FROM SCHEME TO SYSTEM:
UNDERSTANDING THE CONCEPT AND MEASUREMENT OF HOSPITALIZATIONS FOR AMBULATORY-CARE-SENSITIVE CONDITIONS

DISCUSSION PAPER **AUGUST 2023**

Ajay Tandon
Sudha Chandrashekhar
Sheena Chhabra
Navneet Kaur Manchanda

Public Disclosure Authorized

WORLD BANK GROUP
Health, Nutrition & Population

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August 2023

Health, Nutrition and Population (HNP) Discussion Paper

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Ajay Tandon,[a] Sudha Chandrashekhar,[b] Sheena Chhabra,[c] and Navneet Kaur Manchanda[d]

[a] Lead Economist Health, Nutrition, and Population Global Practice, World Bank, Washington, DC, United States.
[b] Senior Consultant, Health, Nutrition, and Population Global Practice, World Bank, New Delhi, India.
[c] Senior Health Specialist, Health, Nutrition, and Population Global Practice, World Bank, New Delhi, India.
[d] Health Economist, Health, Nutrition, and Population Global Practice, World Bank, New Delhi, India.

Abstract: Ambulatory Care Sensitive Conditions (ACSCs)—*conditions for which hospitalization could be prevented or reduced with timely access to effective preventive and early disease management services in primary health care outpatient settings*—has emerged as a valuable concept for assessing disparities in healthcare access and utilization among vulnerable populations. This paper provides an overview of the concept of ACSCs and explores its potential for measurement in low-and middle-income countries, using India as a case study. Hospitalization or claims data for ACSCs are increasingly used globally to assess the access to and quality of primary health care services. Analyzing trends in hospital admissions for ACSCs can provide critical policy-relevant information as effective management of ACSCs can lead to reduced hospitalizations, lower morbidity, and mortality, and reduced cost pressures on health systems. The paper highlights the relevance of ACSC analysis in the context of India's flagship health sector reforms—Ayushman Bharat—which aims to achieve universal health coverage. Monitoring and analyzing hospitalizations for ACSCs under Pradhan Mantri Jan Arogya Yojana (PM-JAY)- *the world's largest health insurance scheme and one of the four pillars of Ayushman Bharat*- will allow decision-makers to assess the magnitude of preventable hospital admissions from an economic efficiency and patient well-being perspective and enable them to make informed policy decisions on strengthening the quality of primary healthcare services. .

Keywords: Ambulatory care sensitive condition, ACSC, Hospitalization, Primary care, India

Correspondence Details: Ajay Tandon, MC 11-TCOM, 1818 H Street, NW, Washington DC 20043, USA; Tel: +1-202-473-1000; E-mail: atandon@worldbank.org; Website: http://worldbank.org.

Table of Contents

ACKNOWLEDGMENTS V

I. INTRODUCTION 6

II. WHAT ARE AMBULATORY-CARE–SENSITIVE CONDITIONS? 7

III. ANALYZING HOSPITALIZATIONS FOR ACSCS IN INDIA 13

IV. CONCLUSIONS AND DISCUSSION 18

REFERENCES 19

ACKNOWLEDGMENTS

The paper was written by a World Bank team comprising Ajay Tandon, Lead Economist (HSAHN), Sudha Chandrashekhar, Senior Consultant (HSAHN), Sheena Chhabra, Senior Health Specialist (HSAHN) and Navneet Kaur Manchanda, Health Economist (HSAHN).

The authors appreciate the thoughtful comments and suggestions of peer reviewers Mickey Chopra, Lead Health Specialist (HSAHP), Reem Hafez, Senior Health Economist (HMNHN), Adanna Deborah Ugochi Chukwuma, Senior Economist (HECHN), and Huong Lan Dao, Senior Health Specialist (HEAHN). Jung-Hwan Choi (Senior Knowledge Management Officer) and Erika L. Yanick (Knowledge Management Assistant) are gratefully acknowledged for editing and formatting the paper.

The paper benefited from discussions with representatives from partner institutions including Dr. R.S. Sharma, former Chief Executive Officer, National Health Authority (NHA), Dr. Basant Garg, Additional CEO, NHA and Dr. Ruchira Agarwal, Head & Principal Consultant- M&R and Capacity Building, NHA.

The paper was prepared under the overall guidance of Trina S. Haque, Practice Manager, South Asia, Health, Nutrition, and Population (HNP) Global Practice, World Bank.The authors are grateful to the World Bank for publishing this report as an HNP Discussion Paper.

I. INTRODUCTION

This paper summarizes the concept of ambulatory-care–sensitive conditions (ACSCs) and discusses its potential for measurement in low- and middle-income countries using India as an example. ACSCs are conditions for which timely and effective community or outpatient care can help to reduce the risks of hospitalization by either preventing the onset of an illness or condition, controlling an acute episodic illness or condition, or managing a chronic disease (Billings et al. 1993). Typical examples of ACSCs are diabetes and hypertension: hospitalizations for complications related to diabetes and hypertension can often be avoided if these conditions are managed properly at the primary health care level. In addition to diabetes and hypertension, there are several other conditions that are deemed ambulatory-care–sensitive including asthma, chronic obstructive pulmonary disease (COPD), iron deficiency anemia, tuberculosis (TB), and congestive heart failure (CHF).

Data on hospitalizations for ACSCs are increasingly being used globally for assessing access to and quality of primary health care services. Assessing levels and trends in hospital admissions for ACSCs can yield policy-relevant information that can be critical for improving the performance of health systems (WHO 2016). Analysis of hospitalizations for ACSCs can also help bolster the economic case for investing in primary health care as reduced rates of hospitalizations for ACSCs are likely to reduce morbidity progression and mortality and can reduce cost pressures on health systems given the generally lower unit costs of implementing frontline interventions.[1] For instance in France, ACSC admissions cost about 4.8 billion euros in 2009 and nearly 5.1 billion euros in 2010, consuming about 7.9 and 8.7 million bed-days of care, respectively. Effective frontline management of ACSCs can help free scarce hospital beds in resource-constrained settings and help ensure sustainability. Hence, reducing unnecessary hospital admissions is also important from an efficiency perspective. Unnecessary hospitalizations are also bad for patients: admissions can lead to hospital-acquired infections as well as loss of mobility and increased frailty from inactivity (Hodgson, Deeny, and Steventon 2019).

Analysis of ACSCs is important given the two-pronged nature of India's flagship reforms. India is implementing several major reforms for progressively realizing universal health coverage (UHC) for its 1.4 billion population. Ayushman Bharat or "Long Live India"—the umbrella term for flagship health sector reforms in the country—comprises two primary components: (i) creation of health and wellness centers (HWCs) that provide diagnostic tests, free essential medicines, and other comprehensive primary health care services including for noncommunicable diseases (NCDs) at subcenters that cater to a catchment area population of 5,000 in rural plains areas versus 3,000 in hilly/desert/tribal areas, and are generally the first point of contact for India's public sector health system; and (ii) implementation of the Pradhan Mantri Jan Arogya Yojana (PM-JAY), which was launched in September 2018 to provide government-sponsored noncontributory health insurance coverage for a package of mostly inpatient secondary and tertiary care to 100 million poor and near-poor families (an estimated total of 500 million individuals, roughly 40 percent of the country's population) up to a maximum annual limit of ₹500,000 (~US$6,000) per family that can be

[1] Focusing on ACSCs neither implies that care of illness should be compromised in favor of preventive measures, nor does it mean prevention is *always* cheaper than treatment. Studies have shown that preventive measures are not always cost-effective. For instance, in the case of mass screening for hypertension, the absolute benefit of lowering mildly high blood pressure is small and its cost-benefit ratio in terms of cerebrovascular accident (CVA) prevention is still questionable (Butler 1993). Another study notes that the treatment intervention in heart failure has a potential of deferring deaths per 100,000 people per year by nearly five times vis-à-vis those deferred by screening and treatment of hypertension (Fleetcroft and Cookson 2006). Similarly, another study finds that it may be cost-effective to treat patients at high risk of coronary artery disease due to dyslipidemia with statins at $12,000/QALY (quality-adjusted life year), while screening and treating 20-year-olds with no known risk factors is costlier (Teutsch and Shenkin 2001).

availed at government and empaneled private hospitals. PM-JAY coverage is cofinanced by both the central and state governments.

Despite their differential scheme-level implementation, availability and quality of service delivery at HWCs has implications for PM-JAY (and vice versa). Regularly assessing hospitalizations for ACSCs under PM-JAY would be important for revealing scheme-to-system linkages. This is especially true for chronic NCDs—now the dominant share of the overall disease burden in India—and especially so, as the prevalence of multi- and comorbidities is rising with population aging. These epidemiological and demographic changes imply that often the same person with the same chronic condition and with varying degrees of complexity will likely have multiple contacts with different levels of the health system throughout their lifetime. Prevention, early detection, and containment, thus, become key considerations. And, once onset, effective management of such chronic conditions imply that the primary, secondary, and tertiary care components of health systems will need to work in tandem to cost-effectively ensure improvements in patient outcomes.

Regular monitoring and analysis of hospitalizations for ACSC, for example, by using claims data routinely collected under PM-JAY can be an important step forward in assessing the quality of services under Ayushman Bharat. Changes in magnitude of potentially preventable inpatient admissions, at least in part can be attributed to access to effective primary health care envisioned in the rollout of HWCs under the program, and enable health facilities and policymakers to use such data and insights to identify community needs, target financial and other resource allocations, and track the impact of programmatic and policy interventions. From a sustainability perspective, controlling costs due to unnecessary readmissions or preventable hospitalizations would be useful for PM-JAY.

II. WHAT ARE AMBULATORY-CARE–SENSITIVE CONDITIONS?

The concept of ACSCs was introduced in the 1990s in the United States and has subsequently been adopted globally. ACSCs were introduced in the context of a study in the United States that assessed differential access to primary health care among those who had private health insurance coverage versus those who either had no insurance coverage or were covered via the country's tax-financed noncontributory insurance program for the poor (called Medicaid, which has design similarities to PM-JAY in how it is organized in the US federal system) (Weissman, Gatsonis, and Epstein 1992). The study found greater rates of ACSC hospitalizations among those without insurance and among those covered under Medicaid, compared to those who had private health insurance coverage. The authors hypothesize that this was due to poor access to and utilization of quality primary health care services due to financial barriers. Similarly, a subsequent application of the methodology found that ACSC hospitalizations in low-income areas were significantly higher than among higher-income neighborhoods, again indicating possible challenges to accessing quality primary health care services (Billings et al. 1993). Subsequently, the concept has been applied in multiple contexts and settings and has become a standard health system metric that is routinely tracked in many countries.

There are several definitions of ACSCs, albeit they all refer to the same underlying logic. The Organisation for Economic Co-operation and Development (OECD) defines ACSCs as "chronic conditions for which access to appropriate primary care could prevent the need for the current admission to hospital."[2] The United Kingdom's National Health Service (NHS) (2014) defines them as "conditions where effective

[2] https://www.oecd.org/health/health-systems/The-Economics-of-Patient-Safety-in-Primary-and-Ambulatory-Care-April2018.pdf.

community care and case management can help prevent the need for hospital admission."[3] The United States' Agency for Healthcare Research and Quality (AHRQ) defines them as "conditions for which good outpatient care can potentially prevent the need for hospitalization or for which early intervention can prevent complications or more severe disease." And the World Health Organization (WHO) defines ACSCs as "conditions for which hospitalizations can be avoided by timely and effective care in ambulatory settings" (WHO 2016). The basic idea behind the different definitions is similar in that analysis of hospitalizations for ACSCs can *indirectly* provide information on systemic inefficiencies, including how well the primary health care system might be performing. It is important to note that ACSCs are not necessarily conditions for which care could be provided at frontline primary health care settings in lieu of at hospitals—for example, this may be the case for certain daycare surgical procedures—but these are conditions whereby the absence of effective care at primary health care settings can lead to subsequent hospitalizations that are potentially preventable.

ACSCs are typically classified into three broad categories: (i) acute, (ii) chronic, and (iii) vaccine preventable. Acute ACSCs are those conditions of which mild cases could potentially be managed in ambulatory care settings, preventing the disease from becoming more severe and thereby necessitating hospitalization (Ansari 2007). Examples of acute ACSCs include kidney infections and perforated ulcers (Table 1). Chronic ACSCs are those that could be pharmaceutically managed at primary care settings—including via behavioral or lifestyle changes—preventing these conditions from advancing to a stage that would require hospitalization. Diabetes and hypertension, mentioned above, are typical examples of chronic ACSCs. Vaccine-preventable ACSCs, as the name suggestions, are conditions such as measles and TB, where the condition itself is potentially preventable since there is a vaccine available for it.

Table 1: Types and Classifications of Ambulatory-Care–Sensitive Conditions

Type of ACSC	Definition	Examples
Acute	Mild cases of conditions that could be managed in ambulatory care settings, preventing the disease from becoming more severe and thereby necessitating hospitalization	Dehydration/gastroenteritis; kidney Infection; perforated ulcer; cellulitis; pelvic inflammatory disease; ear, nose, and throat (ENT) infections; dental conditions
Chronic	Chronic diseases that could be managed at ambulatory care settings, including via behavioral modification or lifestyle change, preventing the disease from advancing to the stage that requires hospitalization	Diabetes; asthma; angina; hypertension; congestive heart failure; and COPD
Vaccine preventable	Conditions for which the actual condition itself is preventable, rather than hospitalization for it, due to availability of vaccines	Tetanus; measles; mumps; rubella; poliomyelitis; bacterial pneumonia; TB

Source: Ansari 2007.
Notes: COPD = Chronic obstructive pulmonary disease; TB = Tuberculosis.

Many countries develop their own localized lists of ACSCs. These can differ depending on context, clinical guidelines, public health importance, and applicability. In most countries, these lists of ACSCs are derived and finalized based on stakeholder consultations using some form of expert consensus. In some cases, conditions that are relatively rare and have low rates of hospitalizations are excluded, as are those for which interventions in the health system may have little or no impact in terms of prevention.[4] As an example, Table 2 lists selected ACSCs as defined by England's National Health Service (NHS) along with their International Classification of Diseases (ICD)-10 diagnostic codes and level of diagnosis—principal or secondary—at which such conditions are to be considered ACSCs.[5] In some cases, ACSC hospitalizations

[3] https://www.england.nhs.uk/wp-content/uploads/2014/03/red-acsc-em-admissions-2.pdf.
[4] For example, the relatively low incidence of gangrene reduces its relevance as an ACSC in England (Purdy et al. 2009).
[5] Full list available here: https://digital.nhs.uk/data-and-information/data-tools-and-services/data-services/innovative-uses-of-data/demand-on-health care/ambulatory-care-sensitive-conditions.

are adjusted depending on both the diagnostic code as well as the procedure code that patients have undergone.[6]

Table 2: Sample of Conditions Classified as Ambulatory-Care–Sensitive by National Health Service, England

ACSC name	ICD-10 code	Description	Comments
Asthma	J45	Asthma	Principal diagnosis only
	J46	Status asthmaticus	
Diabetes complications	E100–108	Insulin-dependent diabetes mellitus	In any diagnosis field
	E110–118	Non-insulin-dependent diabetes mellitus	
	E120–128	Malnutrition-related diabetes mellitus	
	E13–138	Other specified diabetes mellitus	
	E140–148	Unspecified diabetes mellitus	
COPD	J20	Acute bronchitis	Principal diagnosis only; J20 only if there is a secondary diagnosis of J41, J42, J43, J44, J47
	J41	Simple mucopurulent chronic bronchitis	
	J42	Unspecified chronic bronchitis	
	J43	Emphysema	
	J44	Other COPD	
	J47	Bronchiectasis	
Angina	I20	Angina pectoris	Principal diagnosis only; Exclude cases with main operative procedure codes of A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, V, W, X0, X1, X2, X4, X5
	I240	Coronary thrombosis without myocardial infarction	
	I248	Other acute ischemic heart disease	
	I249	Acute ischemic heart disease, unspecified	
Iron deficiency anemia	D501	Sideropenic dysphagia	Principal diagnosis only
	D508	Other iron deficiency anemias	
	D509	Iron deficiency anemia, unspecified	
Hypertension	I10	Essential (primary) hypertension	Principal diagnosis only; Exclude cases with main operative procedure codes of K0–4, K50, K52, K55, K56–57, K60–61, K61, K66–69, K71
	I119	Hypertensive heart disease without heart failure	
Nutritional deficiencies	E40	Kwashiorkor	Principal diagnosis only
	E41	Nutritional marasmus	
	E42	Marasmic kwashiorkor	
	E43	Unspecified severe protein-energy malnutrition	
	E550	Rickets, active	
	E643	Sequelae of rickets	

Source:https://digital.nhs.uk/data-and-information/data-tools-and-services/data-services/innovative-uses-of-data/demand-on-healthcare/ambulatory-care-sensitive-conditions.
Notes: ICD = International Classification of Diseases; COPD = Chronic obstructive pulmonary disease.

A minimum set of information from hospitalization episodes is typically necessary to derive various policy-relevant ACSC metrics. To derive metrics related to ACSC hospitalizations, at the very minimum, information on the primary diagnosis of those admitted for inpatient care along with relevant procedure codes as well as patient characteristics, such as age and place of residence, need to be available. Different ACSC metrics are typically monitored across countries: at the population level (e.g., ACSC discharges

[6] For example, cases with a diagnosis of essential (primary) hypertension that underwent a procedure code of K0, K1, K2, K3, K4, K50, K52, K55, K56, K57, K60, K61, K66, K67, K68, K69, and K71 are not classified as ACSCs because they are mainly operative codes where the primary diagnosis of hypertension was incidental; for example, K0–K4 are diseases of oral cavities, K50 refers to procedures for Crohn disease, K52 for noninfective gastroenteritis and colitis, K55 for vascular diseases of the intestine, K56–K57 for paralytic ileus and intestinal obstruction without hernia, K60 for fissure and fistula of the anal region, K61 for abscess of anal and rectal regions, K66–K67 for peritoneal adhesions and other diseases, K68–K69 for diseases of retroperitoneum, and K71 for toxic liver diseases.

relative to the size of the entire population within a specific area over a given time period), at the level of a facility or facilities (e.g., where the numerator is discharges or bed-days due to ACSC conditions and the denominator is all discharges or bed-days in a given facility or facilities over a specified time period), or at the level of the payer (e.g., expenditures on ACSC-related hospitalizations as a share of total hospitalization expenditures). The choice and information content of different ACSC metrics depends on data availability, the structure of the health system, as well as the overall purpose for which these are tracked. Typically, there is no benchmark for ACSC metrics: the idea being that lower rates are better as long as this is not reflecting foregone inpatient care, an important consideration in low- and middle-income countries (as we also discuss further below). Comparisons can be made over time or relative to averages across facilities or within and across specific districts or states. Ideally, these metrics should be derived from claims data or from medical records. However, in some situations, health survey records have been linked with the hospital administrative data to understand association between demographic, socioeconomic, and health behavioral risk factors and avoidable hospitalizations (Wallar, De Prophetis, and Rosella 2020).

Population-based ACSC metrics focus on measurement at the level of the population in a defined administrative area. One advantage of population-based ACSC metrics is that they can potentially allow for assessments of changes in access to preventive and promotive primary health care that might be expected as a result of broader health system reforms. For example, a 10-year assessment in England's single-payer NHS system found that age-standardized rates of hospitalizations for ACSCs—measured in terms of ACSC hospitalization rates per 100,000 population—increased by 35 percent over time, about the same as the rate for non-ACSC hospitalizations (Bardlsey et al. 2013). Significant reductions in emergency admission rates for ACSCs such as angina, perforated ulcers, and pelvic inflammatory diseases were observed. However, hospitalization rates increased for several other ACSC conditions such as urinary tract infection, pneumonia, and COPD. The authors conclude that this indicated that efforts aimed at improving preventive care for some conditions had not successfully reduced ACSC hospitalizations and that more needed to be done. Typically, population-based metrics of hospitalizations for ACSCs have also enabled findings of strong correlations with measures of deprivation and ethnicity (Bardlsey et al. 2013). A recent systematic review of the literature found that socioeconomic status was a consistent risk factor for hospitalization for chronic ACSCs across several health systems (Wallar, De Prophetis, and Rosella 2020). Where data were available, studies have attempted to understand better as to whether higher rates of ACSC hospitalizations among vulnerable populations were a result of higher prevalence rates of ACSCs, higher severity of conditions when presenting for emergency hospitalization, poor access to primary health care, or other factors. The results of such assessments have been mixed. Some indeed find poor access to primary health care to be the dominant reason for higher risk of ACSC hospitalization rates (Oster and Bindman 2003). Others have found income to be a far greater determinant than availability of and access to primary care (Ricketts et al. 2001).

ACSC metrics can also be measured at the facility level, for example, at the level of a hospital, instead of at the population level. With facility-based ACSC metrics, the focus is typically on highlighting that reductions could potentially help reduce waste and free up scarce resources such as hospital beds at a given facility. For instance, the OECD routinely reports discharges as well as bed-days for ACSCs as a share of total discharges and total bed-days in a given year across member countries. In recent estimates, between 5 and 7 percent of all discharges and bed-days across OECD member countries have been found to be due to just five ACSCs: diabetes, hypertension, congestive heart failure, COPD, and asthma (OECD 2017). This represents a large and potentially preventable burden on hospital systems. Even if hospitals themselves were efficient in managing resources, and episodes of ACSC hospitalizations were managed well, this would represent weaknesses in overall performance of a health system due to negative externalities on hospital systems resulting from poor primary health care services.

Payer-based ACSC metrics look at measures from the perspective of a purchasing agency. The focus on payer-based ACSC metrics—for example, expenditure on ACSC hospitalizations as a share of total

hospitalization expenditures—is typically on issues of cost control and ensuring that services are being provided at the right level and at the right time in the right way. For example, if primary health care is capitated, lower-level facilities may have incentives to skimp on managing care, subsequently leading to higher rates of ACSC hospitalizations at higher-level facilities. This information can and has helped in designing adjustments to provider payment mechanisms to incentivize provision at lower-level and lower-cost facilities, not just from the perspective of improving health outcomes but also from a cost-effectiveness point of view. For example, in the United States, provider payments to Accountable Care Organizations (ACOs)—virtual networks of different levels of providers that take responsibility for all care that may be necessary for beneficiaries that are mapped to them—under the country's social health insurance program for those above 65 years of age (Medicare) are adjusted to reward lower levels of all-cause unplanned admissions for diabetes, heart failure, and multiple chronic conditions.[7] In addition, ACSCs have also been used in the Physician Value-Based Payment Modifier program[8] and now in the Merit-Based Incentive Payment System (MIPS) track of the Quality Payment Program, which ties payments to quality and cost-efficient care by scoring physicians on quality, promoting interoperability, improvement activities, and cost. ACSCs are one of the measures used to determine the providers' final score.[9] Also, as a part of Medicare value-based purchasing, the Hospital Readmission Reduction Program (HRRP) provides negative payments for "unplanned" readmissions of ACSCs within a month of an anchor inpatient admission in hospital. This purchasing mechanism aims to reduce readmissions for most ACSCs including COPD, heart failure, etc., and creates incentives for timely medication and treatment follow-up after discharge.[10]

Box 1: Examples of Country-Level ACSC Analytics

An example of a recent application of the concept of ACSC is from **Portugal**. Portugal—a high-income country with a 2021 per capita national income of US$23,890 and a population of just over 10 million—has a universal tax-financed regionally organized National Health Service (NHS), which provides comprehensive coverage (excluding dental care) with no user charges levied at the point and time of seeking care for services prescribed under the NHS. Additional subsystems coexist with the NHS: there are special health insurance schemes that provide coverage for particular professions or sectors (e.g., civil servants and banking professionals) and voluntary private health insurance plays a supplementary role. Health spending was recently estimated to be US$1,363 per capita with almost 62 percent being publicly financed (including 2 percent via social health insurance), almost 30 percent out-of-pocket (OOP), and about 6 percent from voluntary private health insurance. The country implemented a series of reforms following the 2007–2008 global financial crisis that included bolstering primary health care (including expanding enrollment with general practitioners and creation of Family Health Units) as well as emphasizing public health (including expansion of tobacco control and taxes on sugar-sweetened beverages). Recent studies have indicated improvements reflected in ACSC hospitalizations, which—at 0.3 percent for chronic obstructive pulmonary disease (COPD), asthma, diabetes, and congestive heart failure among adults aged 15+—are now the lowest among European Union (EU) countries (OECD and European Observatory on Health Systems and Policies 2019). A recent expanded assessment used a modified web-based Delphi panel approach to ask a group of experts—general practitioners and internal medicine physicians—to first define a list of ACSCs that would be of relevance to Portugal's context (Sarmento, Rocha, and Santana 2020). Experts were presented with 45 previously identified ACSCs of which they agreed on 34 and proposed four new conditions—colorectal cancer, thromboembolic venous disease, cervical cancer, and voluntary terminations of pregnancies—that were not identified in the list of previously identified ACSCs (the arguments being that for both types of cancers, primary care screening could have helped avoid hospitalization; and for pregnancy terminations, access to effective family planning methods could help prevent the need for hospitalization). The study found that 15.7 percent of all hospitalizations were for ACSCs—a rate of 1.7 percent among adults aged 15+ in the population—with the largest

[7] https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram.

[8] Centers for Medicare and Medicaid Services, Accountable Care Organization 2018 Quality Measures, Medicare Shar Savings Progr., 2018, https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/Downloads/2018-reporting-year-narrative-specifications.pdf.

[9] Centers for Medicare and Medicaid Services, The Merit-Based Incentive Payment System: MIPS Scoring Methodology Overview, 2018.

[10] https://qualitynet.cms.gov/files/62eadf8625af60001694522d?filename=FY2023_HRRP_FAQs.pdf.

being for pneumonia, heart failure, COPD/chronic bronchitis, urinary tract infection, colorectal cancer, hypertensive disease atrial fibrillation, and complications of diabetes mellitus.

Another example of use of hospitalizations for ACSCs to assess health system performance comes from **Brazil**. Brazil is an upper-middle-income country with a per capita income of US$9,130 and a population of 210 million. Like Portugal, Brazil also has a tax-financed universal access system, the Sistema Único de Saúde (SUS), which caters to three-fourths of the country's population (the remainder are covered by voluntary private health insurance, often provided by employers). Current health spending per capita is US$848 with 42 percent being publicly financed, 28 percent coming from OOP sources, and 30 percent from voluntary private health insurance. Since 1994, complementing provision of health care via SUS, Brazil has implemented a widely lauded primary care reform program—the Family Health Strategy (FHS)—which uses community-based multidisciplinary teams (each team comprises a doctor, a nurse, and several community health workers) to provide preventive and basic health care to catchment areas of 3,000–4,000 people each (Wadge et al. 2016). Teams are responsible for registering people in their catchment area as well as for assessing living conditions and health status. Community health workers visit households at least once a month and are trained to help with compliance with medications (including for diabetes and hypertension), providing health education, assisting families with navigating the health system, and with surveillance activities. In conjunction, Brazil also introduced an incentive scheme designed to promote primary health care. This scheme provided additional financial outlays to municipalities based on indicators such as availability of drugs and equipment; privacy during patient consultations and procedures; accessibility; content of antenatal care; treatment completion rates; prevalence of chronic conditions; as well as routine monitoring for diabetes, hypertension, and asthma (Russo et al. 2021). A recent evaluation found modest declines in hospitalizations for ACSCs, with the impact being greatest for children less than five years of age (Russo et al. 2021).

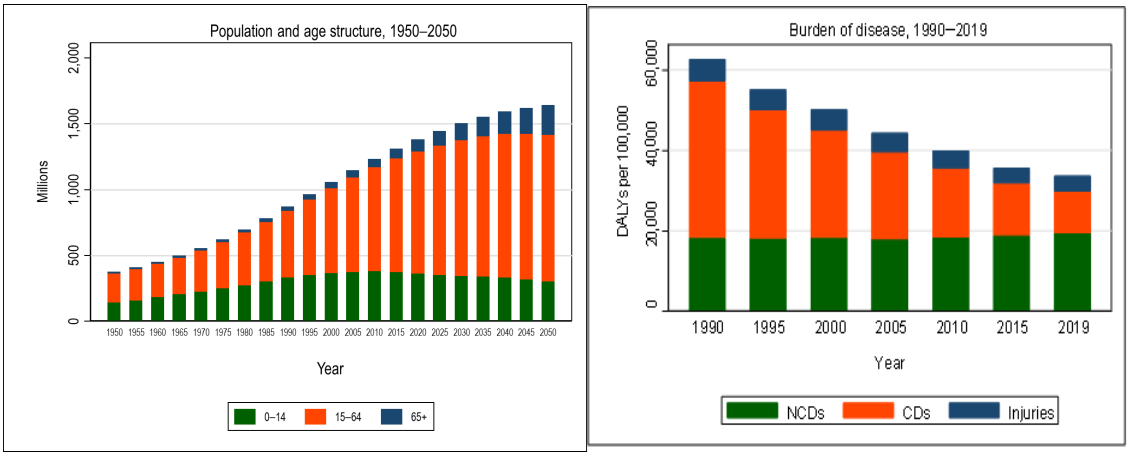
Additional analyses of ACSC hospitalizations include Thailand for five conditions: hypertension, asthma, COPD, diabetes, and heart failure. In 2005, 0.38 percent of members of Thailand's three insurance schemes were hospitalized for these conditions; by 2010, this rate had risen to 0.45 percent. Almost 20 percent of all hospital admissions were found to be for ACSCs in Colombia, Paraguay, and Argentina (Guanais, Gómez-Suárez, and Pinzón 2012). Over time, hospitalizations for ACSCs in Romania—defined based on International Classification of Diseases (ICD)-10 diagnostic-related groups without complications, comorbidities, or procedures—have been falling, down to less than 5 percent of all hospitalizations in 2019. In the case of **Vietnam**, where about 91 percent of the population is covered under Social Health Insurance (SHI), nearly 5.5 million people were admitted annually for ACSCs between 2017 and 2020 as per the SHI claim records. This accounted for nearly one-third of all admissions and Health Insurance Fund payments to providers. Over the years, the rates of potentially preventable hospitalizations have registered an increase from 29 percent in 2017 to 32 percent in 2019. The top-five ACSCs in Vietnam are bacterial pneumonia; ear, nose, and throat conditions; diabetes and related complications; dehydration, gastroenteritis, and intestinal infections; and cerebrovascular disease (Bales et al. 2022).

ACSC metrics need to be interpreted with care. Several studies have found the relationship between primary care and ACSCs to be less straightforward than expected. The role of supply of hospital beds appears to be a key intermediating factor. For instance, admissions for ACSC conditions were found to be high in countries where hospital bed capacity was high, in a study of diabetes-related hospitalizations across 23 OECD countries (Van Loenen et al. 2016). A similar result was evident in the Republic of Korea: even after controlling for the density of primary care physicians across geographic areas, a higher supply of hospital beds was found to be correlated with higher rates of ACSC hospitalizations, likely due to some degree of discretion on whether or not a person needs to be hospitalized for such conditions (Kim et al. 2019). Others have found no relationship between utilization of primary care and ACSC hospitalizations, underscoring the importance of other demand-side factors (Vuik et al. 2017). Given ACSC hospitalizations are a proxy indicator of primary care access, other factors that impact hospitalizations would also need to be taken into account in assessing levels and trends. On the flip side of ACSCs are "care-insensitive" hospitalizations such as for acute appendicitis, where prior access to primary or any other kind of care is generally considered to be largely irrelevant (Hodgson, Deeny, and Steventon 2019).

III. ANALYZING HOSPITALIZATIONS FOR ACSCS IN INDIA

Analysis of ACSCs in India is increasingly relevant given that the country is in the midst of health care reforms and experiencing a growing prevalence of NCDs. In particular, India is undergoing both an epidemiological as well as a demographic transition (Figure 1). India is the world's most populated country, and the demographic profile of the country is rapidly changing: the numbers and share of the population aged 0–14 has started to decline, and the share of the population 65+ is rising. This—combined with changes in lifestyle, behavior, and environmental risk factors as well as a decline in communicable diseases (CDs) and improvements in conditions related to maternal and child health —is leading to changes in the epidemiological profile of the country. Whereas the overall burden of disease—measured in disability-adjusted life years (DALYs) lost—is declining, the prevalence and share of NCDs in the overall disease burden is rising and is expected to continue to do so for the foreseeable future: whereas in 1990 NCDs accounted for almost 30 percent of India's overall disease burden, this number was close to 60 percent in 2019.[11] ACSC metrics could complement other forms of quality assessments that are derived from primary health care facilities themselves, for example, quality scorecards, accreditation status, training, provider knowledge assessments, etc.

Figure 1: Population, Age Distribution, and Burden of Disease in India



Source: Global Burden of Disease.
Note: DALYs = Disability-adjusted life years; NCDs = Noncommunicable diseases; CDs = Communicable diseases.

[11] Neonatal disorders were responsible for the largest share of the overall disease burden, causing 9.2 percent of all DALYs lost due to morbidity and premature mortality in 2019. Although declining slowly, TB remains among the top-ten causes of disease. The share of NCDs such as ischemic health disease, COPD, and diabetes is rapidly rising. New risk factors related to urbanization and lifestyle factors—high systolic blood pressure, high fasting plasma glucose, high body mass index (BMI), and high low-density lipoprotein (LDL) cholesterol—are prominent among the top-ten risk factors contributing to the overall disease burden in the country. Within India, the states of Chhattisgarh, Uttar Pradesh, Assam, Madhya Pradesh, and Odisha have the highest per capita burden of disease (and also the highest shares due to CDs). Kerala, Goa, and Tamil Nadu are the states with the highest burden from NCDs, which accounts for more than two-thirds of the overall disease burden in these states.

Table 3: Top-Ten Diseases/Conditions in India, 1990–2019

Rank in 2019	Top-ten diseases/conditions in 2019	DALYs lost share			
		1990	*2000*	*2010*	*2019*
1	Neonatal disorders (%)	14.4	13.6	12.3	9.2
2	Ischemic heart disease (%)	3.3	4.3	6.0	8.0
3	COPD (%)	2.1	2.7	3.5	4.5
4	Diarrheal diseases (%)	10.4	8.9	6.5	4.3
5	Lower respiratory infections (%)	9.6	7.7	5.9	4.0
6	Stroke (%)	1.9	2.4	2.9	3.7
7	Tuberculosis (%)	5.0	4.8	3.7	3.3
8	Road injuries (%)	1.8	2.5	3.3	3.3
9	Diabetes mellitus (%)	0.7	1.1	1.7	2.7
10	Dietary iron deficiency (%)	1.7	2.0	2.3	2.5

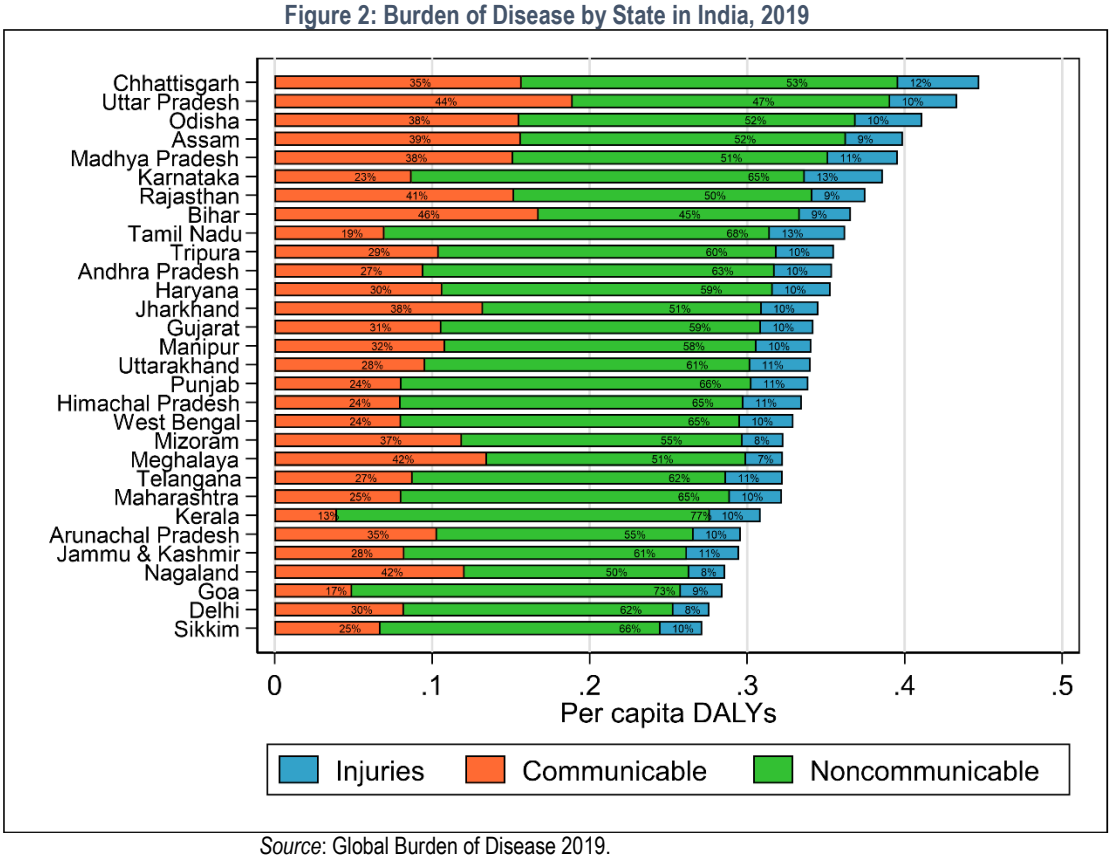
Source: Global Burden of Disease, https://vizhub.healthdata.org/gbd-compare/india.
Notes: DALYs = Disability-adjusted life years; COPD = Chronic obstructive pulmonary disease.

Table 4: Top-Ten Risk Factors in India, 1990–2019

Rank in 2019	Top-ten risk factors in 2019	DALYs lost share			
		1990	*2000*	*2010*	*2019*
1	Particulate matter pollution (%)	12.8	12.0	11.6	11.1
2	Low birthweight and short gestation (%)	16.6	15.2	13.2	9.3
3	High systolic blood pressure (%)	3.3	4.6	6.3	7.9
4	High fasting plasma glucose (%)	1.9	2.9	4.3	7.1
5	Smoking (%)	3.5	4.2	4.8	5.7
6	High body mass index (%)	0.7	1.4	2.5	4.5
7	High LDL cholesterol (%)	1.6	2.1	2.9	3.8
8	Unsafe water source (%)	8.8	7.5	5.4	3.5
9	Alcohol use (%)	1.5	1.9	2.6	3.1
10	Kidney dysfunction (%)	1.2	1.7	2.3	2.9

Source: Global Burden of Disease, https://vizhub.healthdata.org/gbd-compare/india.
Notes: DALYs = Disability-adjusted life years; LDL = Low-density lipoprotein.

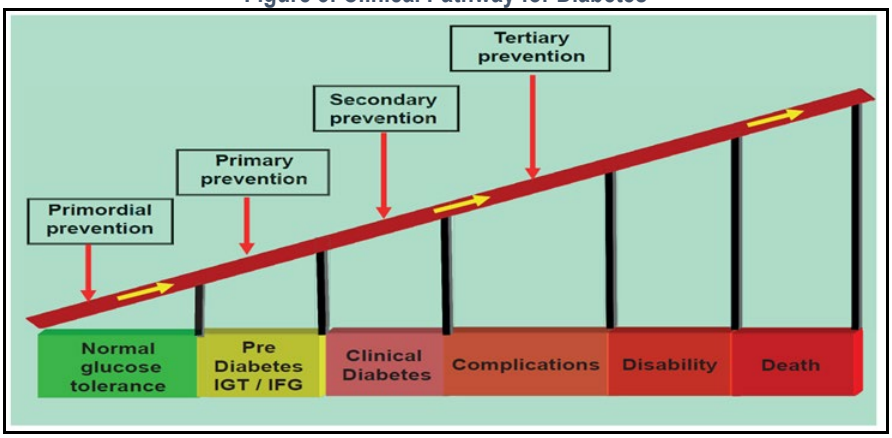
Figure 2: Burden of Disease by State in India, 2019



Source: Global Burden of Disease 2019.
Note: DALYs = Disability-adjusted life years.

Most NCDs tend to be ACSCs and are particularly amenable to promotive, preventive, and management at frontline primary health care facilities. As per Indian government guidelines, primary health care has now been retooled to build awareness regarding conditions such as diabetes and hypertension, to provide advice on lifestyle modifications to those at high-risk, and to proactively conduct screenings to detect undiagnosed cases as per the government's own treatment protocols (Figure 3). Primary care can play a significant role in providing necessary medications to diagnosed cases and monitor compliance and progression of the condition. And it can ensure escalation to higher levels of care early and as needed to prevent further complications.

Figure 3: Clinical Pathway for Diabetes



Source: ICMR Guidelines for Management of Type 2 Diabetes, 2018, https://main.icmr.nic.in/sites/default/files/guidelines/ICMR_GuidelinesType2diabetes2018_0.pdf.
Note: IGT/IFG = Impaired glucose tolerance/Impaired fasting glycemia.

Despite reforms, supply-side readiness for NCDs at primary health care levels remains relatively weak in India. Health facility surveys conducted at government facilities in some states have reported generally good availability of services such as antenatal care, routine deliveries, and general medicine. However, availability of NCD-related services—including psychiatry, cardiology, and chemotherapy—was poor at lower-level facilities. Several government facilities lacked laboratory equipment such as glucometers, blood chemistry analyzers, and incubators (IHME and PHFI 2018). Systematic information about NCD supply-side readiness at private facilities—where the bulk of the population receives care—remains largely unknown but is likely to be weak. Poor supply-side readiness for NCDs at primary care is reflected in lack of awareness and treatment in recent household data. In the National Family Health Survey (NFHS)-5, about one-quarter of all adults were estimated to have hypertension in many states, but only less than one-fifth of those diagnosed had their hypertension controlled and reported being on medication; similarly, more than 15 percent of adults had elevated glucose, but, of these, less than half had this controlled via medication (Table 5). Although not all ACSCs are NCDs, a large proportion are. And given the rising share of the burden of disease from India, assessing hospitalizations for ACSCs ought to be something of interest in terms of its growing policy relevance and given the paucity of supply-side readiness and lack of information on quality of care across frontline service providers.

Table 5: Prevalence of Elevated BMI, Blood Pressure, and Glucose in Selected States

Indicator	Elevated BMI	Elevated blood pressure		Elevated glucose	
State	*Prevalence*	*Prevalence*	*Controlled*	*Prevalence*	*Controlled*
Andhra Pradesh (%)	33.7	27.2	5.1	20.7	1.9
Assam (%)	15.7	19.7	3.2	14.4	1.2
Bihar (%)	15.3	17.2	3.3	14.5	0.9
Goa (%)	34.4	27.2	9.6	22.5	2.4
Gujarat (%)	21.3	20.5	3.6	16.4	0.9
Himachal Pradesh (%)	30.5	23.3	4.1	14.3	1.2
Karnataka (%)	30.5	26.0	3.5	14.8	1.5
Kerala (%)	37.3	31.9	7.9	25.9	3.4
Maharashtra (%)	24.1	23.8	3.8	13.0	1.3
Manipur (%)	32.2	28.1	3.3	15.1	1.2
Meghalaya (%)	12.7	20.1	4.1	11.7	1.3
Mizoram (%)	28.1	21.5	3.7	14.6	1.4
Nagaland (%)	19.2	25.6	0.8	10.9	0.3

Sikkim (%)	35.5	38.1	3.5	14.0	1.3
Telangana (%)	31.2	28.8	5.5	16.4	1.9
Tripura (%)	22.5	21.8	4.5	18.5	1.0
West Bengal (%)	19.5	20.3	3.3	19.4	1.0

Source: Authors' calculation based on data from National Family Health Survey (NFHS-5), 2019–21.

Recent household data are suggestive of a large prevalence of ACSC hospitalizations. For the 75th round, the National Sample Survey Office (NSSO) collected state and nationally representative data in 2018 on hospitalization episodes over the past year for all members of sampled households. NSSO also contains self-reported diagnoses and primary symptomatic information for each hospitalization episode as well as information on length of stay in hospital. These self-reported diagnostic data are grouped under broad categories that can provide some indications as to whether these could potentially be representing hospitalizations for ACSC conditions. For example, respondents were asked if the hospitalization was for "heart disease (chest pain, breathlessness)," "asthma," or "diabetes." Even if we assume these diagnoses were accurately self-reported, not all conditions related to "heart disease," for instance, would or should be considered ACSCs. A subset of these hospitalizations would likely represent the extent of ACSC-related hospitalizations. The superset category of "heart disease" hospitalizations represented 7.1 percent of all hospitalization episodes and 10.3 percent of all bed-days in India (Table 6). This was followed by "asthma" (2.6 percent of hospitalizations; 3.3 percent of bed-days) and "diabetes" (2.0 percent of hospitalizations; 3.4 percent of bed-days). Overall, this superset of conditions containing potential ACSCs accounted for almost 20 percent of all hospitalizations and about 30 percent of all bed-days in the country.

Table 6: ACSC Hospitalizations Estimated from NSSO Household Survey Data

Nature of ailment	Share of all hospitalizations (%)	Average length of stay (Days)	Share of all bed-days (%)
Heart disease (chest pain, breathlessness)	7.1	4 days	10.3
Asthma	2.6	11 days	3.3
Diabetes	2.0	9 days	3.4
Hypertension	2.0	4 days	2.2
Anemia	1.6	5 days	1.8
Acute upper respiratory infections	1.1	7 days	1.4
Tuberculosis	0.9	8 days	2.8
Diphtheria	0.7	6 days	2.1
Seizures/Epilepsy	0.5	5 days	0.8
Tetanus	0.2	7 days	0.2
Undernutrition	0.1	5 days	0.3
Filariasis	0.1	7 days	0.4

Source: Authors' calculation based on data from NSSO 75th round, 2017–18.

ACSC hospitalizations could be systematically and routinely analyzed based on hospital episode statistics captured under PM-JAY. ACSC hospitalizations could be assessed by exploiting claims data that are systematically collected under PM-JAY. When PM-JAY was launched in September 2018, the program's initial health benefits package (HBP1.0) provided coverage for a total of 1,393 secondary and tertiary care procedures, including one procedure that was classified as "unspecified."[12] In November 2019, the health benefits packages was expanded (called HBP2.0) wherein the number of procedures was expanded to 1,578. The current HBP 2022 list has been further expanded to 1,949 procedures. In addition to case-based reimbursements to providers, coverage also includes reimbursements for three days of prehospitalization and 15 days of posthospitalization expenses. Claims data from PM-JAY include information on the specific procedure—including multiple procedures if that was the case—along with the patient's age and sex. Also included is information on the number of days that the patient was hospitalized.

[12] States have the option to expand coverage using their own revenues; for example, the state of Tamil Nadu provides additional coverage for outpatient diagnostics and additional inpatient high-end packages that are not covered by PM-JAY.

Procedures codes refer to medical procedures (e.g., general medicine, medical oncology, and radiation oncology) as well as surgical procedures (e.g., general surgery, cardiology, and neurosurgery). Data on comorbidities or treatment history for the underlying condition for which PM-JAY beneficiaries are being admitted are currently not consistently available. The procedure codes that are available as part of the claims data can be ex post mapped to relevant ICD-11 codes.[13] For example, there is a package for "accelerated hypertension" and "hypertensive emergencies" under PM-JAY. Reimbursement depends on administration of different pharmacotherapies during and after hospitalization. There are also procedure codes for "diabetic ketoacidosis," "acute bronchitis," "acute exacerbation of COPD," "acute asthmatic attack," "acute ischemic stroke," "acute severe malnutrition," as well as for "congestive health failure," among others: all these procedures can be classified as ACSCs. So, in principle, with some minimal adjustments, PM-JAY claims data could provide information to enable tracking of metrics based on ACSC hospitalization, including basic analysis of changes over time, variations across states, age and sex distribution, urban-rural differences, etc.

IV. CONCLUSIONS AND DISCUSSION

This paper has summarized the concept of ACSC hospitalizations and underscored its relevance for low- and middle-income countries such as India. The basic premise being that ACSC hospitalizations potentially reflect weaknesses in access to and quality of primary health care, and analysis of ACSC data can help inform policymakers and facility managers to make adjustments to ensure that ACSC hospitalizations are minimized and decline relative to benchmarks and that resources are not being wasted at the hospital level when such conditions could be more efficiently managed at lower-level facilities. Such information and analysis can be especially important in countries such as India where the prevalence of NCDs is rising and where large-scale hospitalization data are increasingly being collected as part of health reforms that include introductions of purchaser-provider splits and implementation of electronic health records such as PM-JAY and as envisioned under the Ayushman Bharat Digital Mission (ABDM). The paper also outlines ways in which PM-JAY claims data could be routinely monitored and analyzed to provide information of ACSC hospitalizations, which could help inform implementation of India's broader Ayushman Bharat reforms that include strengthening of primary health care services.

A key next step would be to gather experts to define an initial list of ACSC conditions for the Indian context and analyze PM-JAY claims data. This list could build on global experiences but also adapt the list to India's local context. Existing claims data from PM-JAY are currently being analyzed—using ACSC definitions from NHS England—and will be summarized in a forthcoming paper. The objectives are to try and understand and assess the information content in ACSC hospitalization rates across states or across districts and other units of analysis, keeping in mind that ACSC metrics may not solely reflect access to quality primary health care and that other demand-side or supply-side factors may need to be taken into account. Data on ACSC hospitalizations should also be complemented by additional information on utilization and quality of primary health care to better understand the reasons why such hospitalizations are occurring and how they can be prevented in the future.

Several caveats remain on how ACSC data could be interpreted and analyzed. First and foremost, any given hospitalization for an ACSC does not mean that this in and of itself was not necessary; it represents a signal that something perhaps was missing in the continuum of care that could not prevent progression to a more acute stage of the condition. However, assuming that higher ACSC hospitalization rates are always due to poorer access to quality primary health care is not clear since hospitalization data often do not contain information on prior access to and quality of primary health care. There may be other factors at play,

[13] AB PM-JAY has also initiated ICD-11 and International Classification of Health Interventions (ICHI) coding in 19 states since April 2022. The quality and completeness of the coding will improve over time, which could also be used to better identify the ACSCs.

especially demand-side factors but also supply-side factors such as number of hospital beds in a given geographic area, that may influence hospitalizations for ACSC conditions or the prevalence of other risk factors that can aggravate ACSC conditions, which may have nothing to do with how well a health system is performing (e.g., due to poor education or due to unsanitary living conditions). Care in interpretation is necessary to better understand the context within which such hospitalizations might be occurring. Another issue—especially pertinent in low- and middle-income countries such as India—is that ACSC metrics as applied sometimes implicitly assume that there is no foregone inpatient care. So, for instance, ACSC hospitalizations may be lower among lower-income individuals in India because they tend to have lower hospitalization rates for all conditions, despite being in poorer health, not because they have better access to quality primary health care services vis-à-vis those who are relatively well-off. In fact, with the rollout of a program such as PM-JAY, which explicitly targets the economically vulnerable population, it may be expected that hospitalization rates among the poor would initially increase for all conditions, including for ACSCs. If this is observed, it would not necessarily mean that access to quality primary health care services has declined, rather it could mean that the pent-up unmet need for inpatient care is now being fulfilled under the program.

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Ambulatory Care Sensitive Conditions (ACSCs)—*conditions for which hospitalization could be prevented or reduced with timely access to effective preventive and early disease management services in primary health care outpatient settings*—has emerged as a valuable concept for assessing disparities in healthcare access and utilization among vulnerable populations. This paper provides an overview of the concept of ACSCs and explores its potential for measurement in low-and middle-income countries, using India as a case study. Hospitalization or claims data for ACSCs are increasingly used globally to assess the access to and quality of primary health care services. Analyzing trends in hospital admissions for ACSCs can provide critical policy-relevant information as effective management of ACSCs can lead to reduced hospitalizations, lower morbidity, and mortality, and reduced cost pressures on health systems. The paper highlights the relevance of ACSC analysis in the context of India's flagship health sector reforms—Ayushman Bharat—which aims to achieve universal health coverage. Monitoring and analyzing hospitalizations for ACSCs under Pradhan Mantri Jan Arogya Yojana (PM-JAY)- *the world's largest health insurance scheme and one of the four pillars of Ayushman Bharat*- will allow decision-makers to assess the magnitude of preventable hospital admissions from an economic efficiency and patient well-being perspective and enable them to make informed policy decisions on strengthening the quality of primary healthcare services.

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1818 H Street, NW
Washington, DC USA 20433

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