POTENTIALLY PREVENTABLE HOSPITALIZATIONS IN VIETNAM: ANALYSIS USING HEALTH INSURANCE CLAIMS DATA

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Health, Nutrition & Population

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Health, Nutrition, and Population (HNP) Discussion Paper

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Health, Nutrition, and Population (HNP) Discussion Paper

Potentially Preventable Hospitalizations in Vietnam:
Analysis Using Health Insurance Claims Data

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Abstract

Introduction: This study measured the magnitude, trends, and distribution of potentially preventable hospitalizations (PPHs) in Vietnam, defined as inpatient admissions for ambulatory care–sensitive conditions (ACSCs). Many of these admissions could have been avoided if effective primary health care had prevented or managed these cases to avoid the need for hospitalization. **Methodology:** ACSCs were identified from the international literature and defined by International Classification of Disease (10th edition)(ICD-10) diagnosis codes. Data were extracted from social health insurance claims to calculate age-standardized rates within the insured population. **Results:** During the 2017 to 2020 period, about 5.5 million cases were admitted annually for ACSCs. This accounted for one-third of all admissions and Health Insurance Fund payments to providers. 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. PPH rates increased over the 2017 to 2019 period but fell in 2020 due to the impact of COVID-19 on health care–seeking. PPH rates follow seasonal patterns of peaks in the autumn and dips around the New Year holiday. PPH rates for acute diseases are high among children and older adults, but for chronic diseases they are higher among older people, and for vaccine-preventable conditions they are higher among children. Provincial variation in PPH rates was found, suggesting varying disease patterns and effectiveness of PHC. **Conclusions:** This analysis provides evidence of the feasibility and value of estimation of PPH rates, which can be used as a routine indicator to track health system performance for management and planning. The claims review data provide a timely data source, covering most of the population and avoiding additional primary data collection. The results are specific to individual medical conditions and provide useful targeting information to help plan policies and programs.

Keywords: Preventable hospitalization, ambulatory care–sensitive condition (ACSC), primary health care, health insurance, efficiency.

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Table of Contents

List of figures

List of tables

FOREWORD

In Vietnam, social health insurance (SHI) coverage has reached over 91 percent of the population. This is the major source of finance for medical examination and treatment of the people. Over three years (from 2019 to 2021), the average number of medical visits for examination and treatment covered by the Health Insurance Fund was more than 150 million per year, 10 percent of which were hospitalizations for inpatient care, but payments for these accounted for over VND 61 trillion (approximately equivalent to US$2.7 billion). This figure made up 62 percent of the total expenditure of the Health Insurance Fund. As a result, preventive measures, early detections of diseases, and primary health care (PHC) play a key role in ensuring the effective operation of the health system by cutting down the need for costly treatment of hospitalized cases. To this end, many countries worldwide have applied the approach of measuring and assessing potentially preventable hospitalizations (PPHs) for appropriate control and interventions, and one of the assessing indicators is the PPH rate.

This is the first time that Vietnam Social Security (VSS) has cooperated with the World Bank to conduct the study: "Potentially Preventable Hospitalizations in Vietnam: Analysis Using Health Insurance Claims Data." The data extracted from the VSS claims database, which has been directly connected to nearly 13,000 health facilities for over five years, was initially analyzed in relation to PPHs and classified into disease groups, population, ages, and regions, thus proposing appropriate interventions. This valuable information is applied not only for the effective management and utilization of the Health Insurance Fund but also for the development of appropriate solutions to improve the performance of the health care sector by managing and policy-making agencies. In the upcoming years, a calculation method for this indicator is planned to be completed and health facilities will be under annual monitoring from VSS with the application of this method.

We would like to thank the World Bank for cooperating with us in this study. It is our pleasure to introduce and share the initial results of this study with readers, health care managers, and policy makers, and domestic and international researchers.

Sincerely,

Duong Tuan Duc,
General Director
Center for Medical Claim Review,
Vietnam Social Security

ACKNOWLEDGMENTS

ABBREVIATIONS

ACSC	Ambulatory Care–Sensitive Condition
ALOS	Average Length of Stay
BMI	Body Mass Index
COPD	Chronic Obstructive Pulmonary Disease
COVID-19	Coronavirus Disease 2019
DALY	Disability-Adjusted Life Year
ENT	Ear, Nose, and Throat
HCMC	Ho Chi Minh City
ICD-10	International Classification of Diseases (10th edition)
KPI	Key Performance Indicator
MOH	Ministry of Health
PHC	Primary Health Care
PPH	Potentially Preventable Hospitalization
SHI	Social Health Insurance
VSS	Vietnam Social Security

INTRODUCTION

In efforts to enhance health system efficiency, cope with resource constraints, and improve outcomes for patients, reducing avoidable hospital admissions is an important area on which to focus. There are two main approaches to policy action. The first is to reduce inappropriate admissions and increase appropriate admissions by imposing clinical criteria for decisions about admitting patients to inpatient care. This approach can include setting criteria for patients who can undergo day surgery rather than inpatient surgery, which can also reduce unnecessary admissions for procedures that can be safely provided in an outpatient setting. The second approach is targeted actions to strengthen primary health care (PHC) and preventive medicine informed by analysis of potentially preventable hospitalization (PPH) (Falster and Jorm 2017). This report focuses on the second approach. PPHs are inpatient stays for treating cases classified as ambulatory care–sensitive conditions (ACSCs). The term PPH is used instead of ACSC hospitalization to emphasize the whole point of this analysis, which is to reduce hospitalization by preventing the clinical need for hospitalization. ACSCs refer to a set of medical conditions/diagnoses "for which timely and effective 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 or condition" (McDermott and Jiang 2020; WHO 2016).

Many studies have been implemented to analyze hospitalization for ACSCs in different countries because the methodology is simple and only requires administrative patient-level data. Billings et al. (1993) is often considered the first paper to conceptualize, define, and quantify ACSCs in a way that is relatively easy to analyze using existing administrative data systems. Routine analysis of PPH is now part of health indicators and accountability systems in several countries (United Kingdom [NHS Digital 2021][1]; Canada [Canadian Institute for Health Innovation 2021][2]; United States [McDermott and Jiang 2020]; New Zealand [Ministry of Health New Zealand 2022][3]; and Australia [Falster and Jorm 2017]). Besides their use in routine health care–monitoring systems, ACSCs are a popular research topic, with over 11,000 published articles found in a Google search of the key term "ambulatory care–sensitive," of which over 400 were published in 2021. Analysis of ACSCs covering at least 48 countries has been implemented, including studies in the Asian countries of Japan; the Republic of Korea; Taiwan, Hong Kong Special Administrative Region (SAR), China; and Thailand, although some of the studies only look at one or two specific ACSCs (Rocha 2021).

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[1] NHS Digital. 2021. "2.3.i Unplanned Hospitalisation for Chronic Ambulatory Care Sensitive Conditions." NHS Outcomes Framework Indicators-February 2021 Release. https://digital.nhs.uk/data-and-information/publications/statistical/nhs-outcomes-framework/february-2021/domain-2-enhancing-quality-of-life-for-people-with-long-term-conditions-nof/2.3.i-unplanned-hospitalisation-for-chronic-ambulatory-care-sensitive-conditions.
[2] Canadian Institute for Health Innovation. 2021. "Ambulatory Care Sensitive Conditions." Indicator Library. December. https://www.cihi.ca/en/indicators/ambulatory-care-sensitive-conditions.
[3] Ministry of Health New Zealand. 2022. "Ambulatory Sensitive (Avoidable) Hospital Admissions." Nationwide Service Framework Library. September 19. https://nsfl.health.govt.nz/accountability/performance-and-monitoring/data-quarterly-reports-and-reporting/ambulatory-sensitive.

Social health insurance (SHI) in Vietnam covers about 91 percent of the population (Ministry of Health Vietnam 2022)[4] and accounts for 34 percent of current health expenditure (WHO 2022).[5] The SHI package covers curative care services including inpatient and outpatient specialists, PHC, rehabilitation, and palliative care. All public curative care facilities, most private hospitals, and some private outpatient clinics are contracted with the SHI agency. The private sector accounted for about 7.0 percent of inpatient admissions and 30.5 percent of outpatient visits in 2020 (General Statistics Office 2021). Payment from the insurance fund is on a fee-for-service basis, covering drugs and consumables at the procurement price and paying for procedures, bed-days, and consultations based on government-set tariffs. Public health, preventive medicine, and health promotion services are mainly provided by public providers who are funded through state budget payments for payroll and basic operating costs, although some user fees are charged to patients for individual services. PHC consists of both curative and preventive services, and traditionally these have been the responsibility of the commune health stations. However, the technical capacity of these facilities is low and most people bypass this level to seek curative care for common conditions at hospitals. Although insured patients are required to enroll for first point-of-contact care at a single facility, the Health Insurance Law allows people to seek care at any facility they want at the district level or below, undermining the ability of the PHC system to provide continuity of care or integrate preventive and curative care.

Routine analysis of PPHs has the potential to guide strengthening of PHC in Vietnam by focusing on shortcomings that lead to PPHs. With high population coverage, Vietnam Social Security (VSS) currently pays for the vast majority of hospital admissions each year[6] and has the administrative data needed (episode-level data on inpatient care with ICD-10[7] codes for primary and secondary diagnoses) to identify ACSCs and estimate the number and costs of PPHs to the SHI fund. The patient-level data can be analyzed to identify which types of conditions, patients, and localities have high rates of PPH and estimate the potential cost savings if district-level health system actions are taken to prevent and manage these case types to prevent the need for expensive hospitalization. The PPH indicator can be used as a key performance indicator (KPI) of the health system or an outcome measure in evaluations of interventions aimed at reforming and improving PHC as has been done in other countries (Russo et al. 2021). Implementing this analysis on a routine basis using administrative data can contribute to greater sustainability of the SHI fund by improving efficiency of the health system by reducing PPHs.

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[4] Ministry of Health Vietnam. 2022. "Health Statistics (Thống Kê Y Tế)." Ministry of Health Portal 2022. https://moh.gov.vn/thong-ke-y-te.

[5] WHO (World Health Organization). 2022. "Global Health Expenditure Database." https://apps.who.int/nha/database.

[6] Ministry of Health Vietnam. 2022.

[7] ICD-10 = International Classification of Diseases (10th edition).

> **Ambulatory care–sensitive conditions (ACSCs)** refer to a set of medical conditions, diagnosis for which timely and effective outpatient or primary care can help 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 or condition.
>
> **Potentially preventable hospitalizations (PPHs)** are defined as episodes of hospital stays for ACSCs that could have been avoided through various preventive interventions or individualized disease management in the community.

Analysis of the burden of disease in Vietnam shows that about 75 percent of disability-adjusted life years (DALYs) are due to noncommunicable diseases and related preventable risk factors (Global Burden of Disease Collaborative Network 2020)**.** High systolic blood pressure and high fasting plasma glucose account for 24 percent of DALYs (Figure 1). Yet, the National Survey on the Risk Factors of Non-Communicable Diseases (STEPS) 2015 found that among people detected to have raised blood pressure, only 43.1 percent had previously been diagnosed and only 13.6 percent were taking medications to manage it. Similarly for people detected with raised blood glucose, only 31.1 percent had previously been diagnosed and 28.9 percent were taking measures to manage it at a health facility (Ministry of Health Vietnam 2016). Management of chronic conditions to slow progression and risk of complications, including support for self-management, could improve this situation. Tobacco use, alcohol use, dietary risks, and high Body Mass Index (BMI) account for another 34 percent of DALYs. Reducing these risk factors requires combinations of macrolevel measures, such as increased tobacco and alcohol taxes, and behavior change interventions at the individual level, which could be implemented at the PHC level. Examples of other kinds of interventions that can be implemented to reduce PPHs include vaccination for diseases not yet included in the Expanded Program on Immunization (EPI), such as influenza; appropriate diagnosis and prescribing to manage infectious diseases; oral health checks; sexual health checks; and comprehensive antenatal care including screening for syphilis, human immunodeficiency virus (HIV), and hepatitis B (Katterl et al. 2012).

Figure 1: Risk Factors for Burden of Disease in Vietnam, 2019
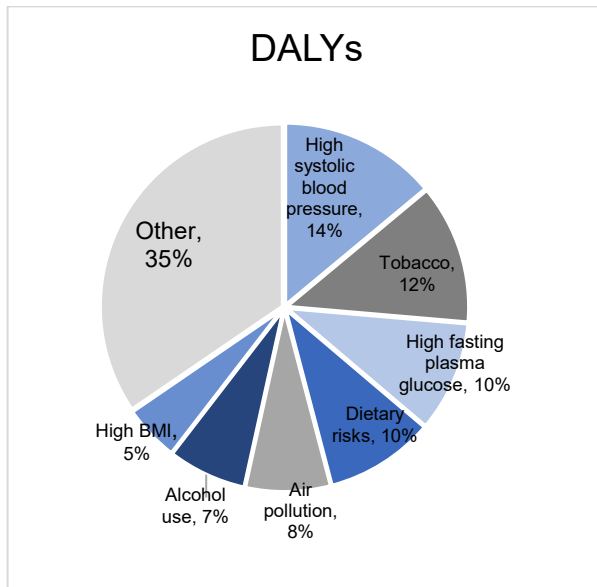
Source: Global Burden of Disease Study 2019.

Note: BMI = Body Mass Index.

Classifying an admission as "potentially preventable" means that preventive, promotive, or other outpatient interventions could avert the need for hospitalization. It does not mean that a specific hospitalization itself was unnecessary. PPHs represent a specified set of hospitalizations that could be significantly reduced or even minimized with effective treatment of acute conditions, good management of chronic illness, and immunizations against infectious diseases. In other

words, these cases should be understood as admissions for which optimal management at an earlier stage in the community or in outpatient care might have prevented the patient's condition worsening to the point where hospitalization was needed. In Vietnam, diagnostic and treatment guidelines often do not provide concrete criteria to guide admission decisions, and clinical admission criteria are not required to justify or authorize hospital admission decisions (even those paid by the Health Insurance Fund). The fee-for-service payment mechanism includes substantial payments per inpatient bed-day, which strongly incentivize admissions rather than outpatient care. These conditions make it likely that some of these PPHs also include inappropriate admissions for patients who do not require inpatient care, such as patients with urinary tract infections or respiratory infections who could take oral medication at home.

This report presents the results of the first Vietnamese analysis of PPH produced in a collaboration between the World Bank and VSS. The methodology is briefly introduced in this report, while more technical details are available in an accompanying methodological guideline. Results of the analysis for the 2017–2020 period include an assessment of the magnitude of PPH generally and for specific diseases, trends, and seasonality in PPH; age-sex structure of PPH; geographic variation in PPH; and a rough disaggregation by vulnerable and nonvulnerable groups and by level of facility where the insured members are enrolled as their first point of contact in the health system. The report concludes with recommendations for policy action based on the findings.

METHODOLOGY

THEORETICAL-BASED DEFINITIONS OF AMBULATORY CARE–SENSITIVE CONDITIONS

Quantification and analysis of PPHs first require defining ambulatory care–sensitive conditions (ACSCs). Definition of ACSCs relies on ICD-10 disease codes, which are found in administrative databases of inpatient admissions. The rigorously defined selection criteria used in the ACSC literature include the following:

1. There is scientific evidence (published literature) that the cause of hospitalization is ambulatory care–sensitive, such as inclusion in published studies of ACSCs.

2. There is clarity on the definition and coding of the diagnosis (using ICD-10).

3. The health problem is important for public health (that is, not a rare event; in some studies a threshold hospitalization rate is given as 1 per 10,000 population).

4. Hospitalization is needed when the condition is present.

5. There is a consensus among experts and clinicians that hospitalization is potentially avoidable by effective and timely provision of ambulatory care for prevention or management to prevent complications.

Most PPH studies initially identify ACSCs by reviewing the literature and creating a tentative list of ICD-10 codes that are widely used to define ACSCs. This study examined the detailed methodology used to measure hospitalizations due to ACSCs in Australia and the United Kingdom, countries with a well-established routine monitoring of PPH as a health system KPI. However, Vietnam is a middle-income country in Asia, and the disease burden is likely to be somewhat different from Australia and the United Kingdom. A wider search of the methodological

literature on ACSCs in other countries was implemented to include a more diverse set of ACSCs that have been assessed as meeting these five criteria. Studies were identified for four countries—— Brazil, Korea, Mexico, , and Portugal—with adequate detail in the methodological description to identify additional ACSCs to be considered in Vietnam.

The definition of ACSCs is further refined to exclude cases that were less likely to be preventable through primary and ambulatory care interventions. Most ACSCs are defined based only on the ICD-10 code for principal diagnosis.[8] Additional criteria for including or excluding episodes of care vary by ACSC but could include secondary diagnosis, some types of procedures, and age categories. For example, patients with bacterial pneumonia who also have sickle cell disease will not be counted as a PPH because that underlying condition makes it much more difficult to prevent bacterial pneumonia. Some episodes of care for a specific ICD-10 disease used in defining ACSCs may involve procedures for comorbidities or underlying causes of disease that are not preventable at the primary care level. For example, congestive heart failure may result from congenital heart defects that have been left untreated. Cases of congestive heart failure that undergo surgeries to repair heart defects would not be considered preventable at the PHC level, so those case types have been excluded from the congestive heart failure ACSCs used to estimate PPH rates. Younger age groups were excluded from definitions of certain chronic ACSCs for which adult cases result from cumulative exposure to preventable causes, while most pediatric cases result from genetic or congenital causes, which are less preventable or manageable at the PHC level. The detailed definitions of cases included and excluded are described in the Methodological Guidelines report.

VALIDATION OF POTENTIAL ACSCS AGAINST THEORETICAL CRITERIA USING VIETNAMESE DATA

The initial selection of potential ACSCs for Vietnam (Table 1) is based on a review of published articles that have validated the definitions of ACSCs through clinical consensus approaches. This gives a strong indication that the ACSCs proposed do meet criteria 1 (scientific evidence of preventability) and 2 (clarity on definition and coding).

The third criterion (the ACSC constitutes an important public health problem in Vietnam) was evaluated based on exploratory analysis of the Vietnamese data. PPH rates per 10,000 people were calculated for each ACSC. These results indicated that hospitalization for gangrene (not linked to diabetes), gallstone ileus, appendicitis with complications, syphilis, dementia, and depressive disorders is relatively rare in Vietnam, so these ACSCs have been excluded from the PPH analysis (Table 1). Together, these account for just 0.2 percent of all ACSCs considered for inclusion.

The exploratory analysis also confirms satisfaction of the fourth criterion—hospitalization may occur when the condition is present. Results indicate that all the ACSCs have at least some cases treated on an inpatient basis, although there is some variation, with hospitalization rates ranging from 1.7 percent of cases for dental disease to 85.7 percent for appendicitis with complications (Table 1). None of the diseases are exclusively treated on an outpatient basis.

The remaining ACSC selection criteria requires consultations with preventive and curative care clinicians to discuss the extent to which these hospitalizations are preventable in the

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[8] Note that traditional medicine diagnosis codes were converted to ICD-10 codes for this analysis.

Vietnamese context. This would involve discussions about whether the existing health care service delivery in Vietnam could potentially prevent disease or manage cases in each ACSC to prevent progression to the point of requiring hospitalization. This further validation of the findings would enhance the health sector's confidence to use the PPH indicator in routine monitoring and evaluation of PHC or as a KPI of the health sector. Further consultations could lead to classification of ACSCs into those for which current PHC service scope and design could prevent hospitalization for those conditions and those for which PHC services would require substantial further investments in training, equipment, drugs, and systems to prevent hospitalization.

Table 1: Assessment of ACSC Eligibility Criteria

	ACSC	Number of countries using this ACSC	In all six studies	2019 Age-standardized PPH rate (per 10,000)	Percent hospitalized (2019)
1	Influenza and pneumonia (vaccine-preventable)	6	Pneumonia (excluding influenza)	13.40	9.1
2.1	Other vaccine-preventable diseases (EPI)	5		11.21	6.4
2.2	Other vaccine-preventable diseases (non-EPI)	5		6.53	18.5
3	Nonvaccine-preventable pneumonia	6	x	114.07	47.5
4	Cellulitis	6	x	15.46	11.3
5	Dehydration, noninfective gastroenteritis, and intestinal infections	5		60.54	33.1
6	Dental conditions	3		7.16	1.7
7	ENT infections	6	x	105.38	3.6
8[a]	Gangrene (not related to diabetes)	2		0.01	23.3
9	Nutritional deficiencies	4		3.01	4.7
10	Pelvic inflammatory disease	4		4.31	3.2
11	Perforated/bleeding ulcer	4		17.83	12.9
12	Pyelonephritis	6	x	9.42	11.2
13[a]	Gallstone ileus	1		0.001	61.5
14[a]	Appendicitis with complications	1		0.42	85.7
15	Tuberculosis	3		10.50	27.9
16[a]	Syphilis	2		0.07	30.6
17	Angina	5		17.18	11.0
18	Congestive heart failure	6	x	15.41	21.0
19	Hypertension-related complications	6	x	67.57	2.3
20	Rheumatic heart disease	3		1.26	5.6
21	Asthma	6	x	13.78	16.7
22	COPD and bronchiectasis	6	x	29.65	9.2
23	Convulsions and epilepsy (including eclampsia)	5		10.21	14.2
24	Diabetes complications	6	x	63.91	3.5
25	Iron deficiency anemia	5		1.62	5.9
26	Cerebrovascular disease	3		52.40	19.4

	ACSC	Number of countries using this ACSC	In all six studies	2019 Age-standardized PPH rate (per 10,000)	Percent hospitalized (2019)
27	Atrial fibrillation	1		1.67	15.3
28[a]	Dementia	1		0.28	6.4
29[a]	Depressive disorders	1		0.57	4.2
30	Colorectal cancer	1		11.38	31.6
31	Cervical cancer	1		1.94	21.6

Source: Based on the VSS SHI claims database*.*
Notes: ACSC = Ambulatory care–sensitive condition; PPH = Potentially preventable hospitalization; COPD = Chronic obstructive pulmonary disease; ENT = Ear, nose, and throat; x indicates that the ACSC was used in all 6 studies. If no x is indicated it means it was used in less than 6 studies.
a. These ACSCs were excluded from the analysis because of the low PPH rates*.*

DATA SOURCE

The main data source used for this analysis is the SHI claims database. Specifications of data elements in this administrative database are stipulated in Ministry of Health (MOH) Decision 4210/QĐ-BYT (2017). Additional information on the number of members who have health insurance, which was used to derive rates, was obtained from the VSS member database. Because no primary data collection was required, this indicator can be calculated with minimal cost, facilitating its use as a routine indicator. No individually identified data were used; only aggregates were calculated for different groups by VSS, thus ensuring personal data protection.

The scope of data used in the analysis of PPH covers all insured people using health care services for which the facility or patient claimed payment from the SHI fund. Corresponding denominators are derived from the SHI member database. Note that all armed forces (military and police) were excluded from the analysis due to the sensitive nature of the information. Patients are classified as inpatient based on a clinician's order for admission and as recorded when submitting the claim. Episodes of inpatient care were counted in a given year if the discharge date fell within that year from January 1 to December 31. The earliest year is 2017, when the electronic claims database first came into operation and the data were extracted through the end of 2020. It is likely that the situation in 2020 is substantially different from other years because the coronavirus disease 2019 (COVID-19) affected patterns of hospitalization. Therefore, in some of the analysis presented for a single year, 2019 is used instead of 2020.

DATA ANALYSIS

Main indicators analyzed in this study

The main indicator used throughout this study is the PPH rate per 10,000 insured people (referred to as the PPH rate in the report). It is calculated by taking the total admissions for cases belonging to the set of ACSCs (described above) in the SHI claims database divided by total insured members taken from the SHI member database.

To assess the burden of PPHs on health insurance and hospital, additional indicators are defined in the Methodological Guidelines and reported in this study including the following:

- PPH as a share of total admissions

- Average length of stay (ALSO) for PPH admissions

- VSS payments for PPH as a share of total VSS payments for all inpatient care

- Patient payments for PPH as a share of total patient payments for inpatient care reported to VSS

- Average SHI payment per PPH admission

- Average patient payment per PPH admission.

Age standardization

To ensure comparability across time and groups in this analysis, age-standardized rates and averages were calculated instead of crude rates. The age structure of different groups varies; for example, some mountainous provinces have much younger populations than rural delta provinces, and a higher share of women live to older ages than men. Age structure also changes over time. When comparing the crude PPH rates across geographic areas, localities with older populations may have higher rates of PPH than those with younger populations simply because they have a higher number of older people. To eliminate the confounding of results due to the different age structure across groups or time, age standardization has been implemented. This is done by estimating age-specific rates or averages, then weighting by the share of population in different ages in the standard population, with the 2019 health-insured population used as the standard for this report. Details of how age-standardized rates are calculated can be found in the Methodological Guidelines.

Variables used for disaggregation

The analysis aims to provide evidence for policy makers to target improvements in PHC interventions to reduce PPH. For this, the analysis is disaggregated by season, sex, age, disadvantaged groups, province of residence, and level of facility where a patient is enrolled for first point-of-contact services in the health system. Additionally, the results are disaggregated by broad types of ACSCs (acute, chronic, and vaccine-preventable) and by the top-10 individual ACSCs. All the data used for disaggregation come from the VSS administrative databases. Details about how these variables are defined can be found in the Methodological Guidelines, and the summary definitions are presented in Table 2. Only a small number of cases (less than 0.01 percent) had to be dropped due to missing or incorrect data, such as miscoding of the province or sex.

Table 2: Definitions of Variables Used for Disaggregation

Disaggregation variable	Definition
Age of patient	Age at time of admission
Sex of patient	1 for male, 2 for female
Province	Province where the individual's health insurance card is registered for first point-of-contact care
Month (seasonality)	Month of admission date in the claims record
Disadvantaged group	The poor, ethnic minorities, and other people living in disadvantaged areas, and members of near-poor households based on the SHI member number
Level of facility where insured patient registered for first point of contact with the health system	Central, provincial, district, or commune level of the facility where a patient is enrolled for care based on designation in the VSS database

Notes: SHI = Social health insurance; VSS = Vietnam Social Security.

RESULTS

POTENTIALLY PREVENTABLE HOSPITALIZATIONS AND RESOURCE USE

From 2017 to 2020, total PPHs ranged from 4.5 to 5.5 million among the insured population compared to a total of 15 to 17 million admissions paid by the SHI fund per year. The number of PPHs, total inpatient episodes, PPH rate per 10,000 population, and PPH share of total inpatient episodes paid by SHI increased between 2017 and 2019 (Table 3) but then fell in 2020, which can be attributed largely to disruptions in the health system due to COVID-19.

Table 3: Summary Indicators on Magnitude of PPHs, 2017–2020

All conditions	2017	2018	2019	2020
Number of PPHs (thousands)	4,483	4,912	5,525	4,990
Total inpatient episodes paid by SHI (thousands)	15,466	16,017	17,164	15,362
PPH share of total inpatient episodes (%)	29.0	30.7	32.2	32.5
Crude PPH rate (per 10,000)	553.4	592.6	656.8	583.3
Age-standardized PPH rate (per 10,000)	547.2	580.7	632.6	553.1

Source: Based on the VSS SHI claims database.

Notes: PPH = Potentially preventable hospitalization; SHI = Social health insurance.

PPHs use up a large amount of health sector resources. A total of 32 to over 37 million inpatient days are attributed to PPHs, depending on the year and method of calculating inpatient days (Table 4). The ALOS for PPHs has been declining from 7.2 in 2017 to somewhere between 6.4 and 6.9 days per case in 2020, depending on how length of stay is calculated from the claims database. The high-end estimates are derived from information on discharge and admission dates but include days not actually spent in the hospital. The low-end estimates are derived from hospital charges for inpatient bed-days, but these are discounted when inpatient cases exceed the number of chargeable beds in the hospital, such as when more than one patient uses the same bed. Future analysis can also examine the proportion of PPH cases that are same-day cases to inform policies for shifting care from inpatient to outpatient settings.

Table 4: Indicators on Inpatient Days of PPHs, 2017–2020

All conditions		2017	2018	2019	2020
Number of PPH inpatient days (1,000s)	High-end estimate	32,647	35,262	37,262	34,303
	Low-end estimate	32,069	33,466	35,523	32,621
ALOS per PPH episode (days)	High-end estimate	7.3	7.2	6.7	6.9
	Low-end estimate	7.2	6.5	5.8	6.4

Source: Based on the VSS SHI claims database.
Notes: PPH = Potentially preventable hospitalization; ALOS = Average length of stay.
The low-end estimate is obtained by counting the bed-days charged, which discount by half any cases where patients double up in the same bed. High-end estimates are obtained by subtracting the admission date from the discharge date, which may count the admitted cases who do not immediately occupy a bed. The true estimate lies somewhere in the middle.

PPHs cost VSS US$632 to US$874 million per year during 2017–2020. This represents approximately one-quarter to one-third of all SHI payments for inpatient services depending on the year (Table 5). PPHs also add to the financial burden of households, with the total patient payments for PPHs at US$74.2 million in 2017, increasing to US$125 million in 2020. On a per

episode basis, PPHs cost the insurance fund about US$141 to US$175 per episode of care. The average patient share of total payments has been increasing, from 11.7 percent of claim value in 2017 to 14.3 percent in 2020, consisting mostly of official patient health insurance copayments. The actual out-of-pocket payments of patients is higher than these estimates because items prescribed to patients that are outside the health insurance package are not required to be reported by hospitals in their claims.

Table 5: Indicators on Inpatient Costs of PPHs, 2017–2020

All conditions	Payer	2017	2018	2019	2020
Total payments for PPHs (US$, thousands)	SHI	632,407	731,615	852,616	874,042
	Patient[a]	74,162	89,063	116,962	125,085
Total payments (US$, thousands)	SHI	2,535,171	2,686,747	2,837,628	2,739,498
	Patient[a]	355,922	408,282	475,787	472,116
PPH share of total inpatient costs (%)	SHI	24.9	27.2	30.0	31.9
	Patient[a]	20.8	21.8	24.6	26.5
Average cost per PPH episode (US$)	SHI	141	149	154	175
	Patient[a]	17	18	21	25
Patient share of total costs[a] (%)		11.7	12.2	13.7	14.3

Source: Based on the VSS SHI claims database.
Notes: PPH = Potentially preventable hospitalization; SHI = Social health insurance.
a. The total payment from patients is based on information submitted by hospitals in their SHI claim but may exclude items collected by hospitals that are not eligible for SHI payment.
Exchange rate: US$1 = VND 22,370.09 (2017); VND 22,602.05 (2018); VND 23,050.24 (2019); and VND 23,208.37 (2020).

POTENTIALLY PREVENTABLE HOSPITALIZATIONS BY ACSC TYPE

Breaking down PPHs by ACSC type or medical condition can help identify priorities for targeted policy interventions. Conditions with the largest burden or higher-than-expected rates may indicate priority areas to target improvement or potential areas for review. In 2019, the age-standardized PPH rate for acute disease (347.4/10,000) was higher than the rate for chronic disease (288.0/10,000) (Table 6), while the rate for vaccine-preventable ACSCs was low, only 31.1 per 10,000. In terms of total PPHs, 2.9 million were for acute care, 2.4 million for chronic diseases, and 0.26 million for vaccine-preventable conditions. Although the number of inpatient days and episodes for acute PPHs were higher than for chronic PPHs, the payments from SHI and patients were substantially higher for chronic PPHs.

Table 6: Basic PPH Indicators by Type of ACSC, 2019

Type of ACSC	Age-standardized PPH rate (per 10,000)	Total PPHs	Total PPH inpatient days (thousands)	Total SHI payments for PPH (US$, thousands)	Total patient payments for PPH (US$, thousands)
Total ACSCs	666.6	5,524,955	35,523	852,616	116,962
Acute	347.4	2,879,787	17,409	348,760	38,741
Chronic	288.0	2,386,971	16,607	470,971	73,101
Vaccine-preventable	31.1	258,197	1,508	32,885	5,119

Source: Based on the VSS SHI claims database.
Notes: ACSC = Ambulatory care–sensitive condition; PPH = Potentially preventable hospitalization; SHI = Social health insurance.

Exchange rate: US$1 = VND 23,050.24 (2019).

In 2019, the top 10 ACSCs included four acute and six chronic groups of conditions. The top 10 accounted for 82 percent of all PPHs, 80 percent of all PPH inpatient days, and 79 percent of total SHI payments for episodes classified as a PPH (Table 7). In 2017 and 2018, congestive heart failure and asthma were in the top 10, but their PPH rates fell while the rates for cellulitis and perforated or bleeding ulcers rose, altering the ranking.

Table 7: Top-Ten Ranked ACSCs by PPH Rate, 2019

Age-standardized rate of PPH (per 10,000)	ACSC type	Age-standardized PPH rate per 10,000	Ranking in 2019	Total PPHs	Total inpatient days	ALOS (days)	Total SHI payments (US$, thousands)	Total patient payments (US$, thousands)
Bacterial pneumonia (not preventable by vaccine)	Acute	115.7	1	945,535	7,280,558	7.7	197,685	19,316
ENT diseases	Acute	105.4	2	873,471	4,118,382	4.7	47,592	4,600
Diabetes and related complications	Chronic	64.7	3	529,779	4,191,798	7.9	120,197	18,001
Dehydration, gastroenteritis, intestinal infections	Acute	60.8	4	501,797	1,954,843	3.9	27,529	3,886
Cerebrovascular disease	Chronic	53.4	5	434,303	3,518,330	8.1	95,316	16,550
Complications of hypertension	Chronic	51.0	6	560,102	3,119,928	5.6	100,199	17,511
COPD	Chronic	30.3	7	245,726	1,871,355	7.6	35,539	2,475
Perforated and/or bleeding ulcer	Acute	18.1	8	147,757	816,517	5.5	24,909	3,145
Cellulitis	Acute	15.5	9	128,111	817,940	6.4	11,035	1,521
Angina	Chronic	12.7	10	142,374	771,809	5.4	16,307	1,678
Total top 10		527.7		4,508,955	28,461,459	6.3	676,309	88,682
Top 10 ACSCs as a share of total PPHs (%)				82	80		79	76

Source: Based on the VSS SHI claims database.
Notes: ACSC = Ambulatory care–sensitive condition; PPH = Potentially preventable hospitalization; ENT = Ear, nose, and throat; COPD = Chronic obstructive pulmonary disease.

Exchange rate: US$1 = VND 23,050.24 (2019).

TRENDS IN PPH AND SEASONALITY

Trends can be used to monitor changes in the rate or burden of PPH over time. Action should be taken if trends reveal an increase in the rate or burden of PPHs. Figure 2 reveals that from 2017 to 2019, there was an increasing trend in PPH rates for vaccine-preventable diseases and acute and chronic ACSCs. However, in 2020, the number and rate of PPH admissions for vaccine-preventable and acute ACSCs dropped substantially,

while for chronic ACSCs, the rate and number of PPH admissions remained relatively constant (Figure 2).

Figure 2: Trends in PPH Rates, by Condition Category, 2017–2020
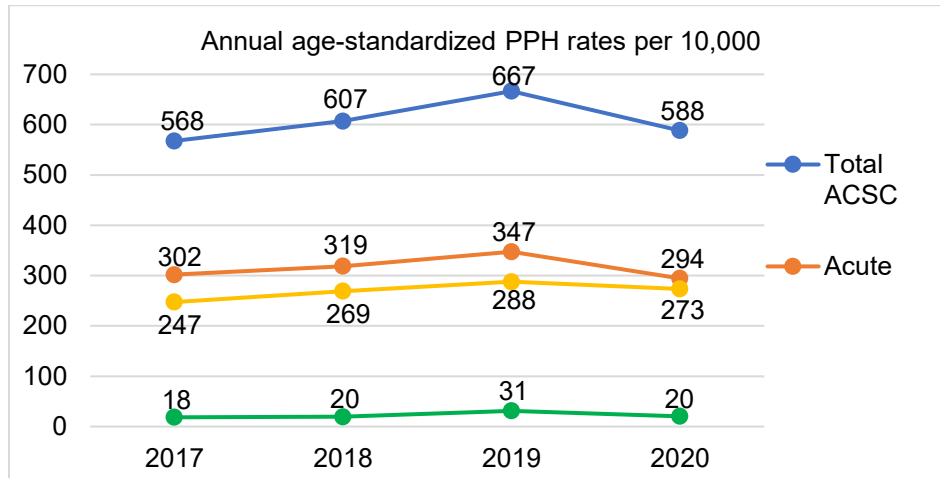
Annual age-standardized PPH rates per 10,000

Note: PPH = Potentially preventable hospitalization.

Although the number and rate of PPH admissions trended upward till 2019 and then fell in 2020, the costs per admission continued to rise. The results presented in Table 8 indicate that admissions for acute illness are more sensitive than chronic illness when the health system faces disruption, such as during the COVID-19 pandemic. Admissions for both acute and vaccine-preventable ACSCs experienced a substantial drop in absolute numbers and PPH rates, but the length of stay and amount paid to providers increased, suggesting more rigorous triage when deciding on admission for acute cases during that first year of the COVID-19 pandemic. The PPH rate for chronic ACSCs saw a slight decline in numbers and rates, but much less than for acute or vaccine-preventable ACSCs. The downward trend in length of stay for chronic diseases continued. The cost per case has been trending upward, both for the amount that VSS pays and the amount that patients pay. However, in 2020, a large jump was seen in the payment per case for vaccine-preventable ACSCs, while the trends in payment for acute and chronic ACSCs were more stable. In 2017, VSS paid 1.7 times more per chronic ACSC episode than acute care episode, but by 2020 this ratio had declined to just 1.5 times. For patient payments, however, the ratio has remained high and steady with a chronic ACSC episode costing about 2.2 times more than an acute ACSC episode.

19

Table 8: Trends in PPHs by Condition Category, 2017–2020

	2017	2018	2019	2020
Number of PPHs				
Acute	2,479,709	2,608,189	2,879,787	2,446,390
Chronic	1,853,993	2,143,071	2,386,971	2,372,388
Vaccine-preventable	149,276	160,560	258,197	170,818
Age-standardized rate of PPHs (per 10,000 population)				
Acute	301.9	318.6	347.4	294.4
Chronic	247.4	269.1	288.0	273.4
Vaccine-preventable	18.4	19.5	31.1	20.4
ALOS (days) (low-end estimate)				
Acute	6.7	6.3	6.0	6.2
Chronic	7.8	7.4	7.0	6.9
Vaccine-preventable	6.6	6.5	5.8	6.4
Average amount paid by SHI per admission (US$)				
Acute	107.6	114.9	121.1	138.6
Chronic	188.9	192.6	197.3	211.4
Vaccine-preventable	102.5	120.2	127.4	196.2
Average amount paid by patient per admission (US$)				
Acute	10.9	11.8	13.4	15.6
Chronic	24.4	25.9	30.6	34.4
Vaccine-preventable	14.3	17.9	19.9	30.3

Source: Based on the VSS SHI claims database.
Notes: PPH = Potentially preventable hospitalization; SHI = Social health insurance; ALOS = Average length of stay.
Exchange rate: US$1 = VND 22,370.09 (2017); VND 22,602.05 (2018); VND 23,050.24 (2019); and VND 23,208.37 (2020).

Clear seasonal patterns are evident when examining PPH rates by month. Peaks in PPH rates tend to be around October, as the colder weather begins. COVID-19 had a huge impact on PPH in 2020, with rates falling to very low levels in March-April and again in August (Figure 3). Chronic diseases fluctuate substantially less than acute ACSC PPHs. The vaccine-preventable ACSCs fluctuate relatively little over the months of the year, although the rate did hit a peak in December 2019. Every year, PPHs tend to decline around the Tet holiday in January or February. This is consistent with the fact that hospitals are not using objective clinical criteria in admissions decisions, resulting in excess admissions not because of clinical need but because of incentives facing hospitals.

Figure 3: Seasonal Variation in PPHs, January 2017–December 2020
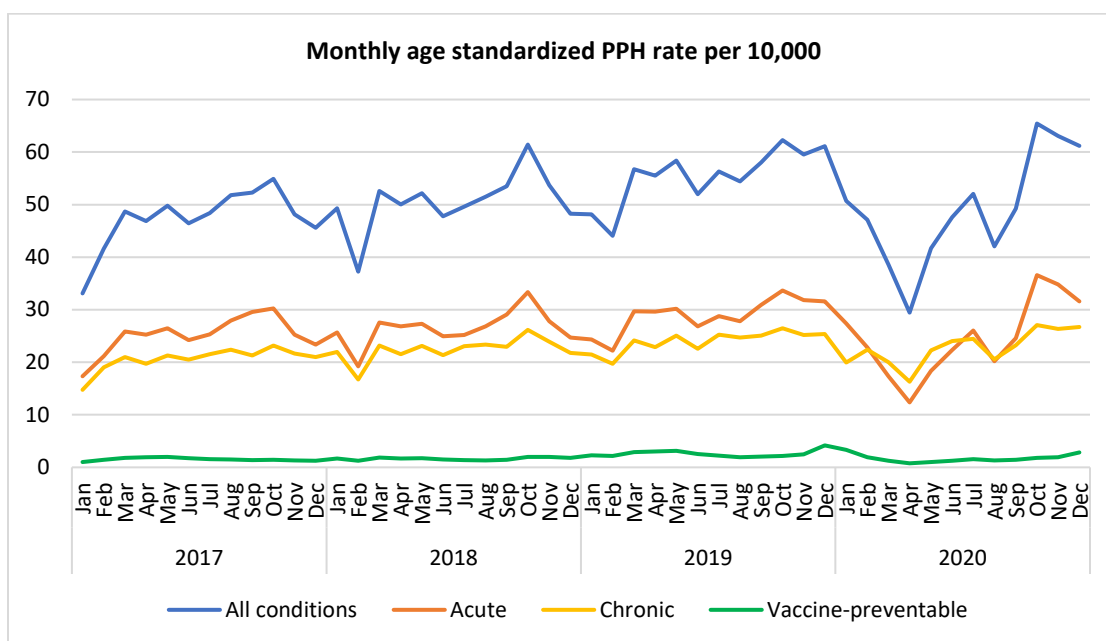
Source: Based on the VSS SHI claims database.
Note: PPH = Potentially preventable hospitalization.

POTENTIALLY PREVENTABLE HOSPITALIZATIONS BY SEX AND AGE

In Vietnam, the PPH rate for men is higher than for women in all years, with the 2019 age-standardized PPH rates for men at 713.1 and for women at 627.0 per 10,000. This difference is not attributable to different age structures of males and females, as this factor has been eliminated through age standardization. These sex differentials exist for both chronic and acute ACSCs and are consistent over time (Table 9 and Figure 4).

The higher PPH rate for acute diseases compared to chronic diseases prevailed for both men and women from 2017 to 2019; however, in 2020 the sex-specific rate differential between these two types of ACSCs disappeared. The PPH rate for vaccine-preventable ACSCs is low for both men and women, although it increased in 2019.

Figure 4: Age-Standardized PPH Rates by Type of ACSC and Sex, 2017–2020
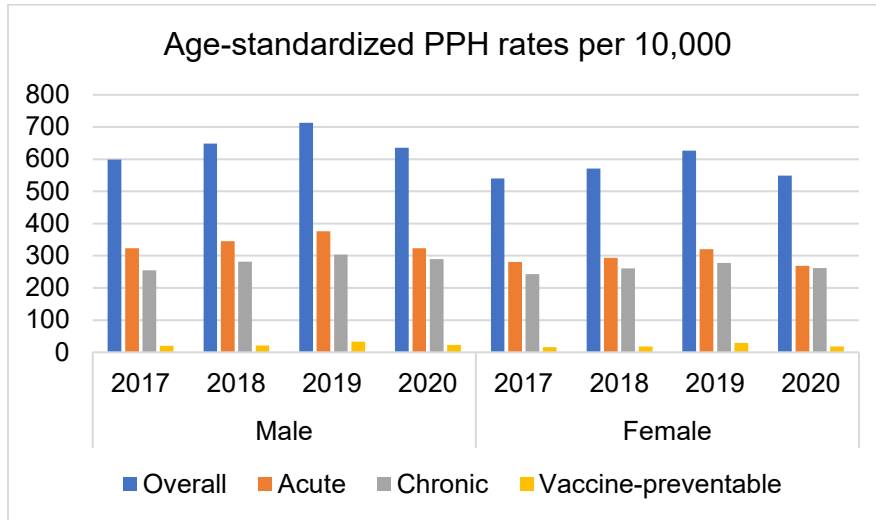
Source: Based on the VSS SHI claims database.
Notes: PPH = Potentially preventable hospitalization; ACSC = Ambulatory care–sensitive condition.

Table 9: Age-Standardized PPH Rates per 10,000 by Sex, 2017–2020

ACSC type		2017	2018	2019	2020
Overall	Male	598.7	648.5	713.1	635.4
	Female	540.3	571.1	627.0	548.9
Acute	Male	323.7	345.3	376.3	322.9
	Female	280.6	293.1	320.7	268.9
Chronic	Male	254.8	281.8	303.5	289.7
	Female	243.1	260.3	277.2	261.7
Vaccine-preventable	Male	20.2	21.4	33.3	22.7
	Female	16.6	17.7	29.0	18.3

Source: Based on the VSS SHI claims database.

Notes: PPH = Potentially preventable hospitalization; ACSC = Ambulatory care–sensitive condition.

The top-five PPH admissions are relatively similar between men and women, including bacterial pneumonia, ENT diseases, dehydration (and associated gastrointestinal conditions), and diabetes and diabetic complications (Table 10). However, while PPH admissions for cerebrovascular disease are in the top five for men, they are not for women, but complications of hypertension are in the top five for women. When using bed-days to rank the most common ACSCs, bacterial pneumonia and ENT diseases remain dominant for both men and women, but dehydration is no longer present, as chronic conditions rise in the ranking.

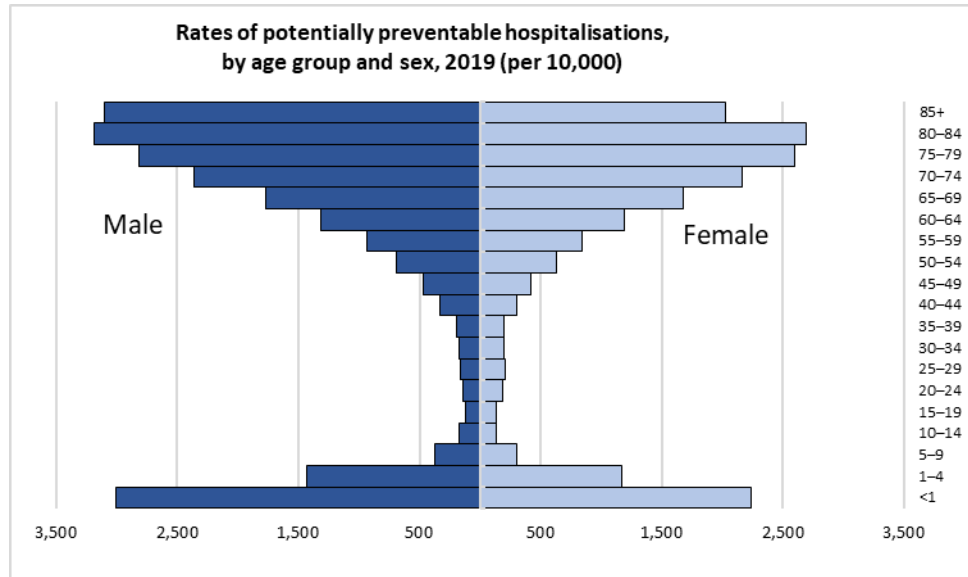**Table 10: Most Common PPH Admissions and Bed-Days, by Sex, 2019**

	Most admissions	Most bed-days
Persons	Bacterial pneumonia (not vaccine-preventable)	Bacterial pneumonia (not vaccine-preventable)
	ENT	Diabetes and diabetic complications
	Complications of hypertension	ENT
	Diabetes and diabetic complications	Cerebrovascular disease
	Dehydration, noninfective gastroenteritis, and intestinal infections	Complications of hypertension
Male	Bacterial pneumonia (not vaccine-preventable)	Bacterial pneumonia (not vaccine-preventable)
	ENT	ENT
	Dehydration, noninfective gastroenteritis, and intestinal infections	Diabetes and diabetic complications
	Diabetes and diabetic complications	Cerebrovascular disease
	Cerebrovascular disease	Complications of hypertension
Female	Bacterial pneumonia (not vaccine-preventable)	Bacterial pneumonia (not vaccine-preventable)
	ENT	Diabetes and diabetic complications
	Complications of hypertension	ENT
	Diabetes and diabetic complications	Complications of hypertension
	Dehydration, noninfective gastroenteritis, and intestinal infections	Cerebrovascular disease

Source: Based on the VSS SHI claims database.

Notes: PPH = Potentially preventable hospitalization; ENT = Ear, nose, and throat.

Age-specific PPH rates show different patterns for acute, chronic, and vaccine-preventable ACSCs. Panel A of Figure 5 shows that high rates of PPH for acute ACSCs are concentrated in the youngest age groups and older persons, with low rates seen in working-age people. This panel also shows higher rates of PPH for acute ACSCs in males in the older and younger groups compared to females. The top ACSCs in the groups under 10 years are bacterial pneumonia and ENT diseases. Panel B shows that chronic ACSCs mostly affect the older age groups, with much higher rates for chronic than acute ACSCs in each of the older age groups. The panel also shows that the rates for men are substantially higher than the rates for women in the older age groups. PPH rates for vaccine-preventable ACSCs are relatively low in Vietnam, so Panel C uses a different scale to reveal the age patterns. Vaccine-preventable diseases are mainly concentrated in childhood, with little to no increase in rates for older age groups.

Figure 5: Rate of PPHs for Acute, Chronic, and Vaccine-Preventable ACSCs by Age Group and Sex (Rate per 10,000), 2019
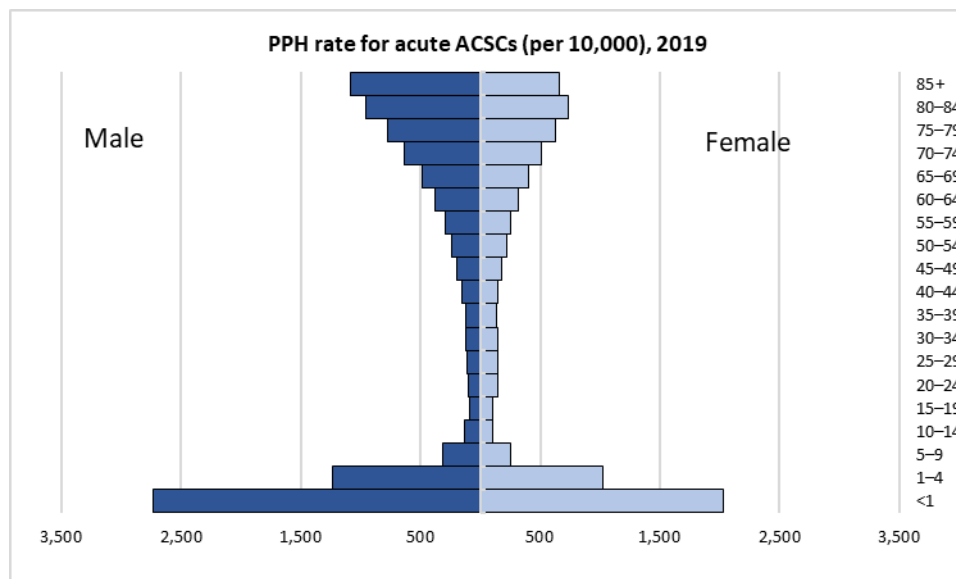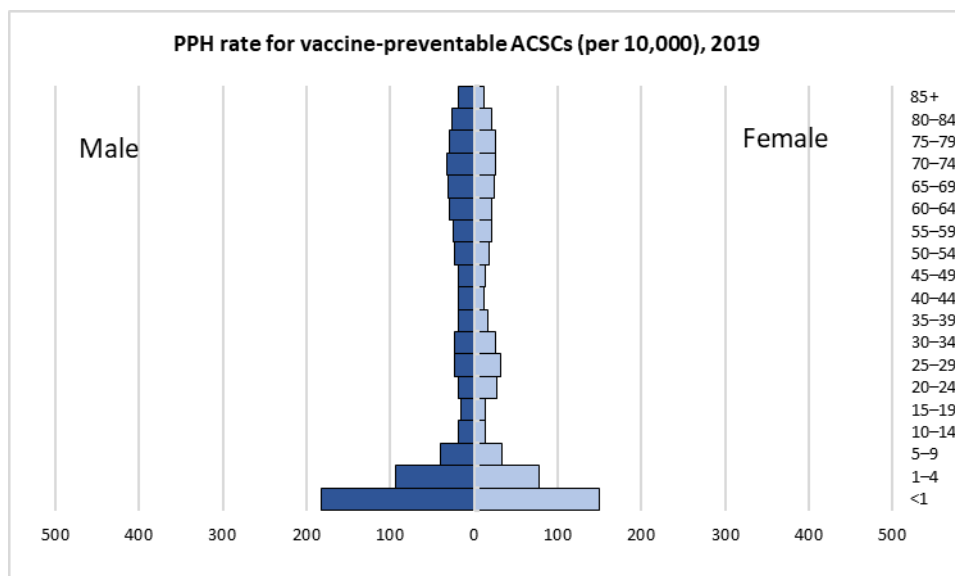
Rates of potentially preventable hospitalisations,
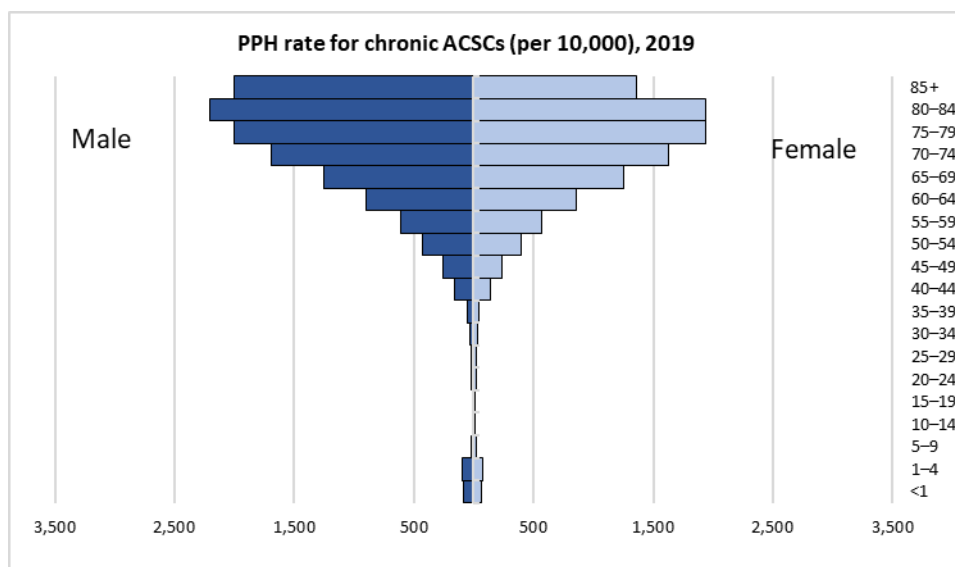by age group and sex, 2019 (per 10,000)

Panel A

PPH rate for acute ACSCs (per 10,000), 2019

Panel B

PPH rate for chronic ACSCs (per 10,000), 2019

Male

Female

85+	
80–84	
75–79	
70–74	
65–69	
60–64	
55–59	
50–54	
45–49	
40–44	
35–39	
30–34	
25–29	
20–24	
15–19	
10–14	
5–9	
1–4	
<1	

3,500 2,500 1,500 500   500 1,500 2,500 3,500

Panel C

PPH rate for vaccine-preventable ACSCs (per 10,000), 2019

Male

Female

85+	
80–84	
75–79	
70–74	
65–69	
60–64	
55–59	
50–54	
45–49	
40–44	
35–39	
30–34	
25–29	
20–24	
15–19	
10–14	
5–9	
1–4	
<1	

500 400 300 200 100   0   100 200 300 400 500

Source: Based on the VSS SHI claims database.

Notes: PPH = Potentially preventable hospitalization; ACSC = Ambulatory care–sensitive condition.

GEOGRAPHIC VARIATION IN PPH ADMISSIONS

Differences in epidemiology, socioeconomic conditions, and health care networks across provinces and regions can lead to differences in the rate of PPHs across localities. Age-standardized PPH rates were calculated for each of the 63 provinces and are presented in Figure 6. Higher rates of PPH are represented by dark blue and lower

rates in light gray. Can Tho City, Hau Giang, and Lao Cai have the highest age-standardized rates of PPH. Overall, 32 provinces have PPH rates above the national average, indicating substantial room for improvement. Provinces with low rates, which may have important lessons about preventing hospitalization for ACSCs, include Ha Nam, Nam Dinh, and Bac Giang in the north and Ba Ria Vung Tau and Ho Chi Minh City (HCMC) in the southeast.

Figure 6: Age-Standardized PPH Rates by Province (per 10,000), 2019
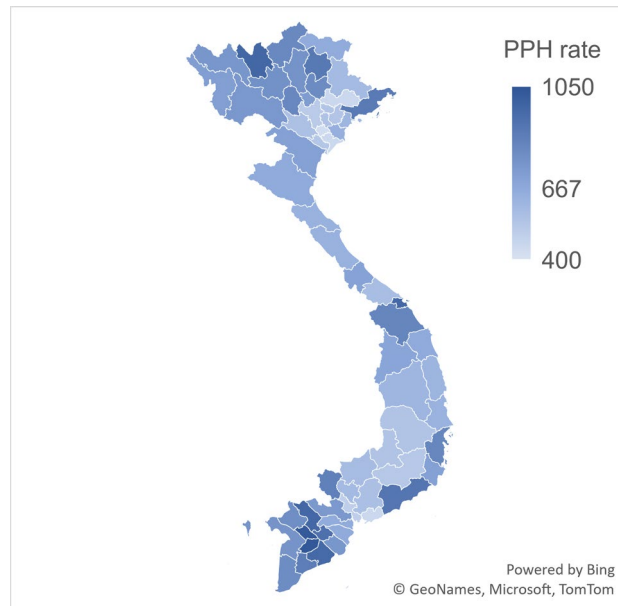
Source: Based on the VSS SHI claims database.

Note: PPH = Potentially preventable hospitalization.

Geographic patterns of PPH vary by type of ACSC, indicating differential geographic epidemiological patterns and differential effectiveness of PHC (Figure 7). The three provinces with the highest age-standardized PPH rates for acute illness are Lao Cai, Hau Giang, and Can Tho City; for chronic illness—Soc Trang, Bac Lieu, and Can Tho City; and for vaccine-preventable diseases—Quang Ninh, Son La, and Ha Giang. Some 25 provinces have PPH rates above the national average for vaccine-preventable diseases, 28 provinces for chronic diseases, and 36 provinces for acute illness.

Five provinces have good performance resulting in low PPH rates for more than one ACSC category: Ba Ria Vung Tau, HCMC, Bac Giang, Ha Nam, and Nam Dinh. This suggests that they may have strong PHC systems worthy of emulation by other provinces but still have room to improve. Ba Ria Vung Tau, HCMC, and Nam Dinh perform well with low PPH rates for acute illness and vaccine-preventable diseases but are not among the best performers for chronic diseases. Bac Giang and Ha Nam perform well on both acute and chronic illness but are not top performers in vaccine-preventable diseases.

26

Figure 7: Age-Standardized PPH Rates by Province and Type of ACSC (per 10,000), 2019

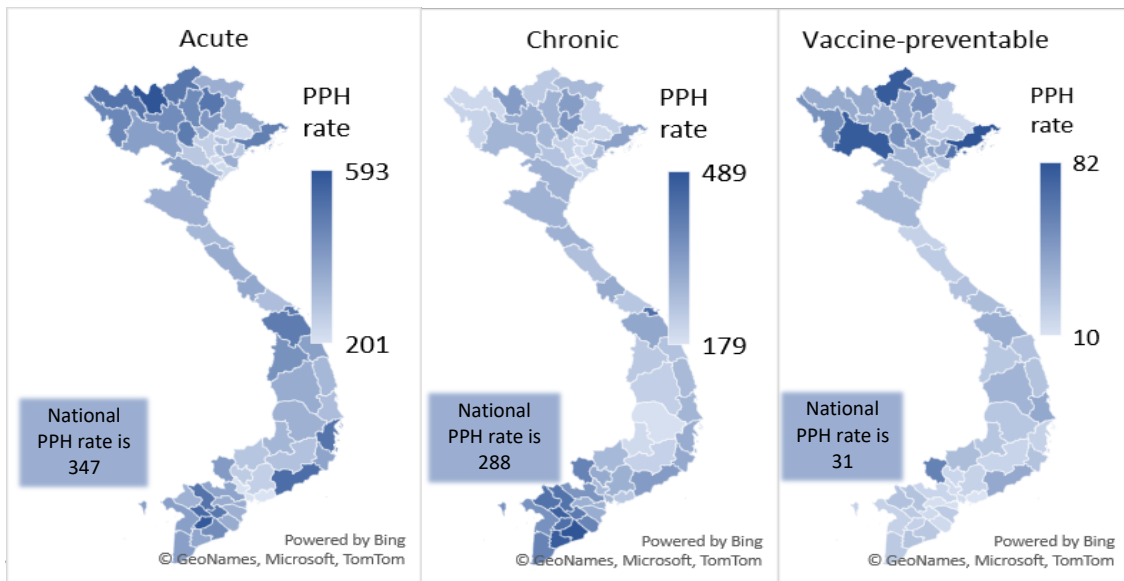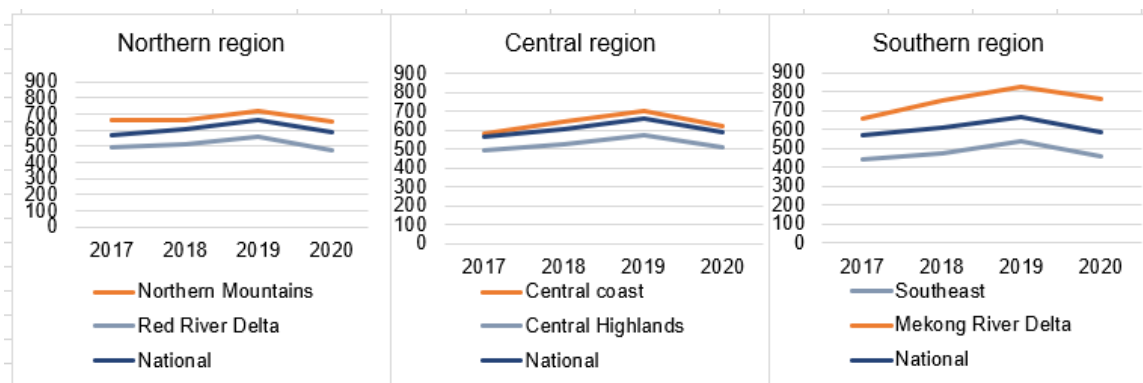*Notes:* PPH = Potentially preventable hospitalization; ACSC = Ambulatory care–sensitive condition.

Comparison of regional trends in PPH rates indicates that all regions show an increasing trend in PPH rates up to 2019 and all experienced a drop in 2020 (Figure 8). The Northern Mountains and Midlands, North and South Central Coast, and Mekong River Delta regions have age-standardized PPH rates higher than the national average, with no evidence of narrowing in the gap over time, indicating potential for reductions to at least the national average level.

Figure 8: Age-Standardized PPH Rates by Region (per 10,000), 2017–2020

Source: Based on the VSS SHI claims database.
Note: PPH = Potentially preventable hospitalization.

SOCIOECONOMIC DISADVANTAGE

Analysis of disparities in PPH rates across socioeconomic groups is important for monitoring health equity goals. Disadvantaged groups may face low access to PHC or ineffective PHC service delivery, hindering the ability to prevent or manage disease in the early stages before hospitalization is needed. The need for hospitalization due to preventable illnesses in disadvantaged groups may also be affected by socioeconomic

determinants of health, such as low health literacy, substandard housing, and dangerous occupational and unhealthy lifestyle factors detrimental to people's health. While lifestyle factors may adversely affect the health of advantaged groups, they would generally not face the same barriers to accessing and using preventive and primary health care services and are expected to have lower PPH rates. However, high PPH rates in the advantaged group may occur if they have easy access to high-tech hospitals that are incentivized to admit patients without clinical need for inpatient care.

This study relies on information about the insured membership category to identify disadvantaged groups. SHI members categorized as disadvantaged include members from poor households, near-poor households, ethnic minorities, and people living in disadvantaged areas. However, some people may belong to multiple member categories, yet in the membership database they are categorized as one. This is the case for nearly all children under age six, who cannot be distinguished as disadvantaged or advantaged. Analysis of socioeconomic disparities, therefore, can only be done for the age groups five and older.

Overall, disadvantaged individuals account for a declining share of SHI members. Overall, about 26 percent of SHI members five years and older belonged to the disadvantaged member categories in 2017, declining to about 20 percent by 2020 (Table 11). There is little differential in the disadvantaged share of SHI members among males and females.

Table 11: Disadvantaged Groups as a Share of Total SHI Members Five Years and Older
**(*Percent*)**

	2017	2018	2019	2020
Total	25.9	23.9	21.9	20.4
Male	26.2	24.4	22.4	20.8
Female	25.5	23.5	21.4	20.0

Source: Based on the VSS SHI member database.

*Note:* SHI = Social health insurance.

Despite the inability to clearly distinguish disadvantaged and other groups, socioeconomic disparities were found in age-standardized PPH rates. Overall, PPH rates are higher among disadvantaged women than other women for all four years of analysis, while no disparities were evident in the overall PPH rates for males (Figure 9). However, analysis by ACSC categories finds that PPH rates for disadvantaged women are higher than for other women for all types of ACSCs (acute, chronic, and vaccine-preventable). However, for males, PPH rates are higher for disadvantaged males than other males for acute conditions but lower for disadvantaged groups in relation to chronic conditions. (Figure 10). In other countries, disadvantaged groups generally have higher PPH rates because they have lower access to effective PHC. The anomalous finding among disadvantaged males with chronic conditions is likely due to either generally low access to inpatient care among disadvantaged males or excess inappropriate care provision for advantaged males with chronic conditions. Information on patient characteristics that are better able to distinguish disadvantaged from better-off groups will be needed to pursue further analysis of disparities.

Figure 9: Age-Standardized PPH Rates for Disadvantaged versus Other Member Categories, by Sex, 2017–2020
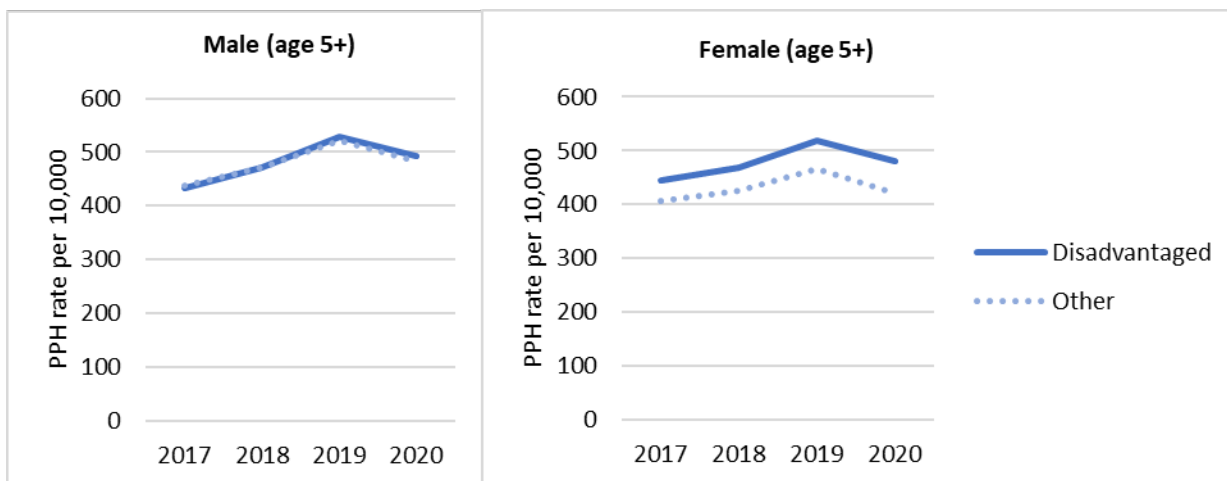
Source: Based on the VSS claims database.
Note: PPH = Potentially preventable hospitalization.

Figure 10: Comparison of Age-Standardized PPH Rates by ACSC Category, 2019
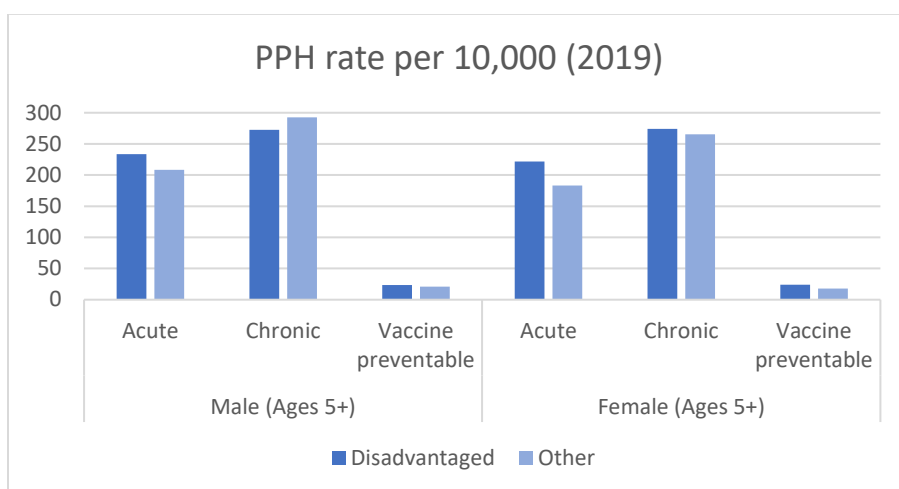
Source: Based on the VSS claims database.
Notes: PPH = Potentially preventable hospitalization; ACSC = Ambulatory Care–Sensitive Condition.

FACILITY WHERE SHI MEMBERS ENROLL FOR FIRST POINT-OF-CONTACT CARE IN THE HEALTH SYSTEM

The type of PHC facility used by SHI members could influence PPH rates. Vietnam's health insurance system requires people to register their insurance at a facility considered their first point-of-contact provider in the system; however, the Vietnamese policy does not require that these providers be primary care providers. Most people do register at grassroots-level facilities (district or commune) that are considered primary care providers, but a relatively large share of SHI members register for first point-of-contact care at secondary or tertiary providers (provincial- and central-level hospitals). Higher PPH rates
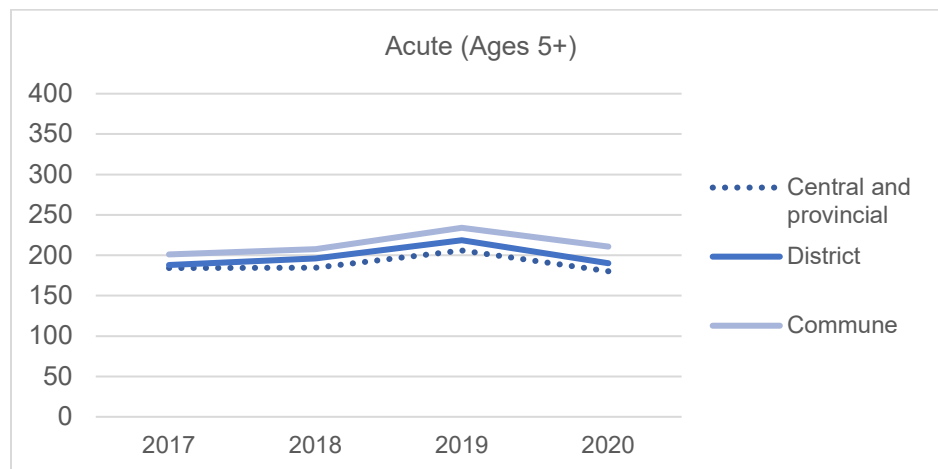
could indicate weaknesses in the ability of these first point-of-contact providers to provide PHC, or if secondary or tertiary facilities are used for primary care, it could reflect the obvious conflict of interest that makes them likely to refer primary care patients to admitted care.
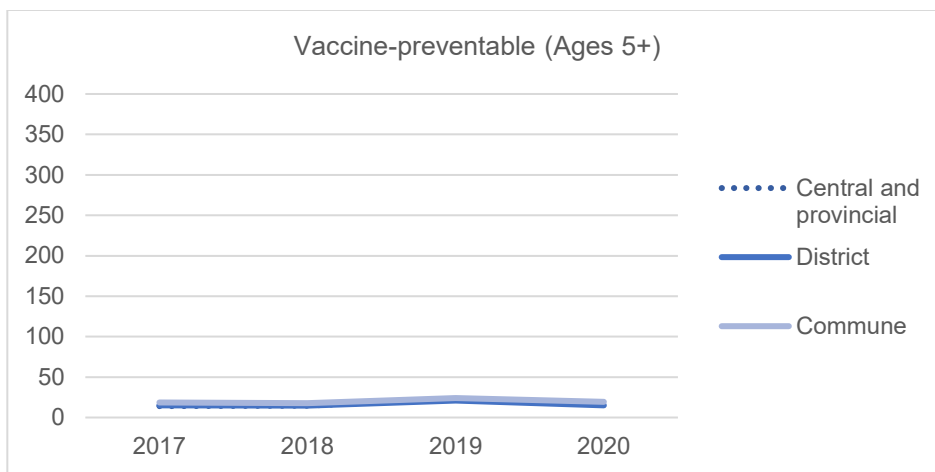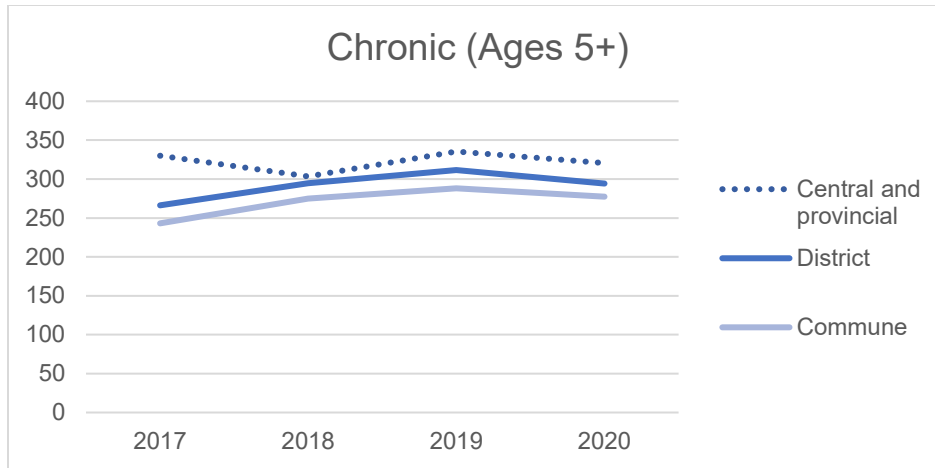
Overall, there are only minimal differentials in PPH rates between patients enrolled at different types of facilities for first point-of-contact care; however, this masks differences across ACSC categories. Results for acute ACSCs reveal that PPH rates are highest for patients enrolled for primary care at the commune level and lower for central- and provincial-level facilities (Figure 11). Results for chronic ACSCs reveal quite the opposite, with higher PPH rates for patients enrolled at central- and provincial-level facilities and lower PPH rates for people enrolled at the commune level. The district level lies in the middle for both types of condition. There is little difference in the PPH rate for vaccine-preventable ACSCs across primary provider types.

When PPH rates are higher for patients receiving primary care for acute conditions at the commune health station, it strongly suggests that primary curative care for acute conditions at the commune level is weak, and this may be delaying health care seeking until the condition is so severe that it requires hospitalization. The most common acute ACSCs associated with high PPH rates for patients enrolled at the commune level include ENT conditions, bacterial pneumonia, and dehydration/gastroenteritis.

The finding of high PPH rates for chronic ACSCs among central- and provincial- level facilities has two possible explanations. First, this finding suggests that secondary and tertiary care facilities may not be as effective as primary care facilities at managing chronic diseases. Second, when a secondary or tertiary facility provides both primary and specialist care, there is an inherent conflict of interest that leads these facilities to transfer the patients to their inpatient wards even when there is questionable clinical justification for admission. Chronic ACSCs leading to high PPH rates for people registered for care at provincial- or central-level facilities include diabetes, complications of hypertension, cerebrovascular disease, Chronic Obstructive Pulmonary Disease (COPD), and angina.

Figure 11: Comparison of Trends in PPH Rates by Facility Where Member Is Registered for First Point-of-Contact Care in the System by ACSC Type, 2017–2020

Chronic (Ages 5+)

- ······ Central and provincial
- —— District
- —— Commune

Vaccine-preventable (Ages 5+)

- ······ Central and provincial
- —— District
- —— Commune

Source: Based on the VSS claims database.

Notes: PPH = Potentially preventable hospitalization; ACSC = Ambulatory care–sensitive condition.

Average costs per PPH are substantially higher for patients registered for first point-of-contact care at the secondary/tertiary level than for those registered for primary care at the grassroots level. The average cost per episode of PPH was age standardized to adjust for differential age structures of members registered at the central/provincial levels and members registered at the commune and district levels. Comparison of average cost per PPH episode between patients enrolled for first point-of-contact care at the central/provincial level (secondary and tertiary care) is substantially higher than for PPH episodes of patients who are registered for care at the primary care level (district and commune levels) (Figure 12). This finding is robust over time and across ACSC categories. This suggests that secondary- and tertiary-level facilities face strong financial incentives to admit patients enrolled for first point-of-contact care rather than providing appropriate and effective PHC that could help avoid hospitalization.

Figure 12: Differential in Age-Standardized Average SHI Payment per PPH Admission by Level of Facility Providing First Point-of-Contact Care by ACSC Category and Year, 2017–2020
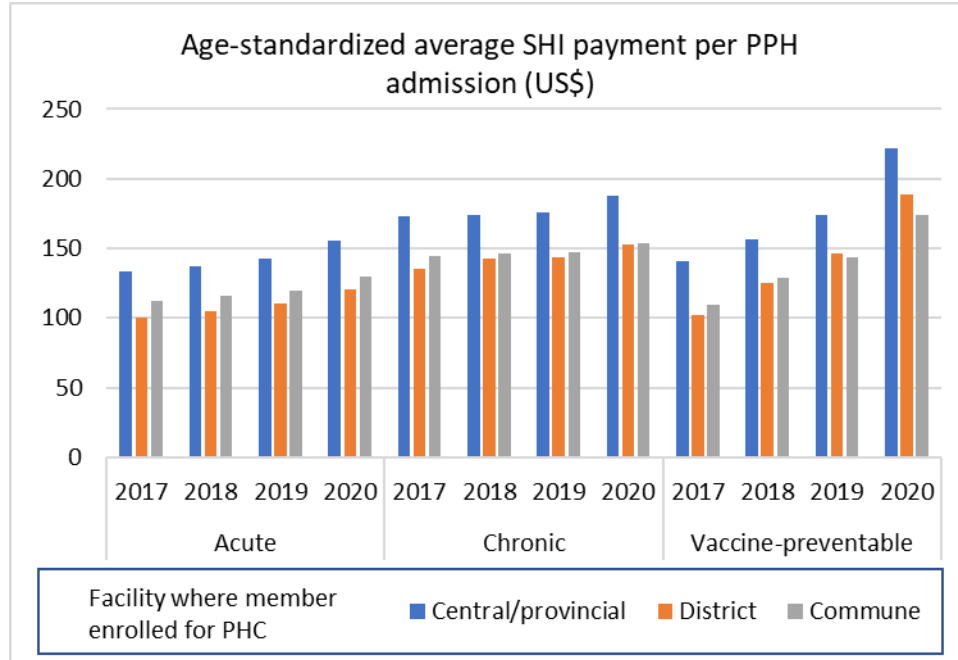
Source: Based on the VSS claims database.

Notes: SHI = Social health insurance; PPH = Potentially preventable hospitalization; ACSC = Ambulatory care–sensitive condition; PHC = Primary health care.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Although studies of PPH in high-income countries are common and provide important evidence for strengthening health system effectiveness and efficiency, middle-income countries are now putting in place electronic data management for their health financing systems. This will facilitate implementation of this kind of analysis and development of routine monitoring of PPHs for health system management. Vietnam is one of the few middle-income countries that has implemented a study of PPHs. The availability of the VSS SHI electronic claims database provides the opportunity to routinely calculate PPH rates and perform detailed analysis of PPHs to inform policy to strengthen PHC. This report shows that it is feasible to calculate PPH indicators and obtain useful results in a lower-middle-income country without requiring costly primary data collection.

The results provide important insights into the interface between primary and secondary care for a country that is struggling to strengthen primary care and is burdened by a highly hospital-centric health system. The analysis presented findings disaggregated by geographic regions, population groups, seasons, and medical conditions to highlight issues for further investigation. This also allows policy makers to develop evidence-based PHC strategies and target interventions to specific provinces, age groups, sex, medical conditions, seasons, disadvantaged groups, or specific levels of facilities providing PHC through the health insurance system.

By defining ACSCs broadly based on the international literature, this report presents findings of the PPH situation in Vietnam, highlighting this as a strategic area for action to improve health system efficiency. Approximately one-third of admissions and one-third of inpatient bed-days and about one-quarter of VSS inpatient spending are accounted for by ACSCs. This suggests substantial room for improvement in PHC to intervene more effectively toward the objective of reducing the need for hospitalization among patients with ACSCs. Vietnam has already developed many diagnosis and treatment guidelines and grassroots-level intervention models but lacks mechanisms for targeting and monitoring implementation and outcomes. PPH rates developed in this report could provide a powerful tool for monitoring PHC by the government, the health sector, and VSS.

Results of the analysis revealed specific conditions where attention could be focused to intervene early and effectively to avoid hospitalization. These include bacterial pneumonia, diabetes and its complications, ENT diseases, complications of hypertension, COPD, gastroenteritis and dehydration, cerebrovascular disease, perforated or bleeding ulcers, cellulitis, and angina. While Vietnam has begun to roll out primary care interventions for hypertension and diabetes at the commune level, there is a need for interventions to move beyond those limited diseases to strengthen the ability of primary care to prevent, treat, and manage other diseases and reduce risk factors, such as smoking, as well. However, this will require changes to the incentives and conflicts of interest that encourage hospitalization for treatment rather than prevention and primary care management of these conditions.

The large variation in PPH rates across provinces indicates substantial scope for provinces to learn from each other on how to reduce PPH rates through local interventions. PPH rates provide a new monitoring instrument for the MOH to monitor PHC effectiveness across provinces and hold provincial authorities responsible for reducing PPH by strengthening PHC. There is even potential to undertake the analysis down to the district level, to monitor effectiveness of the district health center in managing the health of the local population, as is done in Australia.

Variation in PPH rates is observed across various groups, including groups defined by age, sex, and socioeconomic disadvantage. This variation can help in determining key target groups for interventions and ensuring appropriateness of measures to improve the effectiveness of their PHC. Differentials revealed by this analysis require further investigation into the barriers that prevent some population groups from accessing timely and effective PHC care and may lead to excess admissions for other groups. Further analysis of disparities, however, will require additional information on disadvantaged groups to be incorporated or linked with the VSS database.

Evidence of monthly variation in PPH reveals some regular patterns. This information can inform strategies and planning to ensure an appropriate response to peaks in prevalence of certain conditions, mostly respiratory and infectious diseases.

Consultations with clinicians and policy makers about PPH indicators will help improve the appropriateness and usefulness of the measure for the Vietnamese context and focus attention on the health system goal of reducing avoidable hospitalization. Clinical coding quality improvement efforts focused on the principal and secondary diagnoses used in health sector KPIs, such as PPH rates, will improve the validity and usefulness of PPH rates for health system management. Benchmarking of PPH rates through group comparisons and trend analysis allows this KPI to focus on key areas for system change without requiring precise measurement of the extent to which each ACSC can be prevented. Consultations with clinicians on ACSC definitions can help ensure its acceptability as a KPI of Vietnam's health system performance, similar to the KPI used in other countries.

Analysts must understand potential shortcomings of the PPH indicator to interpret and use the results appropriately. The PPH rate in this study counts hospitalizations for specific medical conditions from health insurance claims data covering 91 percent of the population to measure the magnitude of care that could be avoided if effective primary care were provided. However, if disadvantaged insured patients forgo insured care because of the nonmedical costs of seeking care or low geographic access, those cases will not be captured in the numerator of the PPH rate, consequently underestimating PPH rates. Similarly, if the better-off do not bother using their health insurance card to seek services, their hospitalizations will not appear in the health insurance claims data and their PPH rates may also be undercounted. Results of the Vietnam Household Living Standards Survey 2020 indicate that a higher proportion of the poor and people in mountainous areas are admitted for inpatient care than the better-off in urban and lowland areas. Results also indicate that between 94 and 95 percent of all inpatient visits were among people using their health insurance card regardless of the living standards quintile (General Statistics

Office 2021). This suggests that for Vietnam, this shortcoming may only marginally affect the results.

The relationship between PHC effectiveness and PPH rates may also be confounded by other factors that need to be disentangled to attribute variation in PPH rates to PHC performance. Evaluation studies using PPH rates as the outcome variable have found that the urban residence and deprivation pulled PPH rates downward while unemployment rates, private health insurance coverage and hospital policies that incentivize one-night hospital stays resulted in higher PPH rates (Lynch et al. 2019; Russo et al. 2021). The confounding factors influencing the relationship between PHC and PPH rates make it somewhat difficult to use PPH rates in designing financial incentives. However, analysis of these additional factors can be helpful in designing targeting mechanisms and policies that directly address the factors contributing to low use of PHC services.

RECOMMENDATIONS

The analysis and findings in this report point to an important strategy for reducing avoidable hospitalizations. This involves actions by the health sector leadership to monitor and evaluate PHC interventions and policies by using general and ACSC-specific PPH rates disaggregated to relatively small geographic localities and by vulnerable groups. Based on the monitoring and evaluation findings, the health sector can then design and implement specific interventions for specific ACSCs, localities, or vulnerable groups to reduce preventable hospitalizations and evaluate their effectiveness using PPH rates as an outcome variable.

The recommendations from this study focus on two levels. The first level focuses on refining the methodology and institutionalizing the PPH indicators into health system monitoring indicators. The second level relates to concrete PHC system improvements that can be made based on the evidence from this study.

Methodological recommendations

- Organize and implement clinical consultations with doctors and preventive medicine experts to validate the definitions, age groups, and exclusions used to define each ACSC used in this study to ensure acceptability within the Vietnamese health system.

- Disseminate the findings of this study to relevant policy makers and planners to inform policy reform. Consider creating a dashboard to disseminate the results, such as that used in the United Kingdom and Australia.

- Incorporate other variables that reflect socioeconomic status into the VSS claims database to replace use of member category to identify disadvantage. Possible options include requiring commune of residence to be entered rather than free text for current residence or requesting patients to report whether they are members of poor households or ethnic minorities as part of admissions procedures.

- Integrate the member database and SHI claims data to ensure consistency and cross-checks. For example, many SHI members lacked information on where their insurance cards are registered for care, but the claims data had this information.

- Require hospitals to submit the full set of charges rather than only those considered eligible for VSS payment to get better estimates of the financial burden of PPH on households.

- Revise the guidance for hospitals to enter information, allowing more accurate estimation of length of stay.

- Engage Vietnamese academic institutions and VSS in the implementation of this analysis on an annual basis to ensure continuity and refinement over time.

- Adopt monitoring of PPH rates as a KPI in VSS claims management and annual reporting.

PHC reform

- Use results of this study to initiate dialogue with the health sector to focus on policies that can improve the people's health in ways that also reduce PPHs and enhance efficiency in use of the Health Insurance Fund.

- Propose investments in primary care interventions specific to preventing, detecting early, treating, or effectively managing the top-10 ACSCs identified as having the highest rates of potentially preventable hospitalization.

- Prioritize targeting specific population subgroups (age, sex, disadvantaged group, and provinces) where PPH rates are higher than the overall national average with appropriate interventions to reduce their rate of admission through primary care interventions or interventions that require hospitals to use objective clinical criteria when making decisions about admission.

- Monitor PPH rates over time on a routine basis and hold localities responsible for reducing PPH rates for the top-10 ACSCs.

Although the analysis of PPH rate trends and differentials can help guide where actions are most needed by the PHC network to avoid the need for hospitalization, complementary policies are needed to overcome weaknesses in the PHC system and excess admissions not justified by clinical criteria. Global evidence shows that effective PHC requires resources and management to ensure that patients trust and use those services for continuity of care, integration of prevention and curative care, and vertical integration through an upward and downward referral system. To achieve this, appropriate incentives for primary care providers, oversight and monitoring of quality of care, and communication and coordination across the system are required. Rationalization of hospital care is also needed through measures that guide and incentivize hospitals to use clinical criteria for admission decisions and to make more effort to shift care to the outpatient sector, not only for ACSCs but for all medical conditions.

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This study measured the magnitude, trends, and distribution of potentially preventable hospitalizations (PPHs) in Vietnam, defined as inpatient admissions for ambulatory care–sensitive conditions (ACSCs). Many of these admissions could have been avoided if effective primary health care had prevented or managed these cases to avoid the need for hospitalization. **Methodology:** ACSCs were identified from the international literature and defined by International Classification of Disease (10th edition)(ICD-10) diagnosis codes. Data were extracted from social health insurance claims to calculate age-standardized rates within the insured population. **Results:** During the 2017 to 2020 period, about 5.5 million cases were admitted annually for ACSCs. This accounted for one-third of all admissions and Health Insurance Fund payments to providers. 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. PPH rates increased over the 2017 to 2019 period but fell in 2020 due to the impact of COVID-19 on health care–seeking. PPH rates follow seasonal patterns of peaks in the autumn and dips around the New Year holiday. PPH rates for acute diseases are high among children and older adults, but for chronic diseases they are higher among older people, and for vaccine-preventable conditions they are higher among children. Provincial variation in PPH rates was found, suggesting varying disease patterns and effectiveness of PHC. **Conclusions:** This analysis provides evidence of the feasibility and value of estimation of PPH rates, which can be used as a routine indicator to track health system performance for management and planning. The claims review data provide a timely data source, covering most of the population and avoiding additional primary data collection. The results are specific to individual medical conditions and provide useful targeting information to help plan policies and programs.

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