, also considering the geographical location of public hospitals.

While benefit package services were also grouped into tiers under the manual referral system, the new tiers under the ORS modified the service composition to better reflect government capacities. Moreover, through this reclassification, the government sought to provide a unified framework of health services to both the vulnerable (BPL) and all other population groups, aligned with available revenues and resources. In this reclassified system, secondary care services were grouped into "tier 2 packages", further sub-divided into simple procedures (2A), comprising of 294 procedures and complex procedures (2B), constituting of 251 procedures.

[2] At the same time, other health systems strengthening projects, such as the Karnataka Health Systems Development Project, had also enhanced the capacities and infrastructure within the public health system, therefore policy makers were confident that the public health system could cater to the primary- and secondary-level healthcare needs of the population even if more patients were directed into the public system through the ORS.

Also, 2A procedures include 40 simple secondary general procedures which can be performed by any general practitioner. 2A procedures can be provided only in government hospitals. Tertiary procedures are classified into code 3A and comprise 934 procedures.

2B and 3A procedures should be provided preferentially in government hospitals. If the service is not available within government hospitals on that given day, patients are given a referral slip to other (public or private) hospitals offering the service. There are a further 171 emergency procedures which require no referral; any hospital to which an emergency patient presents is obliged to provide services as available. For instance, if a patient requires an elective surgery, they have to first present to a government sub-district or district hospital, where they are assessed and either admitted as patients or they receive a referral letter for another public or private facility if the required services are unavailable in that facility. However, if a patient has an accident or emergency health condition, they can directly go to a public or private facility and receive the required services which will be approved under the scheme, without needing a referral letter.

Table 3: Treatment procedures in the benefit package of the AB PM-JAY CM's ArK Scheme under the ORS

Nature of treatment (Code)	Number of procedures	Referral needed for private hospitals	Service provision in
Secondary procedures (simple) (2A)	294	NA	Public hospitals
Secondary procedures (complex) (2B)	251	Yes	Public and private hospitals
Tertiary procedures (3A)	934	Yes	Public and private hospitals
Emergency procedures (4A)	171	No	Public and private hospitals

Source: (36)

The Hospital Capability Gap Assessment has been linked to the ORS software which automatically undertakes a capability check for each referral case . Moreover, this information is regularly collected and reviewed for monitoring since the implementation of the ORS in 2022.

Changes in the payment system

While the claims and provider payment system (TMS) operate as separate digital systems, it is important to note that the referral letter represents a fundamental prerequisite for private facilities to admit patients under the scheme and to obtain pre-authorization, i.e., clearance from the SAST that the patient can be admitted for a specific treatment procedure or package of procedures that will be paid for by the scheme in accordance to a tariff list for these procedures/packages. The referral system therefore enables the functioning of the provider payment system including the contractual arrangements the SAST has with empaneled providers.

Provider payments are made on the basis of a list of package rates (a form of case-based payment) for inpatient care under the scheme's benefits, which have been in use since 2018. Private providers receive the full package rates and are free to utilize these funds as they choose, whereas public providers receive a proportion of the defined package rates, in view of the line-item budget allocations also provided to them (see below in Table 4). They have some degree of financial autonomy with respect to spending these funds whilst following the guidelines on the use of these funds. AB PM-JAY CM's ArK payments per procedure are primarily used for improving hospital infrastructure or procuring additional supplies, but a defined proportion of these payments is provided as a team incentive and paid to the health workers performing the procedure. For lower-level facilities, including sub-district hospitals, this share is 30%, whereas it is 20% at district hospitals and 15% at the highest-level facilities. The idea is to motivate health workers to take on more scheme patients. These team incentives are then apportioned among these staff. A higher team incentive is provided to lower-level facilities in remote areas in order to incentivize specialist staff to work in these facilities and perform the procedures covered by the scheme.

Thus, public providers' overall revenues as well as their degree of financial autonomy have increased through the additional payments received for health services provided to referral patients as well as the flexible use of these funds. This is critical to note in view of the continued input-based line budget allocations to public facilities. In fact, for most services, public providers can continue to treat patients (even those that are referred) as non-scheme or general patients without having to enter patient data into scheme data systems, obtain pre-authorization and they could also provide a different treatment package. Hence, they do not have to treat patients as "scheme patients", and could make use only of their line-item budget allocations.

Table 4: AB PM-JAY CM's ArK payment rates to public health facilities

Type of procedure	% of designated package rate paid
Simple secondary care (2A)	50
Complex, tertiary & emergency	75
Cardiology specialty treatment	100

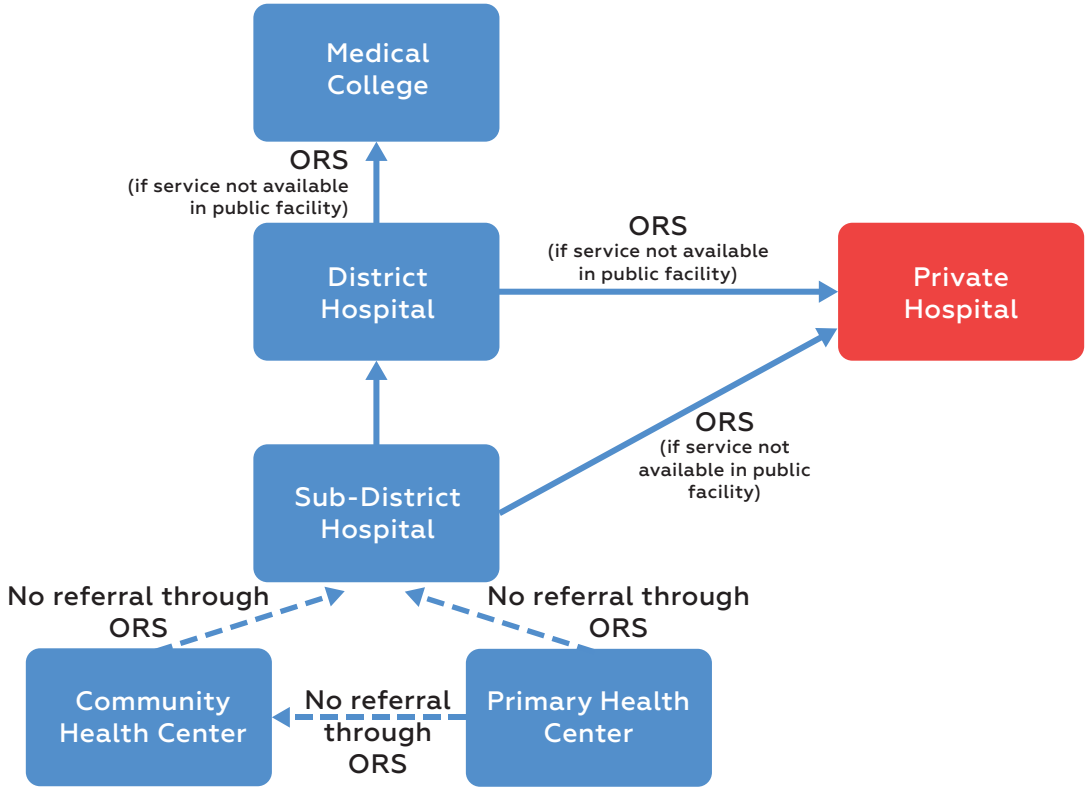
Source: (38)

3.4. ORS design and process flow

A description of the patient flow from referring to receiving hospitals is provided in Figure 1. Patients first present to a sub-district hospital or district hospital, from where they can be directly referred to a public or private receiving facility listed in the AB PM-JAY CM's ArK provider network. Public medical colleges are the highest, most specialized public facilities.

An example referral letter generated through the ORS is shown in Annex 1. A list of receiving facilities providing the referral service procedure is automatically generated by the ORS, which is provided to the patient (see Annex 2 for an example). These facilities are ranked according to physical proximity within a 50km radius of the patient's registered residence.

Figure 1: Patient referral pathways from referring to receiving hospitals under AB PM-JAY CM's ArK Online Referral System

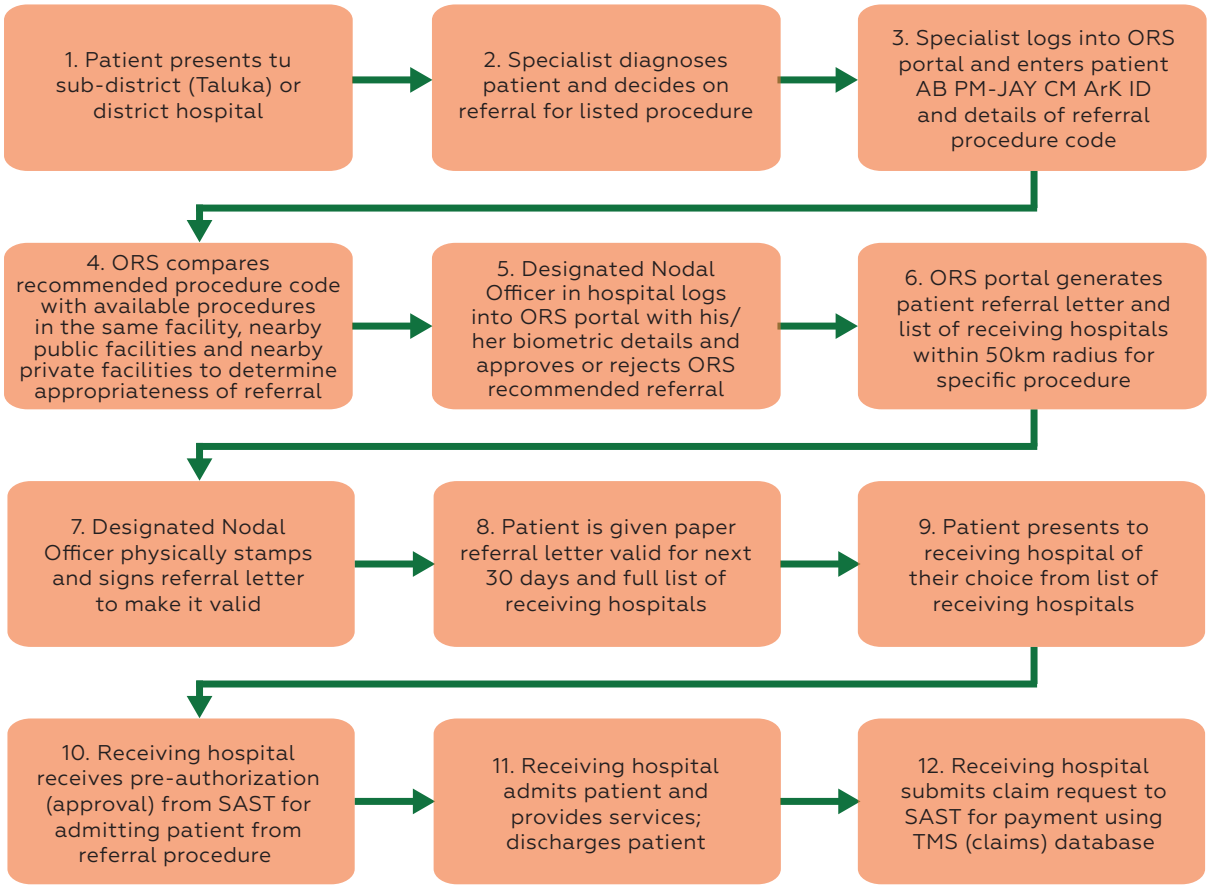


There is supposed to be a paper-based referral (e.g., a line written on the OPD slip) between PHC and CHC, but referral pathways are rarely followed.

A description of the patient process flow upon presenting to a sub-district or district is provided in Figure 2. When patients present to these hospitals, they are first registered as patients (Step 1). If a patient presents an AB PM-JAY CM's ArK card or identifies as a scheme beneficiary during the time of registration, the beneficiary navigator known as Arogya Mitra is responsible for counseling them regarding all AB PM-JAY CM's ArK processes, including the ORS. There are usually one or two beneficiary navigators per hospital. Their role is to enter patient data into the ORS and the claims management portal (TMS).

During the first visit at a (referring) facility, the patient is seen by a medical doctor or specialist, as per their condition. The specialist doctor diagnoses the patient. Normally, the specialist would know whether the required treatment procedure can be offered within the same facility. If deemed necessary, s/he would decide on a benefit package procedure for referral (step 2). The specialist then logs into the ORS portal and enters the patient ID and code of the recommended procedure, based on the procedure codes listed in the tiers of the scheme benefit package (step 3). The ORS software compares the suggested code with the service availability in the hospital capability database, checking for availability of the procedure in the same facility, in other public facilities, or other private facilities (in order of preference, step 4). If the procedure is available in the same public facility, the ORS algorithm proposes a self-admission in the same facility (normally to the same specialist or a specialist for the proposed treatment code). If the procedure is not available in the same facility, the ORS approves the proposed treatment code for referral. The ORS algorithm thus constitutes a control mechanism to avoid that a doctor refers a patient to their own private practice, or to a private practice from which a financial commission may be received.

Figure 2: Patient process flow in the Online Referral System



Each referring facility also has a designated Nodal Officer responsible for the correctness of every referral from the facility, who is usually a specialist doctor from the facility with this additional responsibility. The Nodal Officer must log into the ORS portal with his/her biometric verification (step 5) and approve every referral in the online system. The login by the Nodal Officer into the ORS portal is time sensitive and times out after five minutes of inactivity; this is done to avoid any misuse of the portal by unauthorized persons. Once the Nodal Officer's approval is in the system, the ORS generates a patient referral letter containing the referral procedure code, and a list of hospitals where the procedure can be performed (step 6). This hospital list ranks hospitals by geographical proximity to the patient's home address, with the district hospital prioritized in the first 50 listed hospitals. The Nodal Officer then prints out and physically stamps and signs the generated referral letter (step 7). Patients are then given the referral letter and list of hospitals (step 8) and the beneficiary navigator explains the referral procedure to the patient and how they can get services in the receiving hospital. The referral letter has a validity of 30 days from the date of referral, and patients can present to the receiving hospital of their choice from the list generated by the ORS (step 9).

It is important to note that referring facilities do not receive any payments for making the referral, nor is the referral service affecting their own budget or provider payment for the health service. Receiving hospitals are paid for services rendered by the scheme for referral patients, provided that patients present with the referral letter and the referral information is verified at the time of obtaining pre-authorization for the patient admission (steps 9-12). Moreover, there is no counter referral or other reporting back from the higher-level facility to the referral facility. Neither is there a digital linkage between the referring and receiving hospital, nor an automatic linkage of patient data between the two facilities or tracking of patients and patient records between them.

In summary, the digitalization of the referral system, i.e. the ORS enables certain tasks which the manual system could not operationalize: the real-time assessment of service availability within the public network of hospitals, and referrals of patients for specific procedure codes to a choice of geographically nearby hospitals, thereby enhancing service utilization within public hospitals empaneled within the AB PM-JAY CM's ArK. It also ensures better compliance with the referral rules. This altogether enhances access to health services while increasing system efficiencies by prudent use of services from the private sector.

3.5. Implementation of the ORS

The ORS was built as a proprietary system and was developed in collaboration between the AB PM-JAY CM's ArK Cell, the claim adjudication team within SAST, the Commissioner (the administrative head of the public health department), Karnataka's Department of Health, and the National Informatics Centre (NIC), a government organization. A dedicated team was established to oversee the digital system and to manage the generated information. Yet health care providers, patient groups or private entities were not involved in the process.

The ORS adheres to national regulations for digital data, including for data transmission, storage and retrieval. Data is not shared with any parties beyond the SAST and the NIC. Data privacy matters are under the purview of the State Data Center, E-governance department. Data security protocols of these two government organizations are followed. The NIC also performs periodic data security checks.

There were no financial implications for SAST for developing the ORS; the costs for development were borne by the government. Hospitals incurred costs as they had to purchase hardware (e.g. laptops) to run the ORS, or else they used hardware already being employed for other scheme processes such as claims management. The ORS was initially piloted for two months in 2019, during which public hospitals provided feedback on its operation; this was followed by further testing in January 2020 among public hospitals. After the pilots, approximately six months were spent to resolve technical issues. Issues encountered during the pilot included a lack of adherence by patients to the referral process, with patient delays or patients simply not using the referral slip and presenting to hospitals without them. Subsequently, due to delays brought upon by the onset of the COVID-19 pandemic, the ORS was only implemented in June 2022.

Various teams within SAST, the districts and hospitals are involved in operating the ORS. Within the SAST, the AB PM-JAY CM's ArK Cell under the Commissioner for Health of the Government of Karnataka is responsible for overall monitoring and oversight of the ORS. Several SAST officers are responsible for advisory, data analytics and monitoring tasks, as well as coordination between referring and receiving hospitals (if needed), communication and feedback systems, and training activities. There are weekly review meetings through the Commissionerate. Formal quarterly assessments and ad hoc assessments are conducted by the SAST. Each administrative district has a dedicated team responsible for the scheme, with a sub-team in charge of ORS that includes the District Leprosy Officer who is the designated Nodal Officer for the scheme, and a District Health Officer. These are assisted by various district coordinators and monitoring officers. At each public hospital, there are appointed claims executives (one for sub-district hospitals, two for district hospitals or medical colleges with less than 400 beds, and three for district hospitals or medical colleges with more than 400 beds), freelance data entry operators, a Nodal Officer, as well as a beneficiary navigator. These different teams have routine meetings to exchange and they are also connected by WhatsApp groups.

Data entry operators and beneficiary navigators are critical for operating the ORS, as they enter patient data into the ORS application, which are then used by Nodal Officers to generate a referral. Empaneled private hospitals only have beneficiary navigators to assist patients while their administrative staff enter and process claims data.

To ensure privacy and data security and system stability, various measures are in place, such as hosting the application across three services, undertaking security audits as well as encrypted communication channels *(37)*.

Routine monitoring of ORS functioning is conducted through monthly monitoring meetings. One key indicator is the number of referrals, and referrals from the sub-district hospitals are examined to understand gaps in referral patterns. The referral for package codes by different specialties are tracked, as are the claims volume and value of cardiology and oncology codes as focus benefit packages. Other regularly monitored areas include the hospital capabilities through the Hospital Capability Gap Module to assess which hospitals can be receiving hospitals for which benefit package procedures. However, respondents also remarked that many ORS data fields are incomplete or not regularly assessed; only the completeness of the patient identifier and referral code are regularly monitored (this information is needed for the referral to be valid).

To monitor the actual number of patients receiving referral letters, the number of patients receiving referral services, the hospitals where patient received the referral services, the referral procedures provided and the amount paid to the provider, SAST has to use separate data from the ORS and TMS databases, since the ORS and TMS are not interoperable. The 2B and 3A health services under the benefit package can only be used under the scheme with a referral, hence their utilization frequencies and associated provider payments can be tracked from the TMS. This provides information on the referrals that actually resulted in service utilization at public and private hospitals.

4. Referral trends, effects of the ORS and remaining challenges

4.1. Trends in referral rates

This section presents descriptive data on the trends in referral rates over the period from 2018 to 2023. In view of the COVID-19 pandemic which severely affected health service seeking behaviour during this period (and hence referral rates), it is hard to disentangle the effects of the introduction of the ORS. Nonetheless, this section provides background to Section 4.2., where a (mostly) qualitative assessment of the actual effects of the ORS is provided.

The average number of annual referrals by tier since the implementation of the AB PM-JAY CM's ArK are shown in Table 5. In the manual system (up to May 2022), the average number of referrals increased steadily for 2B and 3A procedures. The year 2020 showed marked increases in utilization, due to the COVID-19 epidemic and inclusion of COVID-19 services in the benefit package. After the implementation of the ORS, the number of monthly referrals stabilized and there were on average 1,694 2B procedures and 7,257 3A procedures per month in 2023. In 2023, the average number of monthly referrals for 2B procedures increased to almost 4.5 times the number in 2018, and for 3A procedures to 1.6 times the number in 2018.

Table 5: Number of referrals over time, 2018 to January 2024

Year	Average monthly 2B Procedures	Total number of 2B procedures	Average monthly 3A Procedures	Total 3A Procedures
Under the manual referral system (until May 2022)				
2018	379	757	4389	8778
2019	885	10623	5452	65418
2020	2993	35910	8587	103045
2021	3069	36824	8749	104991
2022	1899	9493	6812	34061
Under the online referral system (since June 2022)				
2022	1702	11914	6354	44476
2023	1694	20323	7257	87088

Source: AB PM-JAY CM's ArK ORS data

Table 6 shows the percentage and number of referrals, based on the type of facility generating the referral. Across the years, approximately 50% of complex secondary (2B) and 52% of tertiary (3A) procedures were referred by sub-district hospitals. The high proportions of all referrals generated by sub-district hospitals is an expected finding, as these are the lowest-level facilities generating a referral and do not provide all AB PM-JAY CM's ArK benefit package services.

Table 6: ORS referrals based on type of referring facility, 2022 to January 2024

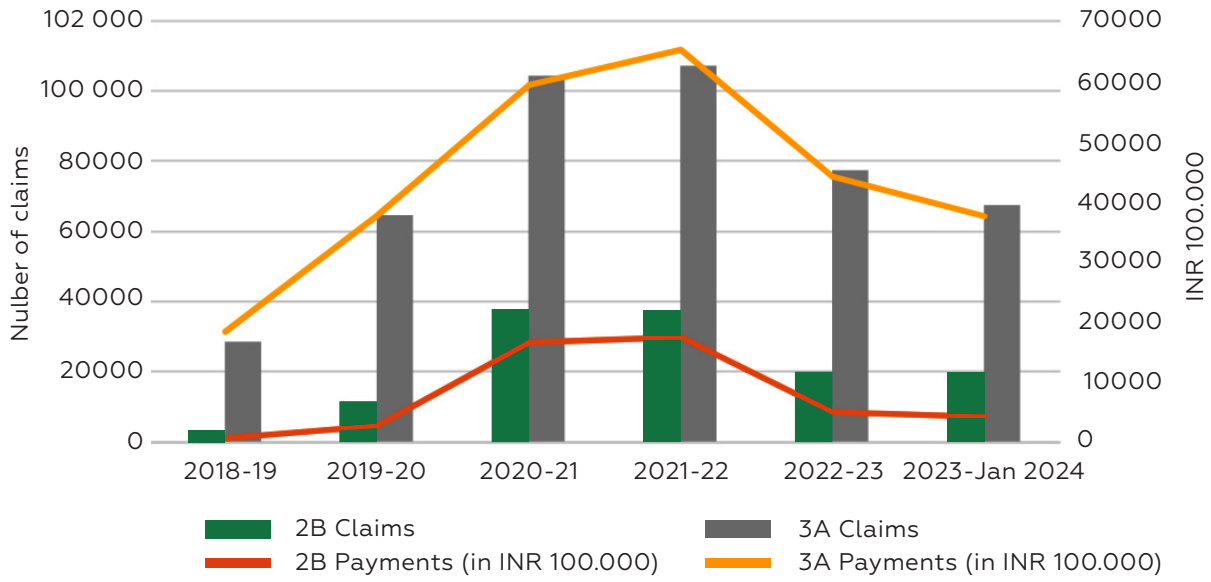
2B Procedures				
Year	**Sub-district hospital**	**District hospital**	**Public medical college**	**TOTAL**
2022 (since June)	58.5 %	37.0 %	4.5 %	100 %
(n)	1674	1059	129	2862
2023	48.5 %	41.5 %	10.0 %	100 %
(n)	11581	9909	2380	23870
2024 (Jan)	48.1 %	42.0 %	9.9 %	100 %
(n)	1012	883	209	2104
All years	49.5 %	41.1 %	9.4 %	100 %
(n)	14267	11851	2718	28836

2B Procedures				
Year	**Sub-district hospital**	**District hospital**	**Public medical college**	**TOTAL**
2022 (since June)	54.5 %	34.6 %	10.9 %	100 %
(n)	4652	2951	932	8535
2023	51.2 %	32.1 %	16.7 %	100 %
(n)	47107	29496	15378	91981
2024 (Jan)	54.2 %	31.3 %	14.5 %	100 %
(n)	4636	2676	1242	8554
All years	51.7 %	32.2 %	16.1 %	100 %
(n)	56395	35123	17552	109070

Source: AB PM-JAY CM's ArK ORS data

Trends in the number of 2B and 3A procedures and payments in private healthcare facilities using the TMS (claims) database are shown in Figure 3. While the COVID-19 pandemic affected these numbers, the data does suggest that private hospitals also benefited financially.

Figure 3: Total number of claims and payments for 2B and 3A procedures in private healthcare facilities, 2018 to January 2024

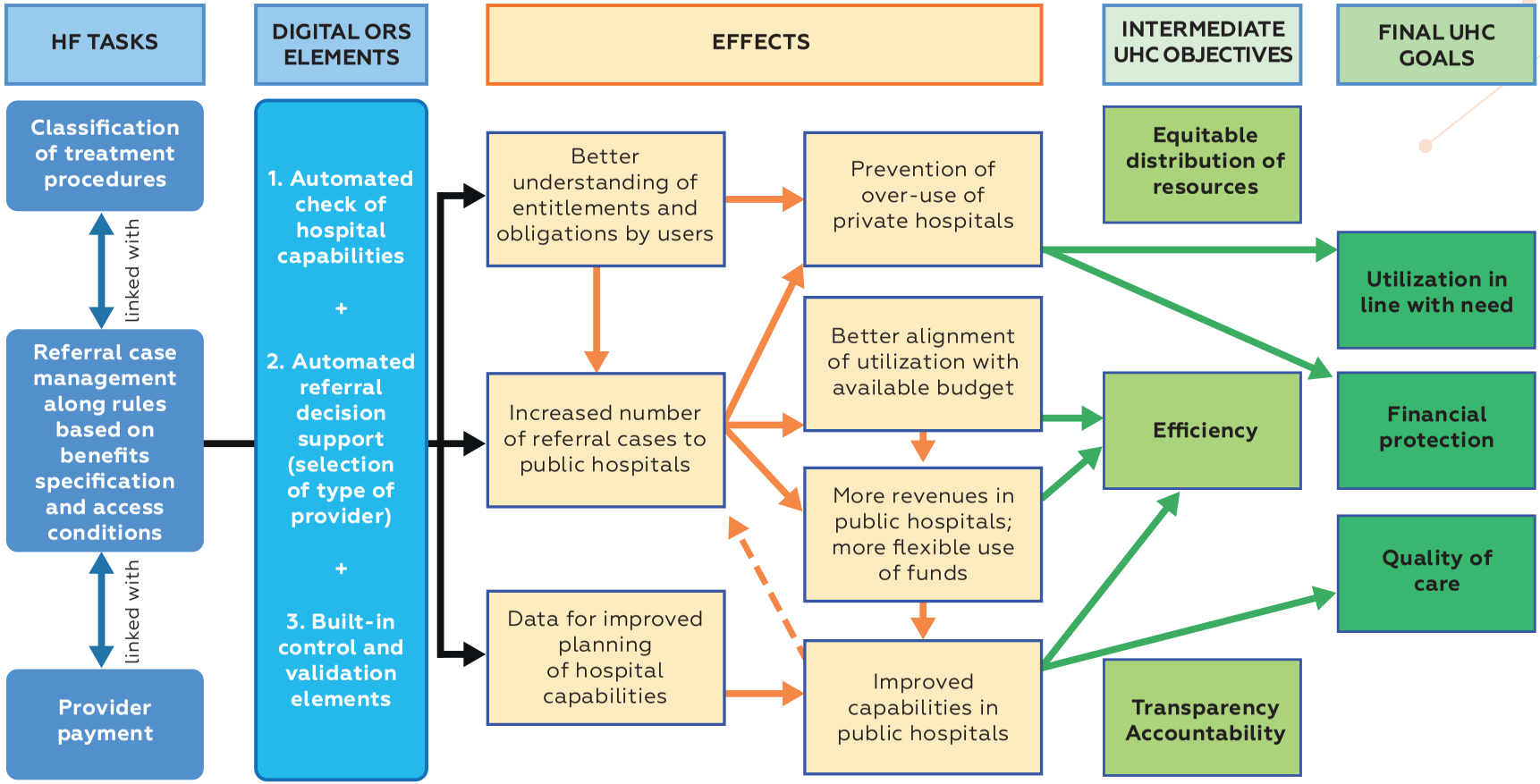


Source: AB PM-JAY CM's ArK TMS data

4.2. Effects of the digital aspects of ORS

Based on the qualitative and quantitative data collected, Figure 4 provides a visual summary of the main health financing tasks supported by the ORS, and the positive effects that were identified in the analysis, which would contribute to the intermediate and final UHC objectives. Each of these effects are explained in further detail below. In reality, directions of effects may more complex than presented here, for example there may be several other feedback loops that are not visualized in this graph.

Figure 4: Health financing tasks supported by the ORS and related effects and contribution to progress in intermediate and final UHC objectives



Better understanding of entitlements and obligations by users

An immediate effect of the referral system rules, and in particular the ORS, is that patients obtain a better understanding of entitlements and obligations, as more focus is put on explaining to a patient the various steps of the referral system. The way the front-end side of the ORS was designed has not exacerbated existing digital divides across different population groups, as the generated referral letter is on paper and patients with limited digital literacy are not dependent on access to digital devices to benefit from a referral.

This better understanding also helps to direct patient flows towards the public sector (see also below). As a result, the ORS prevents the oversupply and over-use of the private sector for health services, which are available in the public sector. As the likelihood to pay additional out-of-pocket expenditure is usually higher in the private sector, the ORS may also help to reduce OOPs for patients following the ORS, thus contributing to improved financial protection.

Disaggregating the patients by socio-economic status reveals a preponderance of referrals for BPL households (see Annex 3). Only 2.3% of all patients receiving referrals through the ORS belong to APL households, which is much lower than their actual share in the population. This may suggest that APL beneficiaries do not follow the referral system but may present directly to their chosen (private) facilities and potentially pay out-of-pocket. More information is needed to understand the reasons for the low number of referrals from APL patients and the implications.

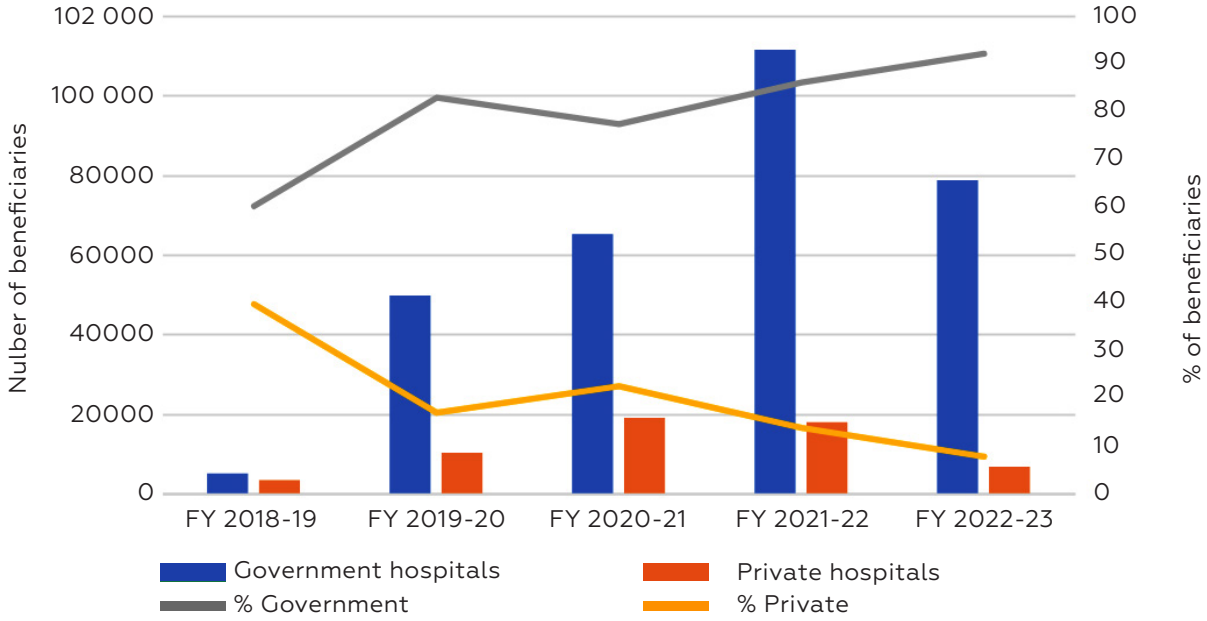
Increased number and share of referrals to public hospitals

Most importantly, one of the key objectives of the referral system and in particular the ORS has been achieved, namely an increase in referrals to the public sector. Figure 5 shows the total number of beneficiaries treated in public and private hospitals under the scheme for 2B and 3A procedures. At the start of the manual referral system in 2018, referrals to public hospitals amounted to about 60% of the total. This increased markedly from 2019 onwards. The years of 2020-21 and 2021-22 showed significant increases in referral cases, primarily due to the COVID-19 pandemic, yet with the introduction of the ORS in 2022-23, public hospital utilization further increased to represent over 92% of all service utilization.

In interviews, all respondents from the government and public hospitals were satisfied with the effects on service utilization that the ORS has been able to achieve. The respondents at the SAST acknowledged the increased referrals and utilization at public hospitals as well as the reduction of potential gaming practices by doctors as benefits of the ORS. It can be assumed that the increased public sector utilization can to a great extent be attributed to the digital tools, that is the ORS algorithm and control mechanisms, since these enabled a more stringent compliance with the referral rules, which the manual system had not been able to realize.

The increased use of the public hospitals and decreased use of private hospitals also lead to cost-savings for the purchasing agency (SAST), contributing to strengthened expenditure management. As a result, utilization is now better aligned with the total available budget.

Figure 5: Number and percentage of cases treated in public and private hospitals for 2B and 3A procedures, 2018 to January 2024



Source: AB PM-JAY CM's ArK TMS data

Another direct result of the growth of services provided in public hospitals is an increase of their financial revenues, as facilities are reimbursed for pre-authorized referral health services based on package rates. This would also translate into a timely and more stable financial cashflow (another desirable health financing attribute *(35)*).

Moreover, the public hospitals enjoy a greater degree of autonomy in facility-level financial management, as they can flexibly utilize these scheme funds as per their requirements. One hospital respondent remarked that due to the financial incentives given to public hospitals, they are now functioning as "mini-private" hospitals and hospital specialist teams have an incentive to maximize patient numbers under the scheme. As the largest share of the financial incentives goes to doctors, there is some competition among specialists within the same public hospital to see more scheme patients. The implications of this will have to be monitored to avoid any negative consequences.

Data for improved planning of hospital capabilities

Moreover, digitalization of the referral system was reported to aid transparency and improve analytics, especially the monitoring of hospital capabilities and infrastructure. For instance, for oncology specialties, the number of private empaneled hospitals is more than five times the number of government hospitals providing these services, yet government hospitals currently provide services for 45% of oncology cases. A SAST official remarked: "The ORS helps in analyzing our

strengths in government facilities." Monitoring of service utilization through ORS data has identified the need to strengthen public provision of certain services in specific districts, such as cardiac, nephrology, oncology; and has been used to empanel more private hospitals in districts lacking public provisioning of certain specialty services.

The progress in capabilities is partially related to the increased number of referral cases and the higher revenues for public hospitals. For instance, the utilization of oncology and cardiology cases from referrals has increased over time in government hospitals, as these hospitals have gradually built capabilities for these specialties. The favorable trends in the utilization of oncology and cardiology services at public hospitals are suggestive of the positive effect of the ORS on increasing capabilities of public facilities. However, it is important to keep in mind that the Health System Development Project has also contributed to improved capabilities of public providers.

In addition, the ORS also enables policy adjustments, as it generates more detailed data on referral numbers disaggregated for procedure types, for specific priority procedures, for type of referring facility, etc. Another area for data analytics is the reason for referral, which is collected in ORS from the referring doctors/facilities, based on five answer options as presented in Table 7. The most common reason for referring patients was the unavailability of specialists within the referring facility for the required procedure. The second most common reason across the three referring facility types was the lack of equipment/infrastructure to provide the respective health services. The third most common reason was "other", at 12% of all referrals. Exploring the changes in the reasons for referral over time, by the different type of health facilities would provide valuable information on whether facilities are able to improve their human resource and infrastructural capacities and provide more services under the benefit package.

Table 7: Reasons for referrals, 2018 to January 2024

Reason for referral	District hospital	Medical college	Sub-district hospital	Total	N
Beds not available	1.2 %	8.5 %	0.3 %	1.8 %	2513
Specialist not available	60.1 %	55.7 %	63.9 %	61.4 %	84626
Operating theatre facility not available	4.2 %	2.6 %	2.5 %	3.1 %	4242
Equipment/Infrastructure not available	18.4 %	19.0 %	24.4 %	21.6 %	29734
Others	16.1 %	14.2 % dual	9.0 %	12.2 %	16792
Total (n)	46975	20269	70662	100 %	137906
Operating theatre facility not available	4.2 %	2.6 %	2.5 %	3.1 %	4242

Source: AB PM-JAY CM's ArK ORS data

4.3. Challenges to realizing the full potential of the ORS

While the interviews revealed that the ORS was envisioned by the Government of Karnataka as an intervention to influence the utilization of health services (by optimizing the referral practice through digitalization), its current design and implementation do not yet allow to realize its full potential as an instrument for strategic purchasing and for the monitoring and oversight of referral activities. This section describes the main challenges, some of which have been magnified by the increased utilization after digitalization.

Incomplete digitalization of the ORS and lack of communication channels between referring and receiving facility

It is important to note that the ORS is not fully digitalized, as referral letters are still handed out in paper format. While this is positive on the one hand, as it may avoid widening the existing digital gap between better off and poorer population groups, on the other hand a patient could also lose this important document.

Yet, the incomplete digitalization also spans to the lack of formal communication channels between referring and receiving facility or of an electronic patient record. This was cited as hindering implementation, as doctors remarked that they refer a patient for a specific package code, but they are unsure if that is accepted by the receiving facility, or if the receiving facility instead opts for other courses of treatment, as a consequence of which patients are forced to pay out-of-pocket for treatment (although this is more a challenge of the referral policy in itself).

Loopholes and misuse of the ORS software

The ORS software is found to be misused, one reported malpractice being that hospitals temporarily modify their human resource or infrastructural availability in the Hospital Capability Gap Assessment Module to show that certain specialists, infrastructure or procedures are unavailable. Thereafter, a referral for a particular patient is generated, after which the status of available capabilities is set back. A doctor may then informally direct the patient to a specific facility. SAST officials remarked that the frequency of such collusion is hard to ascertain, and that these gaming practices persist to some extent, which undermines the envisaged effects of the ORS.

The lack of formal communication channels between referring and receiving hospitals, coupled with the strong relationships between public and private medical practitioners, enhances the possibility of their collusion to direct patient service utilization to private hospitals with potentially informal, mutual benefits for both parties. Since dual practice by government doctors is permitted, they often have strong networks with private hospitals and practitioners and are able to collude with them to preferentially "suggest" certain (private) hospitals to patients from the generated hospital list. They may then perform the services themselves or assist other colleagues in the private sector.

As part of this gaming, the practice of retrospective referral persists, even though fewer patients are going first to private hospitals and then presenting to public hospitals to ask for a retroactive referral since the digitalization of the referral system. One SAST respondent remarked: "The biggest advantage of ORS is that 50% of the pressure is reduced on doctors by those having influential contacts to pressure for pre-dated referrals." In other words, it is much more difficult under the ORS to provide retro-active referrals. To achieve the full potential of the ORS, there is still room for improvement of the understanding and compliance of patients to the rules.

Finally, it was also observed that patients were sometimes given a print-out of a truncated list of hospitals; potentially to orient the patient towards preferential hospitals by the respective officer. A potential check on the misuse of dual practice flexibilities and self-referrals could include checks or flagging to prevent these practices.

Cumbersome ORS procedures and multiple control mechanisms

Under the manual system, only a paper referral letter was printed out and fewer patient details were captured. In contrast, under the ORS, the procedures of data entry, multiple checks by Nodal Officers (including the requirement of physical signatures and stamps on the referral letter) and need for a separate pre-authorization for patient admissions are resource-intensive. The ORS requires several validation and approval steps until a referral is valid. While this is important to curb the previous problems of inadequate referral paths, self-referral and gaming practices, it makes the overall referral process cumbersome at the level of hospitals. As a consequence, it requires additional human resources for these repeated control steps.

Indeed, SAST officials reported that the implementation of the ORS has not led to reduced administrative workload or financial burden, nor has it streamlined processes at the SAST; rather, it has contributed to increased staff workload, as training healthcare providers on the use of the ORS and monitoring their use are continuous processes. For instance, Nodal Officers within referring hospitals found the need for repeated logging into the ORS platform (which times out after a very short period) and for physical signatures and stamps on every referral letter very cumbersome and time-intensive.

While SAST officials acknowledged the benefits of the ORS for patients, their general perception was that there were no administrative efficiency gains for SAST itself, and that for the providers and the purchaser (SAST), the ORS was in fact more time consuming than the previous referral practices. Even from the perspective of patients, the multiple steps may appear redundant. Some patients reported lack of trust in the referring specialist, once they perceived that their referral had to be "verified" by another doctor (the Nodal Officer).

Shortages in digital skills and infrastructure

A key challenge in the implementation of the ORS is the increased human resource requirements for operating and monitoring ORS processes, more so as the operationalization of the ORS has been primarily supported by existing staff who have taken on these additional responsibilities, but who are equally responsible for other AB PM-JAY CM's ArK functions.

Other implementation issues reported at the hospital level include low digital literacy capacities of hospital staff. Further, public providers remarked that they were unprepared for the time-intensive documentation and data entry requirements to admit referral patients, which include digitization and uploading of many patient health records (as per scheme processes). There was a feeling of lacking the necessary human resources and information technology skills to fulfill these requirements. Hospitals reported that they hired additional contractual staff to fulfill these duties. Moreover, it was reported that public hospitals were challenged by inadequate digital infrastructure, which they have tried to address over time by purchasing more equipment and hiring temporary contractual staff.

Lack of interoperability across different digital platforms related to purchasing

One key challenge in the digitalization of the referral system has been the lack of interoperability between the ORS and other digital platforms used by the AB PM-JAY CM's ArK, foremost the TMS for claims submission and provider payments, and the Hospital Empanelment Module, used to empanel hospitals into the provider network.

The lack of integration and interoperability between the ORS and the TMS results claims submission and payments for healthcare providers being performed independently through the TMS. The lack of interoperability between the two creates an additional step in the joint use of data from the two platforms, requiring manual data coding/processing (as opposed to automated information generation). Presently, data on the number of referrals, the package codes for the referrals, and the types of referring facilities are generated through the ORS, while information on the actual package codes being utilized, provider claims and payments and timeliness between patient admission and discharge are generated through the TMS. This information is appraised and used rather independently. Full interoperability between the ORS and TMS would enable linking each referral to a patient admission (referral completion), including the type of treatment provided, the time taken to reach the receiving facility, the provider payments made for each referral, etc. Overall, this would enhance analytical capacity. For example, it would allow to monitor whether the procedure selected by the referring facility matches the procedure actually billed to the scheme. Ultimately, this could be fed into policy revisions to improve patient outcomes.

There is one potential data element that could facilitate the exchange of patient information between the ORS and the TMS: the AB PM-JAY CM's ArK patient identifier (which is based on the household ration card, necessary for obtaining state subsidies, and the Aadhaar number). However, in the ORS database, this is sometimes incorrectly entered or missing, or only the national PM-JAY identifier is present. When both the patient identifier and the Aadhaar are missing, it is not possible to link the patient's ORS and TMS records. AB PM-JAY CM's ArK staff estimated that on average, out of 10,000 generated referrals, they are only able to link approximately 3,000 in the TMS. This may be due to the aforementioned missing data issues, errors or differences in spelling patients' names, or because patients simply did not use the referral letter, instead opting to forgo care or to go to a (private) facility of choice where they become walk-in (paying) patients, in which case they are not captured in the TMS.

From a broader systems integration perspective, there are also challenges in terms of linking ORS generated data with other national initiatives in the digital health ecosystem, such as the ABHA number (electronic patient health record), or the integration with the national, open-source United Health Interface digital health protocol, both under the ABDM.[3] It is important to note that initiatives under the ABDM were started after the implementation of the ORS in June 2022, so further issues due to not having a common data dictionary for interoperability may be expected to arise. Moreover, it is unclear to what extent different aspects of the ORS align with standards specified in the National Digital Health Blueprint of 2019 *(28)*. This could be explored as a way to further strengthen and align the ORS with other existing and future digital health platforms.

[3] The United Health Interface application enables interoperability of records generated through the:

- Ayushman Bharat Health Account (ABHA) Number (under ABDM)
- Healthcare Professionals Registry (HPR) (under ABDM)
- Health Facility Registry (HFR) (under ABDM)

5. Conclusions, policy options and lessons

The ORS has demonstrated some remarkable achievements and has realized its envisaged objective of streamlining referral pathways while monitoring and strengthening the capabilities of public hospitals in Karnataka under the AB PM-JAY CM's ARK scheme. Coupled with the specification of benefits and the conditions of access, the ORS - through its digital tools ensuring compliance with these rules - has been decisive in increasing utilization of referral services in the public sector under the AB PM-JAY CM's ArK. This has in turn improved the capabilities of public hospitals (as they have more patient cases and receive more public funds). Also, the generated data aided the monitoring of capabilities of public hospitals to provide these services and helped identify the specialties that require further strengthening. Moreover, health services from the private sector are only purchased, when these are not available in the public sector. Likewise, the digital control mechanisms built into ORS have reduced (though not eliminated) gaming practices. As such, this would contribute to better expenditure management of the scheme. In sum, the ORS has contributed to making purchasing of health services more strategic.

Moreover, ORS has made it possible to capture more granular data on the referral practice. This is an important achievement and has great value in itself, as it allows to feed these insights into the policy making process. With little adjustments, even more valuable data could be captured, for instance in terms of understanding the reasons for referrals. Further disaggregating the category of "other reasons" for referral may generate important insights, which could help to further improve capabilities of referring facilities.

Importantly, for the patients, the ORS has helped to improve access to care and in particular to specialists. Furthermore, it reduced indirect costs for patients, such as travel, hospital hopping, and waiting times. At the same time, the ORS experience shows that the introduction of a digital tool does not have to lead to an increased digital divide that would further sideline or exclude more vulnerable population groups with fewer digital means and lower digital literacy.

5.1. Policy options

Various challenges related to the design features of the ORS digital tools and the implementation practice prevail however. Moreover, further improvements of the referral policy itself can only be effectively realized through changes within the digital design features of the ORS. The following policy options are shared for consideration.

Expanding and completing the digitalization of the referral system

First, it would be useful to add a communication channel into the ORS through which the referring facility is informed about the final diagnosis, procedures and treatments that a patient received at the receiving facility. This way, the referring doctor gets feedback which will provide guidance for future referrals. Inter-provider communication between primary care and specialist providers would also allow for better continuity of care. Moreover, potential unintended or otherwise indirect effects of the referral policy or specifically the digital tools could also be addressed: for instance, if a receiving facility opts for other courses of treatment, this may have implications on a patient's access, particularly when they are forced to pay out-of-pocket for treatment.

Second, the referral policy and the ORS could be expanded by incorporating backward referral, i.e., the higher-level facility sending the patient back to the lower-level facility for further follow up, as this would further enhance system efficiencies by rationalizing service use and also improve quality of care. Such referral policy revisions need to be reflected and translated into the ORS, since only digital processes allow to realize such further changes.

Automated claim generation

Capturing the referral letter electronically (when presented by the patient) could be used to shift to an automated claim generation by the receiving facility. This would trigger further gains in administrative efficiency. Moreover, longitudinal information on referral rates, completion and referral leakages could be obtained. Considerable opportunities exist to utilize this information to assess the performance of health facilities and to provide facility-level feedback.

Closing software loopholes for misuse

It is equally critical to address the persistent provider gaming practices of bypassing referral rules. Loopholes in the software that allow for gaming need to be closed. Yet, this must be accompanied by other measures: clearer rules around the existing policy of health provider dual practice may also help to reduce referral to private sector facilities for services available in the public sector, coupled with

punitive measures in case of non-compliance with the various rules. Moreover, in order to increase compliance with the referral rules, there is also need for improved patient understanding of these rules as well as of their entitlements under the scheme. The explanations of the referral steps/rules to patients by the beneficiary navigator continue to be an important part of the ORS processes.

Revising ORS procedures and aligning with human resource numbers and skills

While control steps within the ORS are critical to ensure compliance with the referral policy, the multiple steps are cumbersome. One option is to review and potentially revise or simplify these multiple steps. This could also help to align the ORS steps with the available human resources both in terms of numbers as well as skills and digital literacy.

Creating an interoperable national digital health system

End-to-end interoperability between the ORS and TMS could greatly facilitate the joint use of information collected across these two digital systems. This includes data to track patients from referring to receiving facilities, the time lag between referral and service utilization, the distances patients travel between referring and receiving facilities, and the number of referrals that do not result in service utilization, etc.

There is also need to take on an overarching system perspective. The ORS is not interoperable with other national digital health initiatives, although some of these have been developed before the introduction of ORS. Modifying the ORS software and enabling interoperability between the ORS, TMS and beneficiary eligibility databases by using a common patient identifier and facility identifier under the national digital health regulations, as suggested by the ABDM, would enhance the potential of the ORS for further monitoring and evaluation of the referral policy as well as for integrated information recording, performance monitoring and accountability. Moreover, future integration of the ORS with ABDM digital platforms and coherence with the national digital health policies will avoid duplicity of efforts and ease patient navigation throughout the country. In sum, using the existing and potentially available data intelligently is the core element for making purchasing more strategic and it would also provide additional insights and feed into policy development.

Yet, important initiatives are already under way: the SAST is in the process of linking the household ration card database used for the AB PM-JAY CM's ArK patient identifier, to a master population database called Kutumba, which will be interoperable with both the TMS and ORS. This linkage will help to understand where patients come from to seek care, and variations across districts and facility catchment areas. This will also reduce and avoid duplicity of digital system processes. Further, ensuring linkages with the Aadhaar would enhance

interoperability with other national and state systems beyond the health sector. Regulatory implications for the AB PM-JAY CM's ArK, and India in general, include harmonizing future developments and safeguarding coherency with national policies.

In conclusion, current achievements can potentially be further advanced via the expansion of the referral policy and strengthened digitalization of different operational aspects of the policy. Combined, these strategic approaches would further streamline patients' pathways through the system, resulting in increased patient access to quality services, while maintaining efficient use of resources and open communication channels across levels of care. As such, the ORS has high potential to contribute to UHC objectives.

5.2. Broader lessons

The ORS achievements and implementation experience provide important lessons on the development process, design and implementation that may be useful for other Indian states or other countries.

First, the study demonstrates that it is possible to build digital technologies supporting health financing functions without exacerbating digital divides: the front-end interactions with patients need to be shaped in line with their digital means and literacy, and this may imply an offline version, accompanied by a digital version.

Second, in contrast to beliefs that digitalization will always imply a reduction of manpower at the level of providers and purchasers, the case of Karnataka and other country experiences reveal that digitalization may also require new skills and more human resources to operate a digital system.

Third, implicitly, the Karnataka experience also confirms again the importance to first establish a membership data system as a prerequisite for a digital claims management system, so as to be able to build on and link beneficiary data with claims data as well as with a referral system, as also demonstrated in Estonia *(39)*, Korea *(5)*, Kenya *(40)* and Ghana *(41)*.

Fourth, a critical design principle is to take on a holistic system perspective and to carefully consider the sequence in which new digital systems are introduced. This requires strong and visionary (digital) governance as well as data governance. Rather than pursuing a stand-alone scheme approach, although sometimes easier and more feasible to realize, it is important to have a long-term version of how a specific, new digital system will be compatible and interoperable with other existing and anticipated systems.

Last, in doing so, it is important to be clear and explicit about the purpose of the reform and the digitalization of specific tasks, as well as to include all actors in the development process to ensure their voices and perspectives are taken into account, also for buy-in, including from the private sector.

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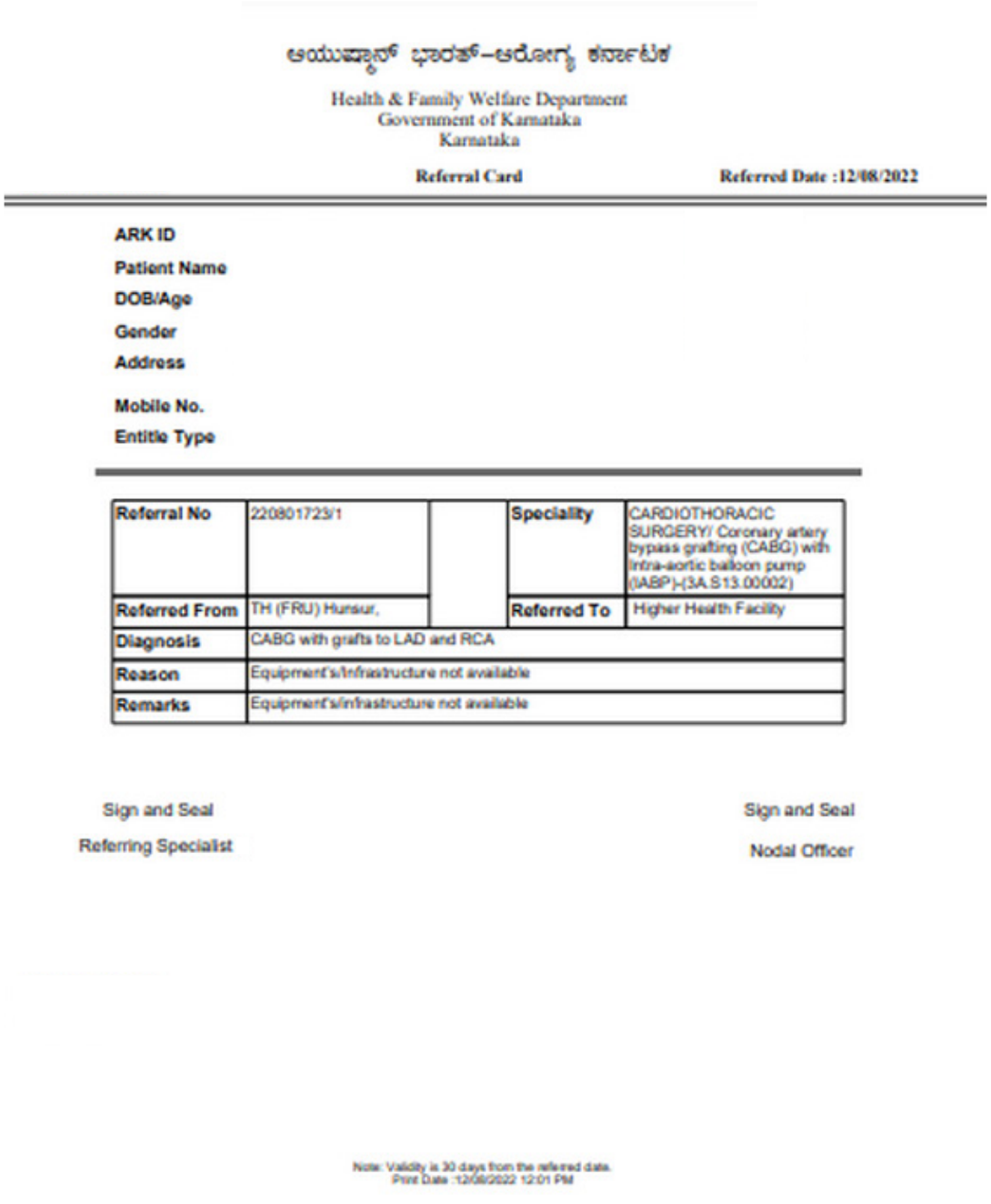
Annex

Annex 1: Sample ORS-generated referral letter



ಆಯುಷ್ಮಾನ್ ಭಾರತ್–ಆರೋಗ್ಯ ಕರ್ನಾಟಕ

Health & Family Welfare Department
Government of Karnataka
Karnataka

Referral Card **Referred Date :12/08/2022**

ARK ID
Patient Name
DOB/Age
Gender
Address
Mobile No.
Entitle Type

Referral No	220801723/1		**Speciality**	CARDIOTHORACIC SURGERY/ Coronary artery bypass grafting (CABG) with Intra-aortic balloon pump (IABP)-(3A.S13.00002)
Referred From	TH (FRU) Hunsur,		**Referred To**	Higher Health Facility
Diagnosis	CABG with grafts to LAD and RCA			
Reason	Equipment's/Infrastructure not available			
Remarks	Equipment's/Infrastructure not available			

Sign and Seal
Referring Specialist

Sign and Seal
Nodal Officer

Note: Validity is 30 days from the referred date.
Print Date :12/08/2022 12:01 PM

This image shows a referral card with the following items: the ARK ID number, the patient name, age, gender, address and mobile phone, as well as referral number, specialty, the facility referred from and the facility referred to, the diagnosis, the reason, and remarks.

Annex 2: Sample hospital list for the referred health service

ಆಯುಷ್ಮಾನ್ ಭಾರತ್–ಆರೋಗ್ಯ ಕರ್ನಾಟಕ

Health & Family Welfare Department
Government of Karnataka
Karnataka

Referral Card **Referred Date :12/08/2022**

Available Hospitals

ಆಸ್ಪತ್ರೆಯ ಹೆಸರು (Name of the Hospital)		ಜಿಲ್ಲೆ	ವಿಳಾಸ	ದೂರವಾಣಿ ಸಂಖ್ಯೆ	ದೂರ(Distance) ಕಿ.ಮೀ.
ಆರ್ ಎಲ್ ಜಾಲಪ್ಪ ನಾರಾಯಣ ಹೃದಯಾಲಯ ಹಾರ್ಟ್ ಸೆಂಟರ್	R L Jalappa Narayana Hrudayalaya Heart Centre	ಕೋಲಾರ	ಆರ್ ಎಲ್ ಜಾಲಪ್ಪ ನಾರಾಯಣ ಹೃದಯಾಲಯ ಹಾರ್ಟ್ ಸೆಂಟರ್ ಬಡಕ ಕೋಲಾರ-563101	8152243262	29
ವೈದೇಹಿ ಆಸ್ಪತ್ರೆ	Vydehi Hospital	ಬೆಂಗಳೂರು	ನಂ.82 ಎಮಿಕ್ ಲೇಔಟ್ ವೈಟ್ ಫೀಲ್ಡ್ ಬೆಂಗಳೂರು-560066	8028413381	59
ಸ್ಪೆಷಾಲಿಟಿ ಹೆಲ್ತ್ ಸಿಸ್ಟಮ್ ಪ್ರೈವೇಟ್ ಲಿಮಿಟೆಡ್	Specialist Health System Pvt Limited	ಬೆಂಗಳೂರು	ಸ್ಪೆಷಾಲಿಟಿ ಹೆಲ್ತ್ ಸಿಸ್ಟಮ್ ಪ್ರೈವೇಟ್ ಲಿಮಿಟೆಡ್ ನಂ.216 ನೇ ಮೇನ್ 80 ಫೀಟ್ ರಸ್ತೆ 6ನೇ ಬ್ಲಾಕ್ ಹೆಚ್.ಆರ್.ಬಿ	8042522322	61
ಆಸ್ಟರ್ ಸಿ.ಎಂ.ಐ ಹಾಸ್ಪಿಟಲ್	Aster CMI Hospital	ಬೆಂಗಳೂರು	ಆಸ್ಟರ್ ಸಿ.ಎಂ.ಐ ಹಾಸ್ಪಿಟಲ್ #43/2 ಎನ್ ಹೆಚ್-7 ಸಹಕಾರನಗರ ಬೆಂಗಳೂರು -560092	0802338242	63
ಭಗವಾನ್ ಮಹಾವೀರ್ ಜೈನ್ ಹಾಸ್ಪಿಟಲ್	Bhagwan Mahaveer Jain Hospital	ಬೆಂಗಳೂರು	ಭಗವಾನ್ ಮಹಾವೀರ್ ಜೈನ್ ಹಾಸ್ಪಿಟಲ್ ಮೈಸೂರ್ ರಸ್ತೆ ಮಂಜುನಾಥ ನಗರ ಬೆಂಗಳೂರು -560052	8040875555	66
ತಥಾಗತ್ ಹಾರ್ಟ್ ಕೇರ್ ಸೆಂಟರ್ ಎಲ್ ಎಲ್ ಪಿ	Tathagat Heart Care Centre Llp	ಬೆಂಗಳೂರು	ನಂ. 31/32 ಮಲ್ಲಿಗೆ ಮೆಡಿಕಲ್ ಸೆಂಟರ್ ಪ್ರಿಮಿಸಿನ್ ಕ್ರಿಸೆಂಟ್ ರೋಡ್ ಬೆಂಗಳೂರು	8022357777	68
ಎಚ್ ಬಿಎಸ್ ಆಸ್ಪತ್ರೆ ಟ್ರಸ್ಟ್	HBS Hospital Trust	ಬೆಂಗಳೂರು	58 ಕಾಕ್ ಬರ್ನ್ ರಸ್ತೆ ಕಿಮಾಪೆನಗರ	9845154577	68
ಸೆಂಟ್ ಜಾನ್ಸ್ ಮೆಡಿಕಲ್ ಕಾಲೇಜ್ ಆಸ್ಪತ್ರೆ	St Johns Medical College Hospital	ಬೆಂಗಳೂರು	ಸರ್ಜಾಪುರ ರೋಡ್ ಜಾನ್ ನಗರ ಕೋರಮಂಗಲ	8022065324	69
ಎಂ ಎಸ್ ರಾಮಯ್ಯ ನಾರಾಯಣ ಹೃದಯ ಕೇಂದ್ರ	M S Ramaiah Narayana Heart Centre	ಬೆಂಗಳೂರು	ಎಂಎಸ್ಆರ್ ಐ ಪೋಸ್ಟ್ ಎಂಎಸ್ಆರ್ ನಗರ ನ್ಯೂ ಬೆಲ್ ರಸ್ತೆ	9686922556	69
ಪೀಪಲ್ ಟ್ರೀ ಆಸ್ಪತ್ರೆ	People Tree Hospitals	ಬೆಂಗಳೂರು	ಹುಮಕೂರು ರಸ್ತೆ ಗೋದರಂಬೆಪಾಳ್ಯ ಯಶವಂತಪುರ	9972011182	69
ಸಪ್ತಗಿರಿ ಸೂಪರ್ ಸ್ಪೆಷಾಲಿಟಿ ಹಾಸ್ಪಿಟಲ್	Sapthagiri Super Speciality Hospital	ಬೆಂಗಳೂರು	ಸಪ್ತಗಿರಿ ಸೂಪರ್ ಸ್ಪೆಷಾಲಿಟಿ ಹಾಸ್ಪಿಟಲ್ ನಂ.15 ಚಿಕ್ಕನಂದ್ರ ಹೆನಡಹಳ್ಳಿ ರಸ್ತೆ ಬೆಂಗಳೂರು-560090	8022188999	70

This image provides an example of a list of proposed hospitals within a radius of 50 km to which the referred patient could go.

Annex 3: Referrals by socio-economic status at different levels of care, 2022-2024

2B referrals					
	District Hospitals	**Medical Colleges**	**Sub-District Hospitals**	**Total %**	**Total n**
Households above the poverty line	2,5	2,9	2,0	2,3	660
Households below the poverty line	97,5	97,1	98,0	97,7	28176
Total	**11851**	**2718**	**14267**	**100**	**28836**

3A referrals					
	District Hospitals	**Medical Colleges**	**Sub-District Hospitals**	**Total %**	**Total n**
Households above the poverty line	3,9	3,1	2,9	3,3	3555
Households below the poverty line	96,1	96,9	97,1	96,7	105515
Total	**35123**	**17552**	**56395**	**100**	**109070**

For additional information, please contact:

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