USAID
FROM THE AMERICAN PEOPLE

VIETNAMESE AND AMERICANS
IN PARTNERSHIP TO FIGHT HIV/AIDS
PEPFAR

Health Finance & Governance
Expanding Access. Improving Health.

ACTUARIAL ANALYSIS
RELATED TO DEVELOPMENT OF VIETNAM'S
SOCIAL HEALTH INSURANCE
BENEFIT PACKAGE

This publication was produced for review by the United States Agency for International Development. It was prepared by Mr. Eamon Kelly (FIAA), Dr. Giang Thanh Long, and Pham Thi Hong Tham for the Health Finance and Governance project.

The Health Finance and Governance Project
USAID's Health Finance and Governance (HFG) project will help to improve health in developing countries by expanding people's access to health care. Led by Abt Associates, the project team will work with partner countries to increase their domestic resources for health, manage those precious resources more effectively, and make wise purchasing decisions. As a result, this five-year, $209 million global project will increase the use of both primary and priority health services, including HIV/AIDS, tuberculosis, malaria, and reproductive health services. Designed to fundamentally strengthen health systems, HFG will support countries as they navigate the economic transitions needed to achieve universal health care.

February 2017

Cooperative Agreement No: AID-OAA-A-12-00080

Submitted to: Scott Stewart, AOR
Office of Health Systems
Bureau for Global Health
United States Agency for International Development

Recommended Citation: [Kelly, Eamon, Long, Giang Thanh, and Tham, Pham Thi Hong]. February 2017. *Actuarial Analysis Related to Development of Vietnam's Social Health Insurance Benefit Package*. Bethesda, MD: Health Finance & Governance Project, Abt Associates Inc.

Abt Associates Inc. | 4550 Montgomery Avenue, Suite 800 North | Bethesda, Maryland 20814
T: 301.347.5000 | F: 301.652.3916 | www.abtassociates.com
Broad Branch Associates | Development Alternatives Inc. (DAI) | Futures Institute
Johns Hopkins Bloomberg School of Public Health (JHSPH) | Results for Development Institute (R4D) | RTI International | Training Resources Group, Inc. (TRG)

Acknowledgments

This work is based on data and information supplied by Vietnam Social Security and the Ministry of Health and it also reflects significant input, support, and guidance by the Vietnam Ministry of Health and from Vietnam Social Security. The authors thank Mr. Naz Todini and Mr. Lam Dam Duy, who led this process and coordinated all consultations in Vietnam. The authors also wish to thank the ISMS team in collecting data, especially Dr. Bui Dai Thu and Ms. To Lan Anh, for their great contribution. However, sole responsibility for this work rests with the authors.

Contents

List of Figures

List of Tables

Abbreviations

BHSP	Basic Health Service Package
BHTT	Total Amount Reimbursed by Social Health Insurance Fund
CKD	Chronic Kidney Disease
DALY	disability-adjusted life years
GBD	Global Burden of Disease
GVN	Government of Vietnam
HCF	health care facility
HFG	Health Finance and Governance
ICD	International Classification of Diseases
IP	inpatient
MOH	Ministry of Health
NCD	non-communicable disease
OP	outpatient
PEPFAR	Presidential Emergency Plan for AIDS Relief
PSS	Provincial Social Security Office
SHI	Social Health Insurance
SFI	Sustainable Financing Initiative
VSS	Vietnam Social Security

Executive Summary

Scope and Purpose

This is the executive summary of a report that documents Actuarial Analysis related to the development of a Basic Health Service Package (BHSP) for Social Health Insurance (SHI) in Vietnam. It attempts to answer the following key questions:

- What is the disease burden based on cost for SHI in Vietnam? What are the top five most costly ICD-10 categories?[1]
- What are the key services to treat these diseases, and does treatment vary significantly by level of health facility?

We then consider how these findings might possibly impact the development of a BHSP for SHI in Vietnam.

Key Findings

Top Five Most Costly ICD Categories[2]

The top five ICD categories that represent the majority (60%) of the total outpatient and inpatient cost for SHI are as follows:

- I00-I99: Diseases of the circulatory system
- C00-D49: Neoplasms
- J00-J99: Diseases of the respiratory system
- K00-K95: Diseases of the digestive system
- N00-N99: Diseases of the genitourinary system

The consequence is that if one is to develop policy for a BHSP targeting areas of highest cost, then one can narrow down the focus to just five ICD categories and still impact the majority of cost.

The top five single ICD codes in each of the top five categories represent the majority (60%) of the cost for these categories. The consequence for developing a BHSP is that if one focuses on cost, then any policy focusing on the top 25 single ICD codes (refer to Figure 8) will

[1] Defined as the five most costly ICD categories in aggregate across the six provinces and for outpatient and inpatient services combined. In other words, of the 22 ICD categories, what are the top five most costly, and what proportion of the total cost do they represent?

[2] Throughout this report, "ICD" refers to diagnosis coding from the International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM).

have a significant impact on total cost for SHI. This could simplify the approach for targeting and cost management of the SHI fund.

There is a broadly similar disease burden between males and females (after excluding pregnancy). Pregnancy is not among the top five ICD categories, but it is significant for females of child-bearing age. Any BHSP that is to cover this population would also need to include pregnancy-related services and treatment.

Young children and teenagers have a very different disease burden compared with adults. The consequence of this for BHSP is that any policy focusing on total cost will focus on the top diseases for adults, but may not necessarily consider the diseases of children and adolescents. Any BHSP that is to address the disease burden for this age group would need to specifically include their typical diseases.

Key Outpatient Services Used

The vast majority of outpatient (OP) visits and cost are at the province or district level of health facilities, except for neoplasms (which are at the central and province level). The consequence of this when developing a BHSP is that any policy focusing on the cost of OP services will be most effective at the province or district level, given the current cost structure. However, any policy for neoplasms will need to focus largely on services at the central level, where the cost is greatest.

Drugs & Consumables is the dominant service grouping, representing the vast majority of cost (more than 70%) at both the province and district levels of health facilities and for each of the five ICD categories.[3] The consequence for developing a BHSP when considering outpatient costs is that drugs and consumables are a critical cost element. However, if one focuses only on drugs, then one might miss a more complete picture of the various cost elements of services and treatments. One should also consider tests, check-ups, and imaging. Also factoring in the illness (or ICD) then reveals a more complete picture of the cost elements, as they can be related directly to the type of illness and level of care.

On average, 7-8% of the drugs used represent the vast majority of cost. The consequence of this when developing a BHSP is that focusing on a small subset of drugs will have the most cost-effective impact if they represent the vast majority of cost.

Key Inpatient Services Used

The vast majority of inpatient (IP) admissions and cost are at the central or province level of health facilities (combined 95% of cost), except for neoplasms. This indicates that services at the district level are not a significant part of the overall cost burden for IP services. The consequence for developing a BHSP is that any policy focusing on the cost of IP services will be most effective at the central or province level, given the current cost structure. However, the cost of neoplasms is predominately at the central level (76% of cost). Therefore, any policy

[3] There is one exception where drugs and consumables are a minority of cost: for N00-N99: Genitourinary System. For this category, check-ups and tests are significant service groupings, usually at the district level only. The consequence of this is that if we focus only on drugs, then we might miss a more complete picture of the various cost elements of services and treatments.

specifically for neoplasms will need to focus largely on services at the central level, where the cost is largest.

Drugs and consumables are significant at both the central and province levels of health facility, at approximately half of total cost. At the central level, medical procedures are the most significant. However, at the province level, the other costs are more evenly spread across the other service groupings. The consequence of this in developing a BHSP is that any policy focusing on cost of IP services at the central level will be most effective if it focuses on drugs and consumables and medical procedures, as they represent the vast majority of cost. However, at the province level, the simplest approach would be to focus solely on drugs and consumables, as this is half the cost (or more) across ICD categories.

There are some specific single diseases for which the vast majority of IP cost (more than 75%) is for drugs and consumables, namely neoplasms and diseases of the genitourinary system. For these, a small number of drugs typically represent the majority of the cost (for drugs and consumables), either high-cost drugs or very high volume drugs. The consequence of this in developing a BHSP is that in any policy focusing on cost of drugs and consumables, one could target a small number of specific drugs that are high-cost or high-volume and have a significant impact on total cost. Another consequence is that one could also possibly simplify the list of allowable drugs (for reimbursement), depending on clinical efficacy, with limited impact on cost. Such a process could simplify the recording and administration when working off a shorter, simpler list of drugs reimbursable under SHI.

For some specific diseases, a service grouping other than Drugs & Consumables is the most significant cost. When significant, the service is usually a high-cost activity, such as surgery or the use of expensive technology (e.g., an appendectomy for acute appendicitis, or imaging for angina). The consequence of this in developing a BHSP is that any focus purely on drugs and consumables, though impactful in aggregate, will miss some of the major costly service items for specific illnesses. For certain conditions, it is not drugs that are the most significant but another type of service. One could possibly target some of the high-cost services (besides drugs), taking into account the illnesses they relate to. This would then have the most cost-effective impact.

A number of risks and limitations associated with the above analysis are detailed in the body of the report.

Background

HFG Background

Abt Associates is a mission-driven, global leader in research and program implementation in the fields of health, social and environmental policy, and international development. Known for its rigorous approach to solving complex challenges, Abt Associates was ranked as one of the top 20 global research firms in 2012 and also named one of the top 40 international development innovators. The company has multiple offices in the United States and program offices in nearly 40 other countries. Its USAID-funded Health Finance and Governance project (HFG) provides technical assistance in health systems strengthening around the world. The project addresses the financing, governance, operational, and capacity-building constraints that block access to and use of priority population, health, and nutrition services by people in developing countries.

HFG is a five-year (2012–2017) global project, designed to improve health finance and health governance systems in partner countries, so as to lead to expanded access to health care and improved health outcomes. HFG also works with country partners to improve the management of health systems and generate much-needed evidence on the most effective and efficient ways to improve health systems.

HFG provides support to the Vietnam Ministry of Health (MOH) in a variety of activities in support of the expansion and improvement of Social Health Insurance (SHI) as a sustainable and effective financing mechanism to ultimately provide better health care to the people of Vietnam. HFG is also the implementing agency for the Sustainable Financing Initiative (SFI) in Vietnam, a three-year program funded by the Presidential Emergency Plan for AIDS Relief (PEPFAR), committed to supporting ongoing country-led efforts to further mobilize Vietnam's resources to help deliver an AIDS-free generation.

Beneficiary and Contracting Authority

The beneficiaries of the final deliverable are the MOH and the Vietnam Social Security (VSS) of The Socialist Republic of Vietnam.

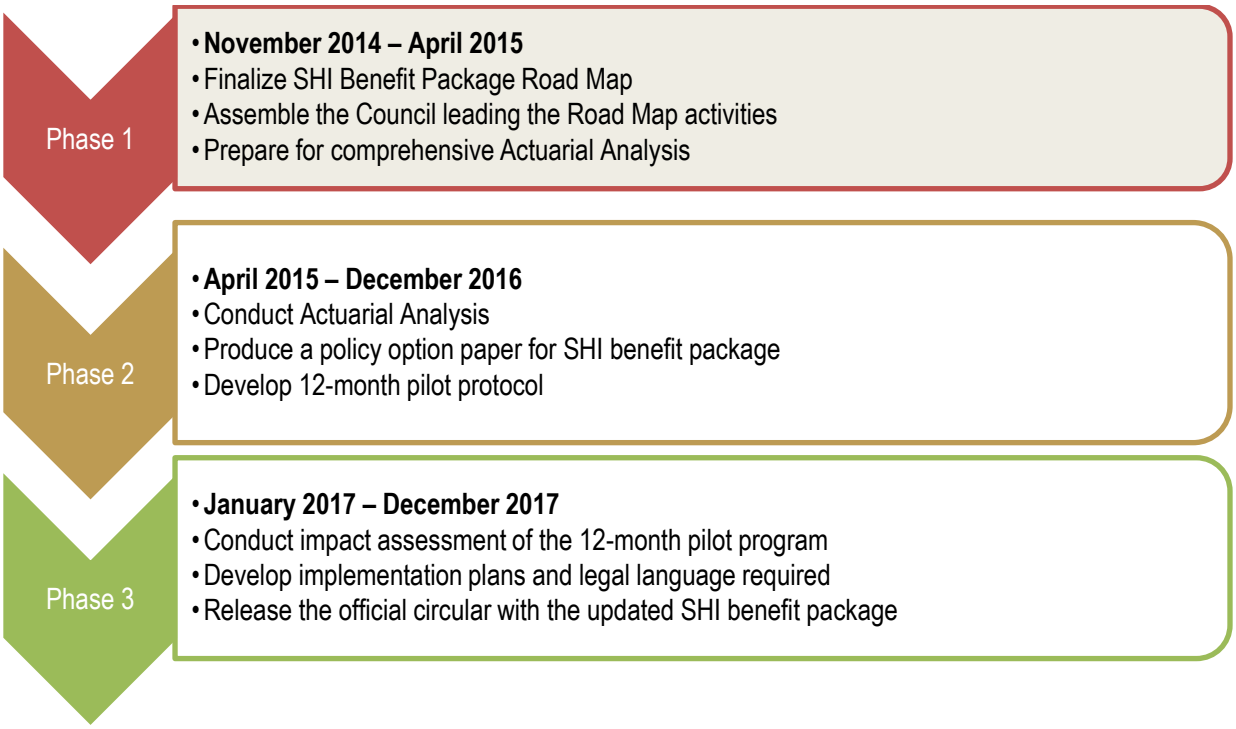
The contracts for this consultancy have been signed by the representatives of Abt Associates Inc., in its role as the provider of technical assistance to the MOH as outlined in the VSS/MOH/HFG Vietnam work plan.

Context of This Assignment

The Ministry of Health is currently assigned by the National Assembly to propose a Basic Health Service Package (BHSP) to be paid for by SHI. Without a clearly defined benefit package and the appropriate medical guidelines, health service providers are not in a position to offer standardized services and provide a consistently cost-efficient level of care. The need for a BHSP paid by SHI also has been expressly recognized in the newly amended Health Insurance Law, and the Ministry of Health has recently mentioned the introduction of BHSP as a way to rationalize the supply of health care services while maintaining and/or improving the affordability and the quality of care provided to the insured population.

Critically, in addition to the clear needs for a comprehensive BHSP paid by Social Health Insurance, there is now a unique opportunity for the development and inclusion of an HIV-specific cluster of services into the BHSP that can be provided to people living with HIV/AIDS and covered by health insurance. Without timely participation in the discussions and decision points around a BHSP paid by SHI, it will be difficult and inefficient to address the needs of people living with HIV/AIDS at a later stage, especially if a standard package were to be approved without explicit coverage for HIV-related conditions.

Figure 1. Summary of Phases in SHI Benefit Package Road Map



The Ministry of Health underscored the importance of defining a BHSP and criteria to selected pilot provinces. Article 2 in Resolution 68 stipulates that the development of a BHSP paid by SHI must be completed in balance, with premium rates and socio-economic conditions of Vietnam, prior to 2018. HFG Vietnam has designed its activities to follow the three phases identified in the Government of Vietnam Road Map for updating the SHI Benefit Package as presented in **Figure 1**. Phase 2 of this Road Map requires the Government to identify and evaluate SHI Benefit Package options against economic, political, and medical priorities.

However, the Minister for Health has recently assigned the Department of Planning and Finance the task of drafting the BHSP circular before the end of 2017 so the BHSP paid by the SHI fund will be effective earlier than planned.

As planned in Phase 2 of the Road Map, HFG provides the technical support to conduct the Actuarial Analysis. The technical protocol of the actuarial task was prepared and presented to MOH stakeholders and related development partnerships that support this activity.

Scope of the Actuarial Analysis

Scope and Purpose

The scope of this particular assignment was set out in an official letter from the Ministry of Health dated 3rd June 2016: "3362/BYT-KHTC Re: Collaboration for the Next Steps in the Development of the BHSP Paid by Social Health Insurance." The letter set out four tasks, of which this report and underlying analysis relate to the first two tasks:

1. Based on the data of six provinces (Hoa Binh, Ha Noi, Binh Dinh, Gia Lai, Ho Chi Minh City (HCMC), and Dong Thap) in 2014 according to the **Forms 79b and 80b**,[4] conduct the analysis for the **five most costly diseases** by ICD-10 codes, their respective costs, and then stratified by level of care (i.e., central, province, district, and communal) and demographic factors (e.g., age, gender).

2. Based on the data of the six provinces in 2014 according to the **Forms 01/BV and 02/BV**, conduct the analysis for the most costly diseases as mentioned above on the **used services** (including name of services/name of medicine, quantity, total cost paid by SHI fund) and then stratified by level of care.

The first task relates to assessment of the "Disease Burden by Cost" for SHI Vietnam; that is, to identify the top five most costly[5] ICD-10 categories based on amount reimbursed by SHI ("**Top Five ICD Categories**").

The second task relates to assessment and analysis of the services used to treat these top five ICDs, by ICD and by health facility level, for the sample provinces ("**Service Usage**").

Limitations

This work is meant to help inform key policymakers in Vietnam on the critical areas of cost for Social Health Insurance in Vietnam. It is intended to help the stakeholders develop policy and make strategic decisions, taking into account cost assessments. However, it is not a piece of advice or specific guidance or recommendation or professional opinion — it is **not** Prescribed Actuarial Advice.

This work has been performed for the sole use of Abt Associates and HFG Vietnam. However, it may also be of use and interest to the VSS and MOH. The authors accept no liability for loss or damage howsoever arising in the use of this report by these stated parties for other than the purpose stated above.

---

[4] Forms 79b, 80b, 01/BV, and 02/BV are the VSS reporting forms. Form 79b is the reporting to VSS of outpatient service usage for a single year for a single province. Form 80b is the equivalent for inpatient service usage. Form 01/BV is the detailed service usage for outpatient, and 02/BV is the equivalent for inpatient usage.

[5] Defined as the five most costly ICD categories in aggregate across the six provinces and for OP and IP services combined. In other words, of the 22 ICD categories, what are the top five most costly, and what proportion of the total cost do they represent?

A set of Technical Appendices accompany this report. This report and those Appendices must be read in their entirety. Individual sections of this report could be misleading if considered in isolation from one another.

Data and Information Received

Data Received

The data collection process followed a number of steps, beginning with initial scoping discussions (and visits) in March 2015 and continuing with final data collection and validation 12 months later in March 2016.

The data received can be split into four main types:

- Population numbers
- VSS aggregate statistics
- Provincial Social Security Office (PSS) data; member tables, approved claims for OP services (Form 79b), approved claims for IP services (Form 80b)
- Health facility data; detailed services and cost for OP and for IP, respectively

We received detailed data for the six sample provinces and in aggregate. Full details of the data received are set out in the Appendices.

Data Quality and Validation

We conducted a number of independent checks and reasonableness checks on the data at each stage and at as many levels as practical:

- Our base reference for checks was the VSS summary tables per province (of numbers insured, OP visits, etc.).
- We were able to perform checks on the PSS data; and generally speaking, the data was of good quality for 2014 and of varied quality for the preceding years (2012, 2013).
- For all six provinces, the data was of sufficient quality for 2014. For some provinces, however, it was not sufficient for pre-2014 years, whereas for others it was. This made it difficult to do a complete analysis across all six sample provinces for more than one year.

It was not possible to perform independent checks on the data from the health facilities, but we performed a number of reasonableness checks and sense checks (e.g., on duplicates and stand out errors in variable values).

A number of points and learnings arose:

- Collaboration from authorities at all levels was always important and generally helped to make data collection smooth and efficient.
- Forms 79b and 80b are sufficient for this analysis exercise. The quality of Form 79b/80b data from 2014 onwards was good.

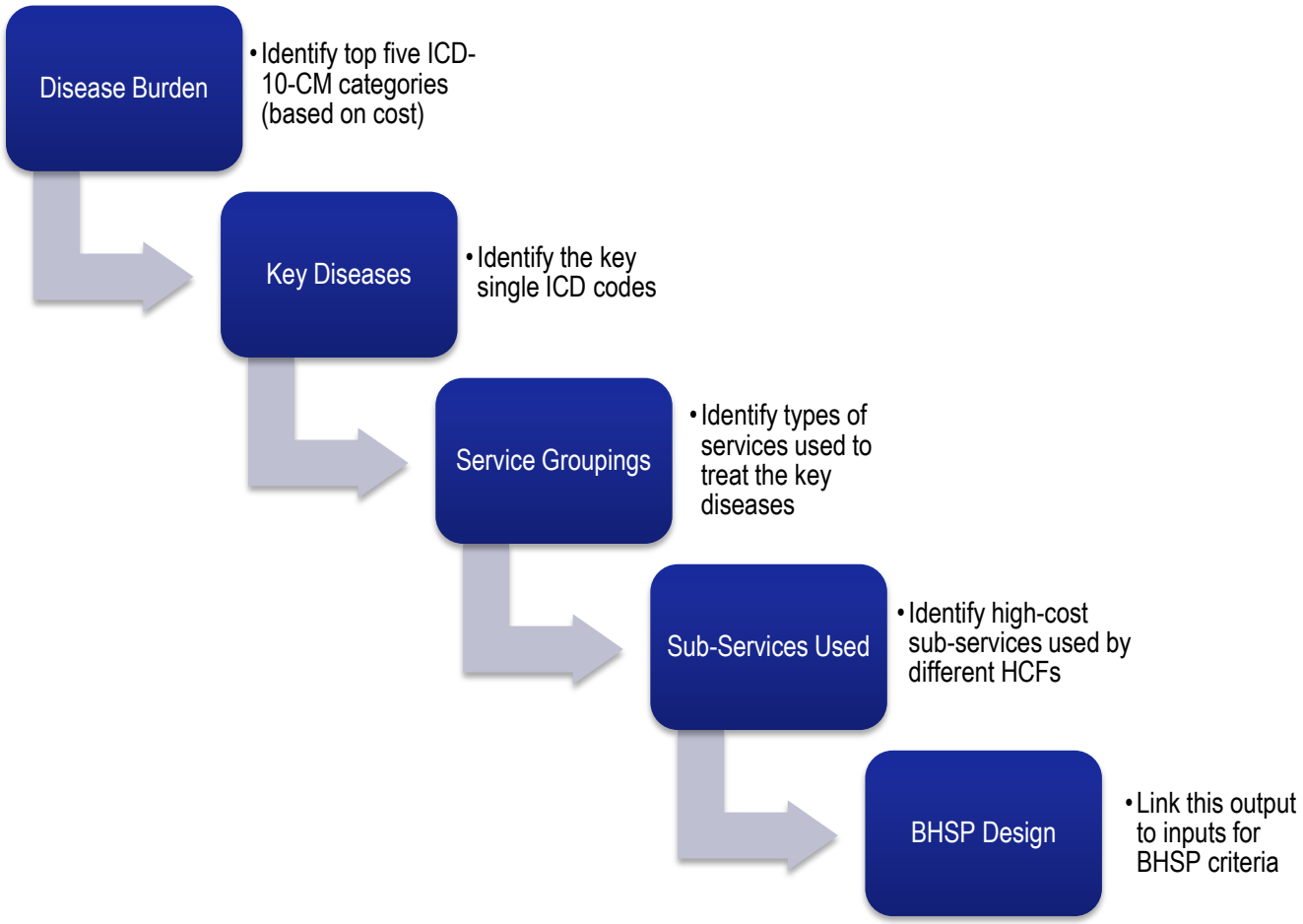
- The majority of data is in digital form, which makes for ease of manipulation.
- It was difficult to explore systematic data in pre-2014 periods. Some membership data was not consistent in terms of age band, terms of validity.
- Many of the data formats are different (especially at the health facility level), so it was very time consuming to unify for data validation and analysis.
- The data from health facilities at the central level (Bach Mai and Cho Ray hospitals) is quite important, but it is impossible to link some information (patient records, services and cost), as the font is in an old format and unreadable, service codes and names do not match with one another, etc. As such, the service analysis at the central level faced many challenges.

Generally speaking, the data was of sufficient quality for this Actuarial Analysis and to perform the scope and purpose of the work as set out in the preceding section. Further detail is set out in the Appendices.

Methodology

A high-level summary of the methodology used to conduct the Actuarial Analysis is set out below.

Figure 2. Methodology Used to Conduct Actuarial Analysis



Further explanatory details are set out below:

- **"Disease Burden"**: There are 22 ICD categories. Summary tables were created for the four key service statistics (number of OP visits, OP cost, number of IP admissions, IP cost) by age/gender/member type for each of the six sample provinces. These tables were then combined to generate a table of total cost per ICD category across the six sample provinces. This then enabled us to rank the ICD categories in decreasing order, according to their total OP and IP costs. This ranking and identification of key diseases was also compared with the Global Burden of Disease (GBD) study to assess for reasonableness and to identify any significant differences.

- **"Key Diseases"**: Once the top five ICD categories were identified, then we repeated the same exercise of ranking by cost the single ICDs within each category; that is, to identify

the critical single ICDs within the five categories, and then the top five single ICDs within each of the categories. This then led to identification of the top 25 single ICDs (five per each of the five ICD categories; i.e., 5*5=25).

- **"Service Groupings"**: Based on the service data from the health facilities, we then produced summaries of the total cost per service grouping for each of the 25 single ICDs. We repeated this exercise for the four levels of health facility (central, province, district, communal) and separately for OP and IP services. This yielded at least seven separate tables of services per ICD. This exercise was used to identify the most significant service groupings per ICD.

- **"Sub-Services Used"**: Based on the service data from the health facilities, we then identified and ranked the most significant single service types within each of the service groupings. We identified those services that contributed at least 70% of the cost for that grouping. For example, for the service grouping "Drugs & Consumables," we identified the drugs that represented at least 70% of the cost for that grouping.

- **"BHSP Design"**: The results of this work were shared with key stakeholders at the MOH, VSS, and other local parties at numerous workshops to inform and help them shape and develop the BHSP. However, final design and specification of the BHSP resides with the MOH.

Fuller details on the methodology adopted are set out in the Appendices.

Top Five ICD Categories

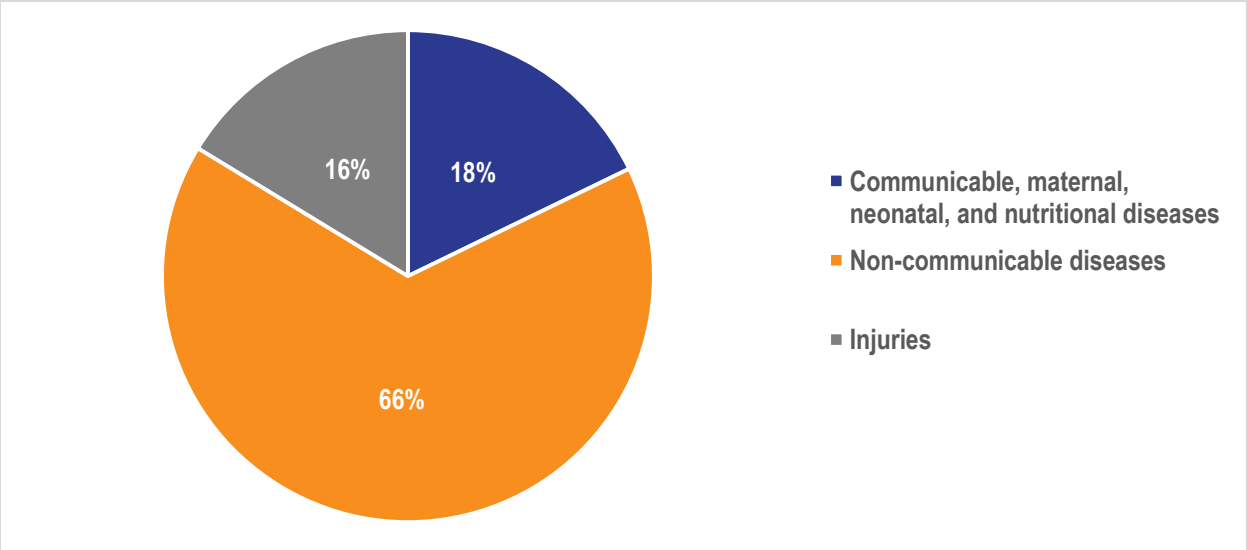
This section sets out the analysis[6] on the top five ICDs in terms of cost and any implications for the development of the BHSP.

Global Burden of Disease

Though not specifically part of the scope, we compiled some basic statistics on the Global Burden of Disease, mainly for comparison purposes as a "sense check" on the statistics on burden of disease based on the SHI cost.

In this section, we draw on the key findings from the recent Global Burden of Disease study, specifically looking at Vietnam.[7] There are a number of ways of assessing and estimating the burden of disease, and we consider one particular measure — disability-adjusted life years (DALY). For Vietnam, the DALY can be summarized into three major categories as set out below.

Figure 3. Disease Burden – Global Burden of Disease DALYs (Major Categories)



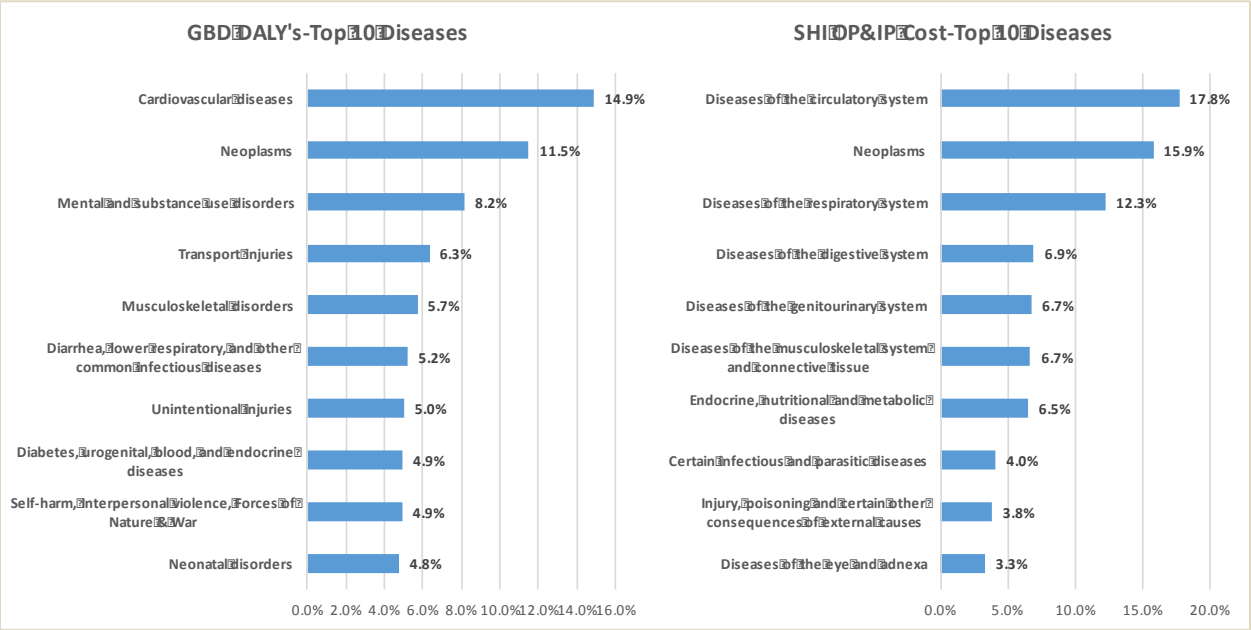
As one can see, the three major categories are non-communicable diseases (NCDs), communicable diseases, and injuries. NCDs represent a significant part of the burden, at two-thirds of total DALYs.

[6] In this section, we generally focus on the proportion of cost (percentage) rather than on absolute values. Percentage was chosen as a way of showing the relative importance (by cost) of certain ICD categories, and then the single ICDs themselves, and then the types of services used to treat those diseases.

[7] Source: "Table 9. Vietnam all ages DALYs (thousands) and age-standardised DALY rates (per 100 000) with 95% UI for 306 causes, both sexes combined, in 1990, 2005, and 2013, with median percent change."

The graph below compares the top 10 diseases (based on DALY) from the GBD study versus the top 10 from SHI (based on total IP and OP cost in the six sample provinces).

Figure 4. Comparison of GBD vs. SHI Disease Cost Burden



For the GBD study, the top 10 diseases (out of 24) represent 72% of the total DALY. Within these top 10, five are NCDs, three are injuries, and the two remaining are communicable diseases. For the SHI population, the top 10 diseases represent approximately 84% of the total burden of cost.

The GBD study gives a different picture of the disease burden than does SHI.

- Six of the top 10 diseases in the GBD study are also in the SHI top 10, but there are four other diseases that are in the GBD top 10 and not in the SHI top 10 (and vice versa). This implies that the GBD[8] is partly different from that of the SHI.
- The consequence of this is that any policy focus on developing a BHSP based purely on the SHI experience will not completely match the GBD study's view of the burden of disease (and vice versa). To develop a BHSP that also matches the GBD study's view of the burden of disease, then one will need to also include the diseases that are in the GBD top 10 (that are not in the SHI top 10).

[8] It should be noted, though, that the SHI data is for the six sample provinces and represents total OP and IP cost for one single year (2014) based on those insured within the SHI population. As such, there will be some differences in the diseases identified within the "burden" estimates. There will also be differences in the methodology, which can affect the comparison.

Top Five ICD Categories

The table below sets out the total OP and IP cost (reimbursed by SHI) for the six sample provinces for 2014 and ranks the ICD categories in decreasing order of significance.

Table 1. Total SHI Costs by ICD Category for OP and IP

TOTAL COST-OP AND IP (t_bhtt VND mn.)

ICD Category	ICD Category Name	OP Cost	IP Cost	Total	Proportion
I00-I99	Diseases of the circulatory system	1,011,086	751,275	1,762,362	**18%**
C00-D49	Neoplasms	228,448	1,344,802	1,573,251	**16%**
J00-J99	Diseases of the respiratory system	528,089	692,873	1,220,962	**12%**
K00-K95	Diseases of the digestive system	278,849	407,621	686,470	**7%**
N00-N99	Diseases of the genitourinary system	212,039	452,961	665,000	**7%**
Total		2,258,512	3,649,533	5,908,045	**60%**
Total ALL		4,170,375	5,750,525	9,920,900	
Proportion of Total		**54%**	**63%**	**60%**	

The top five ICD categories represent the majority (60%) of the total OP and IP cost for SHI.

- The top five ICD categories represent 54% of total OP cost, 63% of total IP cost, and 60% of total OP/IP cost. There are 22 ICD categories in total, so this implies that the 17 other categories represent a minority (40%) of the total cost.
- The consequences of this is that if one is to develop policy for a BHSP targeting areas of highest cost, then one can narrow down the focus to just five ICD categories and still impact the majority of cost.

Differences by Province/Gender/Age

Difference by Province

The table below shows the proportionate split of cost for these top five ICD categories, for each of the six sample provinces.

Table 2. Proportionate Split of SHI Costs by ICD Category and Province

Proportional Split of Cost by Province								
ICD Category	ICD Category Name	HCMC	Ha Noi	Dong Thap	Binh Dinh	Gia Lai	Hoa Binh	Grand Total
I00-I99	Diseases of the circulatory system	20%	16%	18%	13%	11%	11%	18%
C00-D49	Neoplasms	19%	15%	2%	8%	3%	5%	16%
J00-J99	Diseases of the respiratory system	11%	13%	21%	13%	19%	20%	12%
K00-K95	Diseases of the digestive system	6%	8%	9%	9%	11%	10%	7%
N00-N99	Diseases of the genitourinary system	8%	3%	3%	7%	6%	8%	7%
Total		64%	55%	53%	50%	50%	54%	60%

The top five ICD categories represent the majority of cost across the six sample provinces, though there are some differences within each province.

- Given their size HCMC and Ha Noi are driving the total cost. For the four other provinces the top five ICD Categories still represent more than 50% of the total cost with some significant differences by ICD category. The differences by province are most likely due to the type of facility available and used in the provinces, mix of members insured and underlying burden of illness within the province.
- The consequence of this is that any policy for BHSP targeting a single ICD category, such as Neoplasms, will have different impact(s) on cost depending on the specific province.

Difference by Gender and Age

Split of cost by gender

The table below shows the proportionate split of cost for these top five ICD categories, split by gender.

Table 3. Proportionate Split of SHI Costs by ICD Category and Gender

Proportionate Split of cost by Gender

ICD Category	ICD Category Name	Male	Female	Total
I00-I99	Diseases of the circulatory system	18%	17%	18%
C00-D49	Neoplasms	16%	16%	16%
J00-J99	Diseases of the respiratory system	14%	11%	12%
K00-K95	Diseases of the digestive system	8%	6%	7%
N00-N99	Diseases of the genitourinary system	7%	6%	7%
Total		**63%**	**56%**	**60%**

Difference by age

The following graphs show the proportionate split of cost for these top five ICD categories, split by different age bands.

Figure 5. SHI Cost for Members Aged 0-4

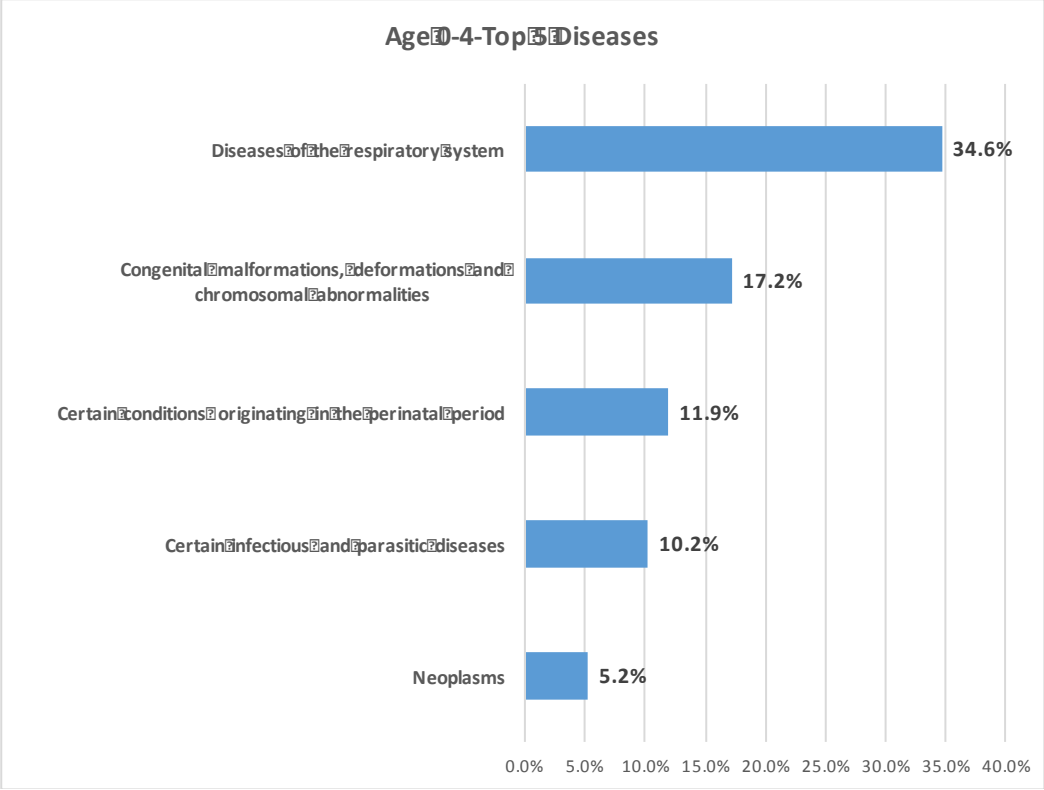


Figure 6. SHI Cost for Members Aged 5-19

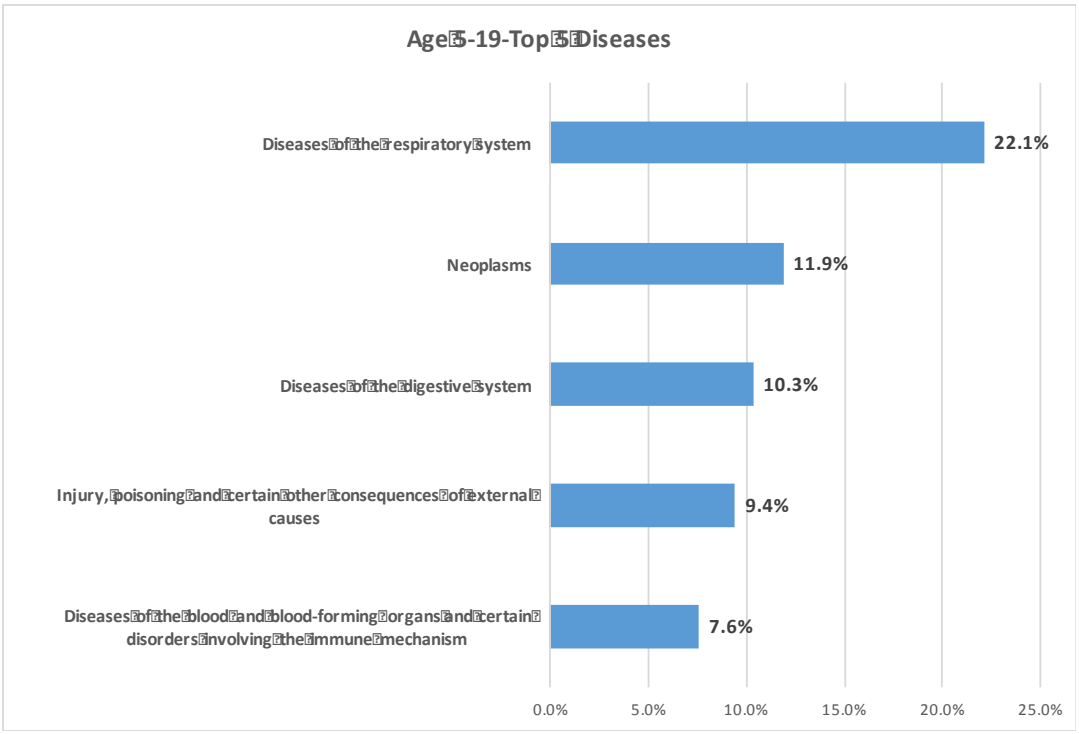
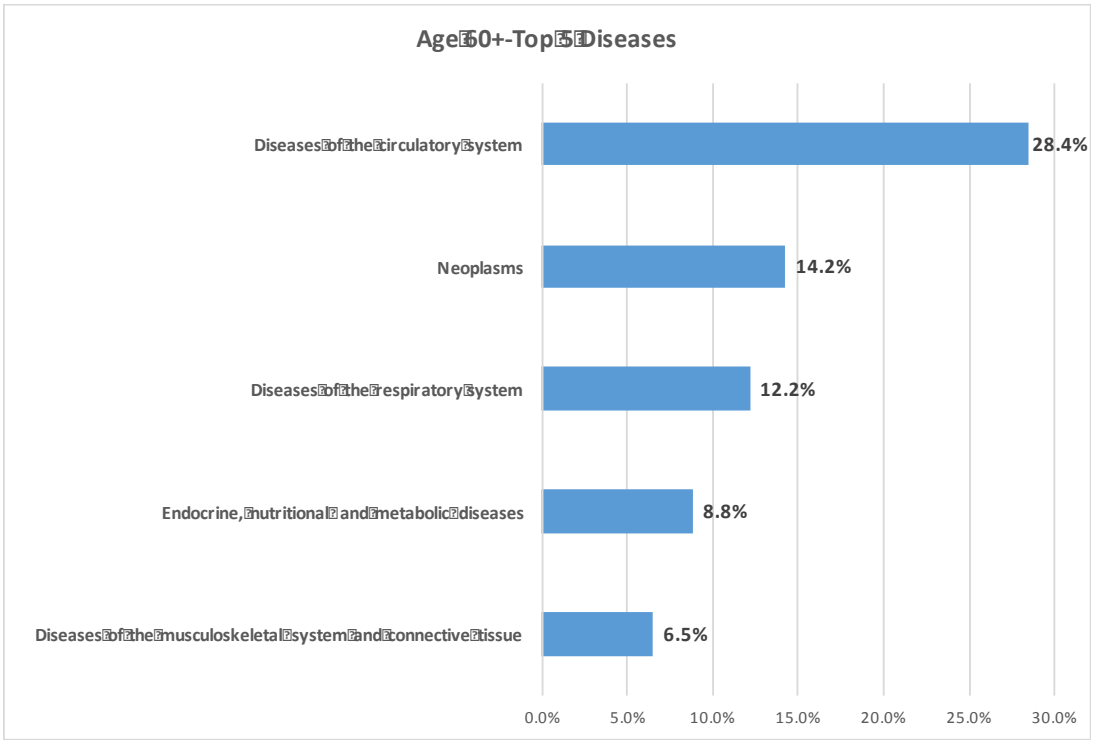


Figure 7. SHI Cost for Members Aged 60+



There is a broadly similar disease burden between males and females (after excluding pregnancy). However, young children and teenagers have a very different disease burden compared with adults.

- Pregnancy does not make the top five ICD categories but is significant for females of child-bearing age (aged 15-44). Any BHSP that is to cover this population would also need to include pregnancy-related services and treatment.
- The top five ICD categories for children (aged 0-4) and teenagers (aged 5-19) are very different than those for adults. However, the top five ICD categories overall match those of the adults, as they represent the majority of cost and will drive the overall burden.
- The consequence of this for BHSP is that any policy focusing on total cost will focus on the top diseases for adults, but may not necessarily consider the diseases for children and teenagers. If one wants to address the disease burden for this age group, then one would need to also include their diseases into a BHSP.

Top Single ICD Codes

For each of the top five ICD categories we looked at the most significant single ICDs within that category and then ranked them according to their contribution to total cost. For most of the five categories (except Neoplasms) the top five single ICD codes make up the majority of cost for that particular ICD category.

Figure 8. Summary Table of Top 25 Single ICD Codes

I00-I99 Circulatory System	C00-D49 Neoplasms	J00-J99 Respiratory System	K00-K95 Digestive System	N00-N99 Genitourinary System
Essential Hypertension I10 (tăng huyết áp vô căn)	Breast Cancer C50 (ung thư vú)	Pneumonia J18 (viêm phổi)	Acute Appendicitis K35 (viêm ruột thừa cấp)	Chronic Kidney Disease N18 (bệnh thận mạn tính)
Acute Myocardial Infarction I21 (nhồi máu cơ tim cấp)	Bronchus & Lung Cancer C34 (ung thứ khí quản)	Other Chronic Obstructive Pulmonary Disease J44 (các bệnh phổi tắc nghẽn mạn tính)	Gastritis & Duodenitis K29 (viêm dạ dày và tá tràng)	Calculus of Kidney & Ureter N20 (sỏi thận và niệu quản)
Cerebral Infarction I63 (nhồi máu não)	Colon Cancer C18 (ung thư đại tràng)	Acute Bronchitis J20 (viêm phế quản cấp)	Fibrosis & Cirrhosis of Liver K74 (gan xơ hoá và xơ gan)	Other Disorders of Urinary System N39 (biến đổi khác của hệ tiết niệu)
Angina Pectoris I20 (cơn đau thắt ngực)	Stomach Cancer C16 (ung thư dạ dày)	Bacterial Pneumonia J15 (viêm phổi do vi khuẩn)	Cholelithiasis K80 (sỏi mật)	Enlarged Prostate N40 (tăng sản tuyến tiền liệt)
Heart Failure I50 (suy tim)	Rectum Cancer C20 (ung thư trực tràng)	Respiratory Failure J96 (suy hô hấp)	Other Digestive Diseases K92 (các bệnh khác của hệ tiêu hoá)	Nephrotic Syndrome N04 (hội chứng thận hư)

We illustrate below the ranking of the single ICD codes within each of the five ICD categories.

Figure 9. Ranking of Top Single ICD Codes – I00-I99 Circulatory System

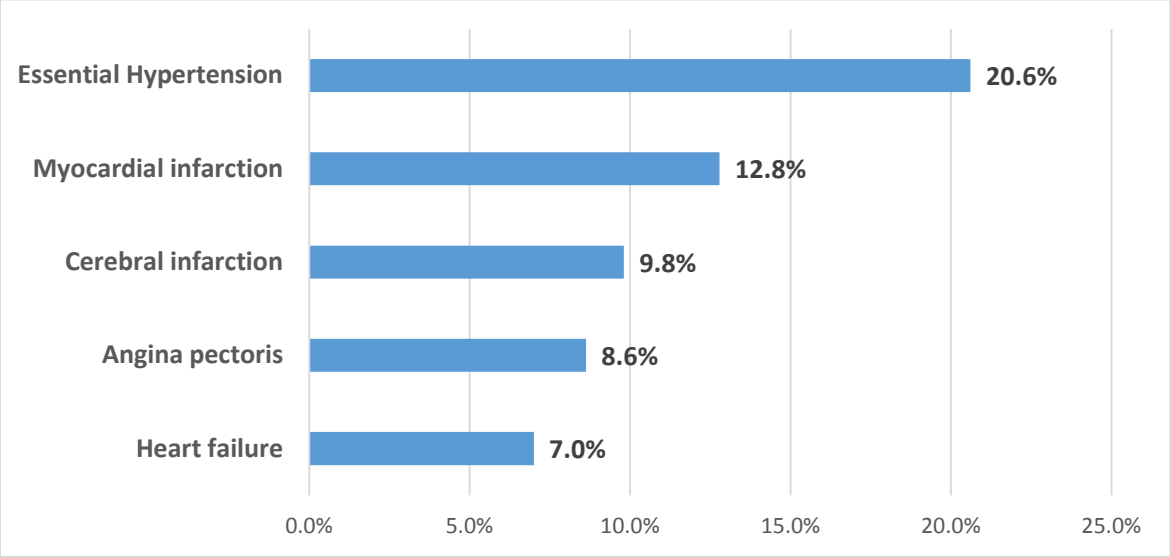


Figure 10. Ranking of Top Single ICD Codes – C00-D49 Neoplasms

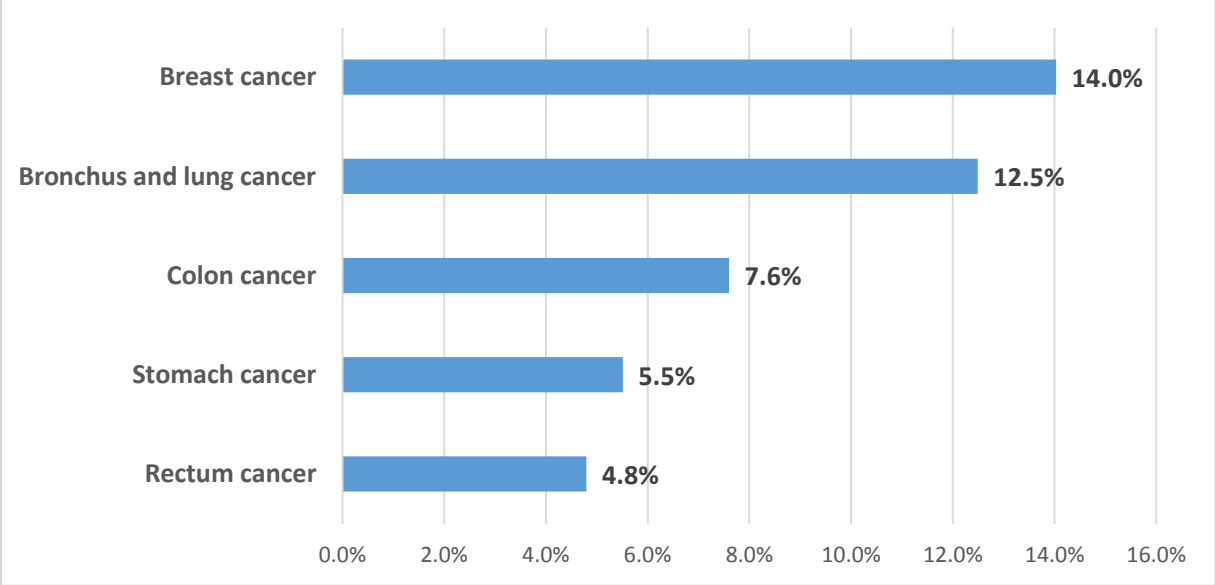


Figure 11. Ranking of Top Single ICD Codes – J00-J99 Respiratory System

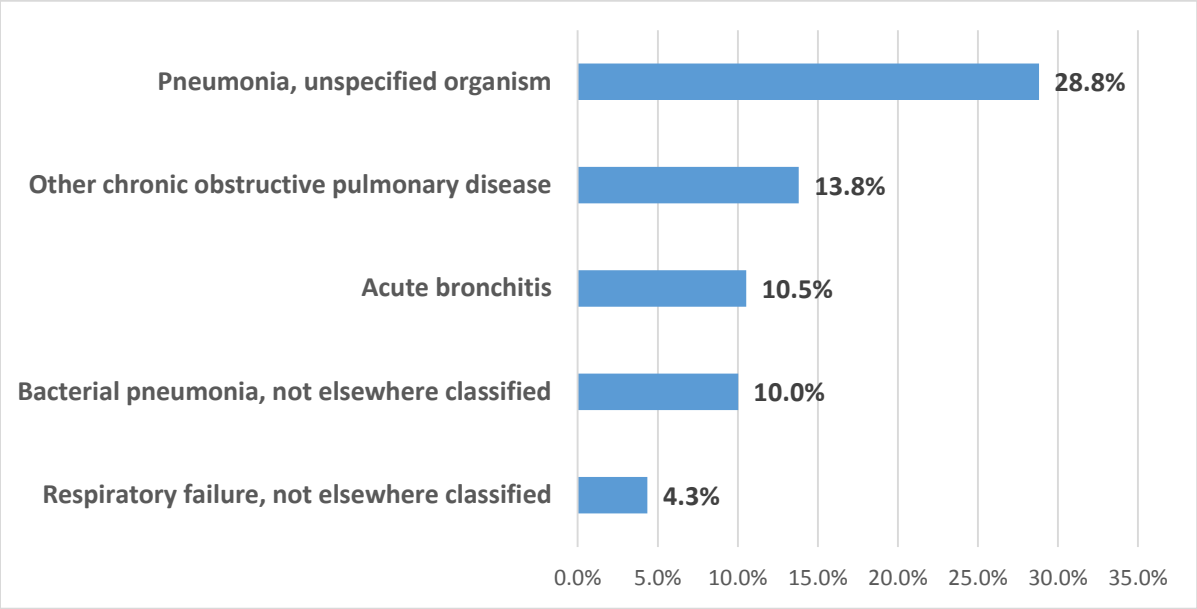


Figure 12. Ranking of Top Single ICD Codes – K00-K95 Digestive System

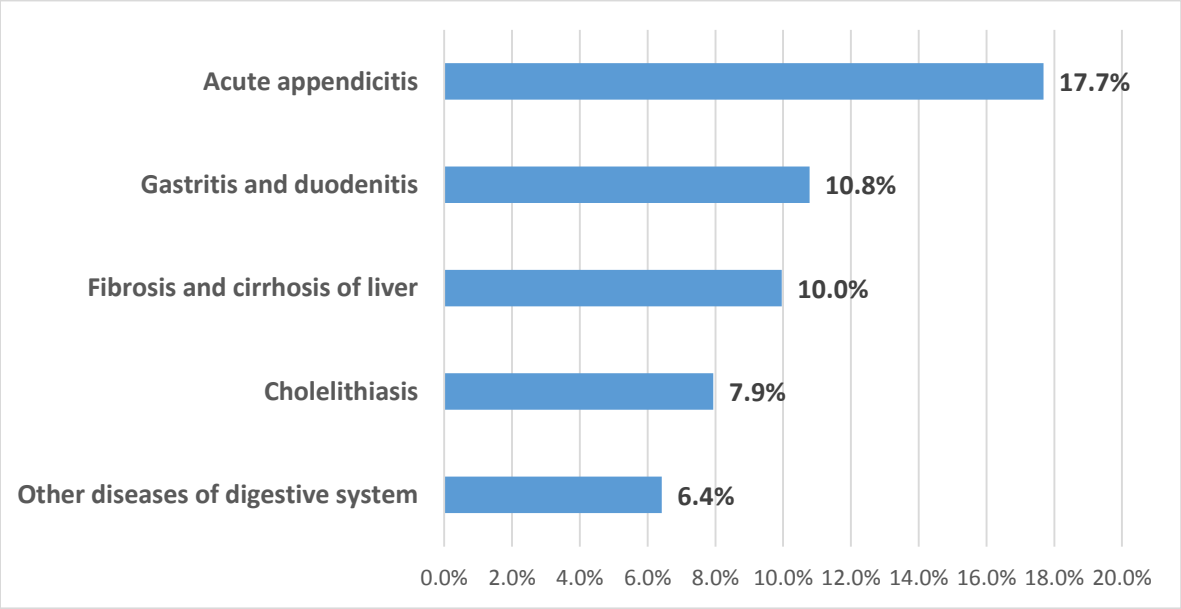
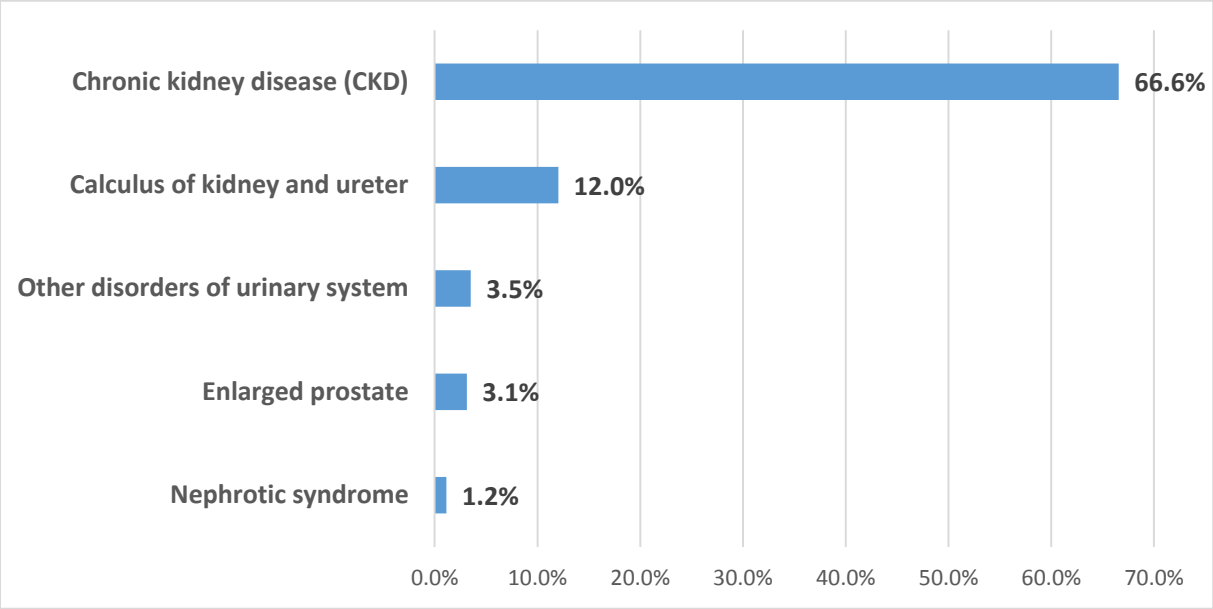


Figure 13. Ranking of Top Single ICD Codes – 00-N99 Genitourinary System



The top five single ICDs in each of the five categories represent the majority (60%) of the cost for these categories. There is usually a small number of major single disease types within each of the categories.

- Each of the ICD categories has more than a 100 single diseases within the category. However, the top five single diseases within each of these categories represent the majority of cost for these categories. For some disease categories, there are a small number of dominant single diseases (e.g. Chronic Kidney Disease for N00-N99); for other categories, the burden is spread more evenly (e.g., Neoplasms).

- The consequence for developing a BHSP is if one focuses on cost, then any policy focusing on the top 25 single ICD codes (out of the thousands of possible ICDs) will have a significant impact on total cost for SHI. This could simplify the approach for targeting and cost management of the SHI fund.

Outpatient Services

In this section we set out the analysis on the outpatient services used to treat the top 25 ICD codes in terms of cost and any implications for the development of the BHSP.

Health Facility Usage

OP Visit Count

The graphs below show the OP visit count split by level of health facility — for all excluding neoplasms, and for neoplasms only.

Figure 14. OP Visit Count by Health Facility Level (Excluding Neoplasms)

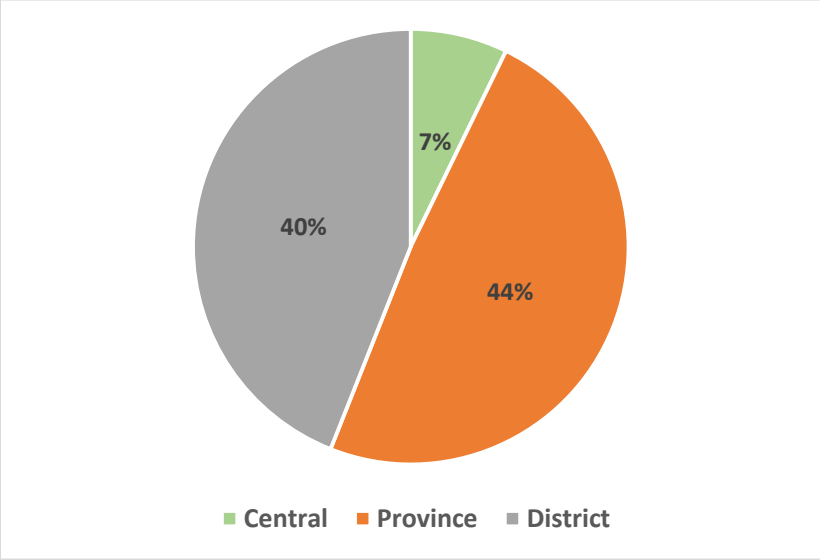
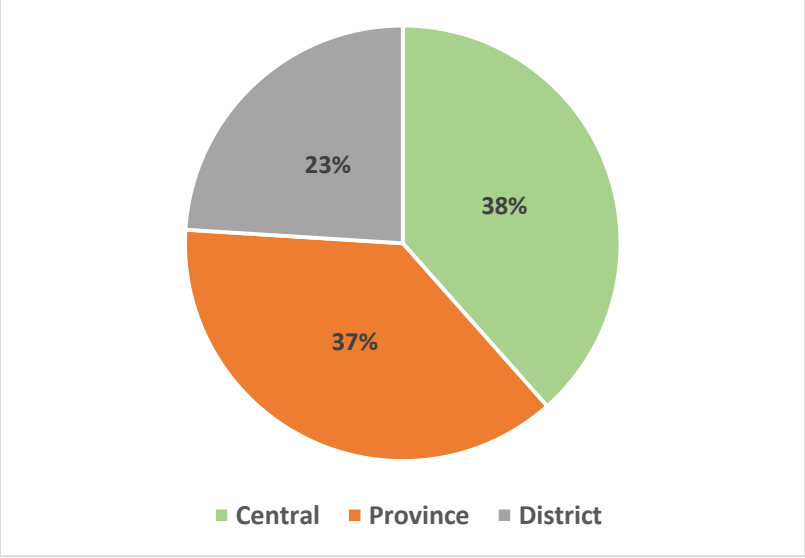


Figure 15. OP Visit Count by Health Facility Level (Neoplasms Only)



OP Cost

The graphs below show the OP cost split by level of health facility — for all excluding neoplasms, and for neoplasms only.

Figure 16. OP Cost by Health Facility Level (Excluding Neoplasms)

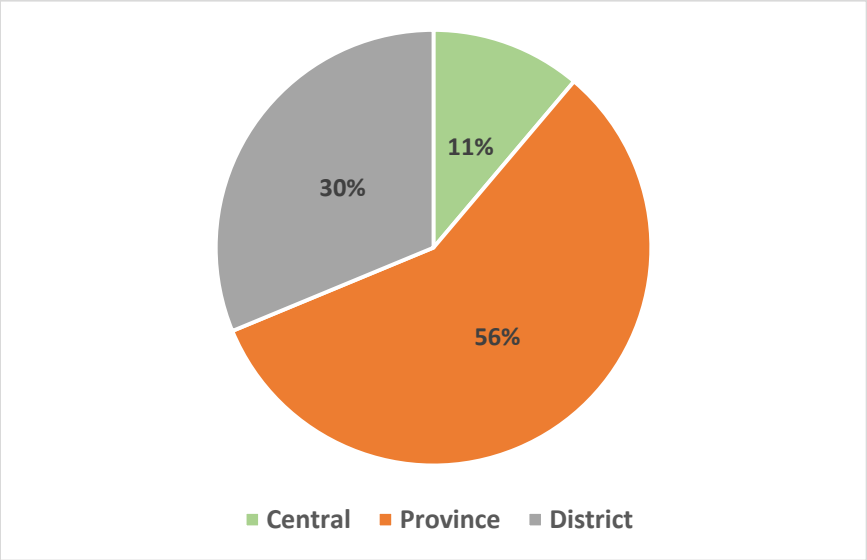
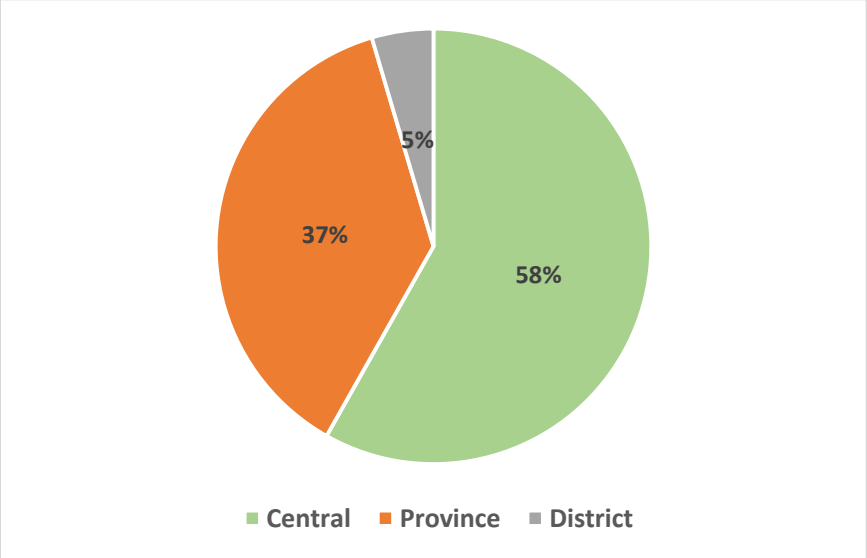


Figure 17. OP Cost by Health Facility Level (Neoplasms Only)



The vast majority of OP visits and cost are at the province or district level, except for neoplasms (which are at the central and province level).

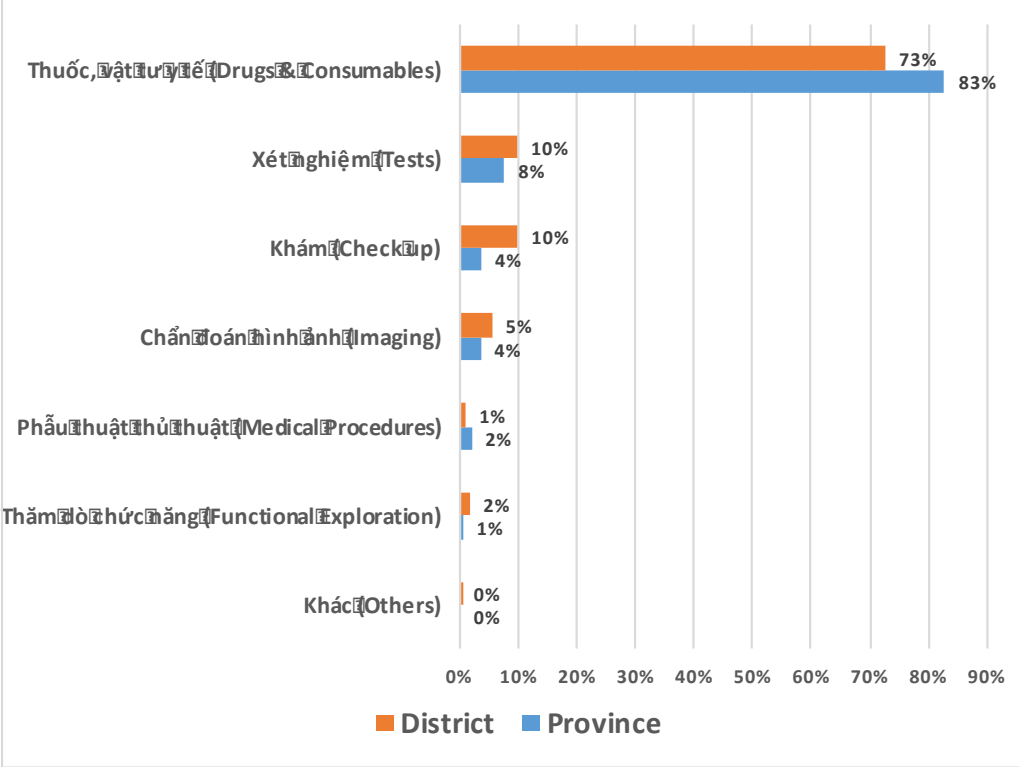
- The vast majority of OP visits and OP cost are either at province or district level – these 2 levels combined represent over 80% of total OP cost

- When we exclude neoplasms, the cost split is 56% at the province level and 30% at the district level. Neoplasms are the reverse, with 58% at the central level and 37% at the province level.
- This indicates that services at the communal level are not a significant part of the overall cost burden for OP services. This also indicates that OP costs at the central level are not significant except for neoplasms.
- The consequence of this for developing a BHSP is that any policy focusing on the cost of OP services will be most effective at the province or district level, given the current cost structure. However, any policy for neoplasms will need to focus largely on services at the central level, as this has the largest cost.

Key Service Groupings

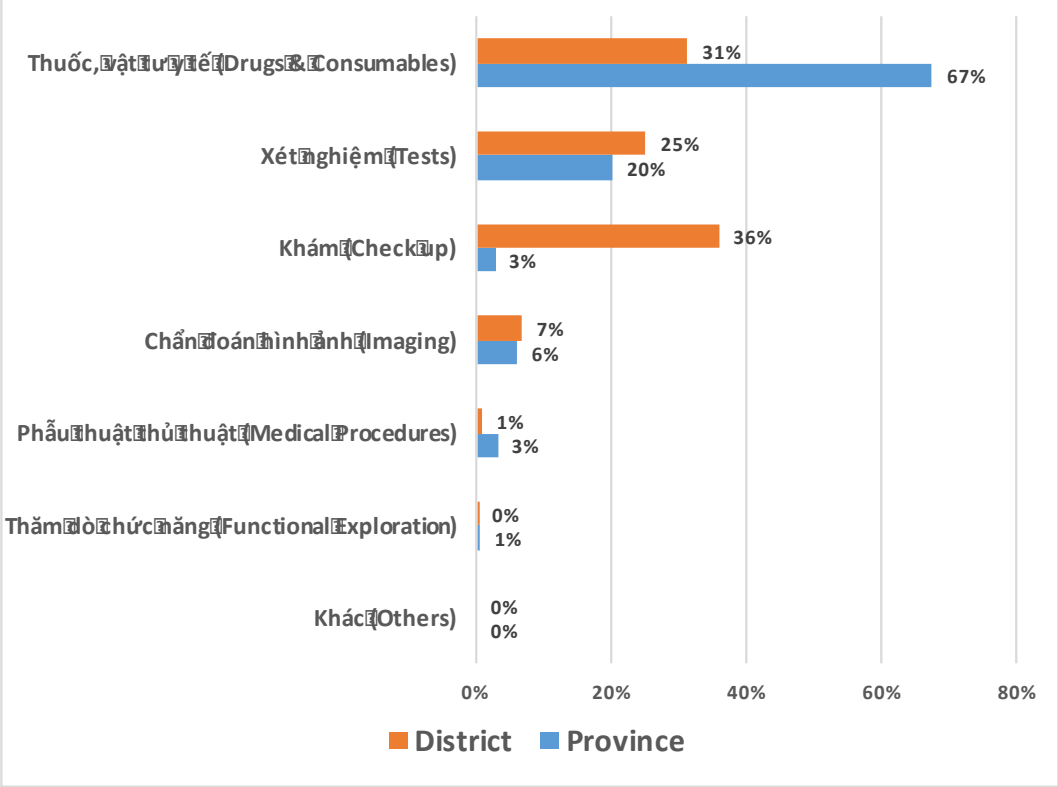
The graph below shows the proportionate split of OP cost according to the service groupings. It compares the proportionate split at the province and district levels for all five ICD categories combined.

Figure 18. OP Cost by Service Grouping by Health Facility Level – Top Five ICD Categories



The graph below shows the proportionate split of OP cost according to the service groupings (consistent with the previous graph) for the ICD category with the ***lowest*** proportion of drugs and consumables at the district level — that is, N00-N99 Genitourinary System.

Figure 19. OP Cost by Service Grouping by Health Facility Level – N00-N99 Genitourinary System



Drugs & Consumables is the dominant service grouping, representing the vast majority of cost (more than 70%) at both the province and district levels and for each of the five ICD categories, with one exception (N00-N99 Genitourinary System).

- Drugs and consumable are the dominant service grouping for all of the top ICDs, at 70-80% of OP cost. However, for certain ICDs, there are some other key service groupings.
- The services used at the province versus district level are broadly comparable except for the categories of Neoplasms (C00-D49) and Genitourinary System (N00-N99). For the other ICD categories, there is generally lower use/cost for drugs at the district level and greater use of other (non-drug) services.
- The consequence of this for developing a BHSP when considering outpatient costs is that drugs and consumables are a critical cost element. However, if we focus only on drugs, then we might miss a more complete picture of the various cost elements of services and treatments. One should also consider tests, check-ups, and imaging. Once we also factor in the illness (or ICD), then we see a more complete picture of the cost elements as they can be related directly to the type of illness and level of care.

Key Medicines Used

I00-I99 Diseases of the Circulatory System

The table below summarizes the number of drugs used for different diseases and the count of drugs that represent 70% of the cost for ICD category I00-I99 Circulatory System.

Table 4. Count of Drugs Used – I00-I99 Circulatory System

I00-I99-Diseases of the circulatory system						
	Count of Drugs Used		Count in top 70% of cost		Proportion	
Disease Type	Province	District	Province	District	Province	District
I10-Essential Hypertension	730	673	57	57	8%	8%
I20-Angina pectoris	348	272	42	23	12%	8%
I21-myocardial infarction	186		17		9%	
I50-Heart failure	514	534	43	47	8%	9%
I63-Cerebral infarction	295		29		10%	
Total	2,073	1,479	188	127	9%	9%
Average	**415**	**493**	**38**	**42**	**9%**	**9%**

We note the following from the above table:

- Fewer than 10% of the total number of drugs used for each illness represents the majority of the cost (70%) for the various diseases. For example, for I10 Essential Hypertension, there are 730 drugs used at the province level in OP treatment, but 57 of these represent 70% of the cost; that is, just 8% of the total number of drugs used.
- We observe a similar picture for the other diseases, within this ICD category and at either the province or district level.

The Top Five ICD Categories

The table below summarizes the average number of drugs used for the top five ICD categories and the count of drugs that represent 70% of the cost.

Table 5. Count of Drugs Used – Top Five ICD Categories

Average Drugs Used - for each ICD Grouping						
	Count of Drugs Used		Count in top 70% of cost		Proportion	
ICD Grouping	Province	District	Province	District	Province	District
I00-I99-Diseases of the circulatory system	415	493	38	42	9%	9%
C00-D49-Neoplasms	191	31	1	6	2%	20%
J00-J99-Diseases of the respiratory system	452	707	29	53	6%	8%
K00-K95-Diseases of the digestive system	267	372	26	24	10%	6%
N00-N99-Diseases of the genitourinary syst	289	232	17	14	6%	6%
Total	1,514	1,835	111	140	7%	8%

On average, 7-8% of the drugs used account for the vast majority of the cost. The consequence of this when developing a BHSP is that focusing on a small subset of drugs will have the most cost-effective impact, as they represent the vast majority of cost.

We note the following from the above table:

- For three of the five ICD categories, more drugs are used at the district level versus the province level.
- Typically, there are similar numbers of drugs at the district and province levels that account for the majority of cost. For example, for K00-K95; 70% of cost is due to just 26 drugs at the province level and 24 drugs at the district level.
- On average, 7-8% of the drugs used account for the vast majority of cost. The consequence of this when developing a BHSP based on cost is that focusing on a small subset of drugs will have the most cost-effective impact, as they represent the vast majority of cost.

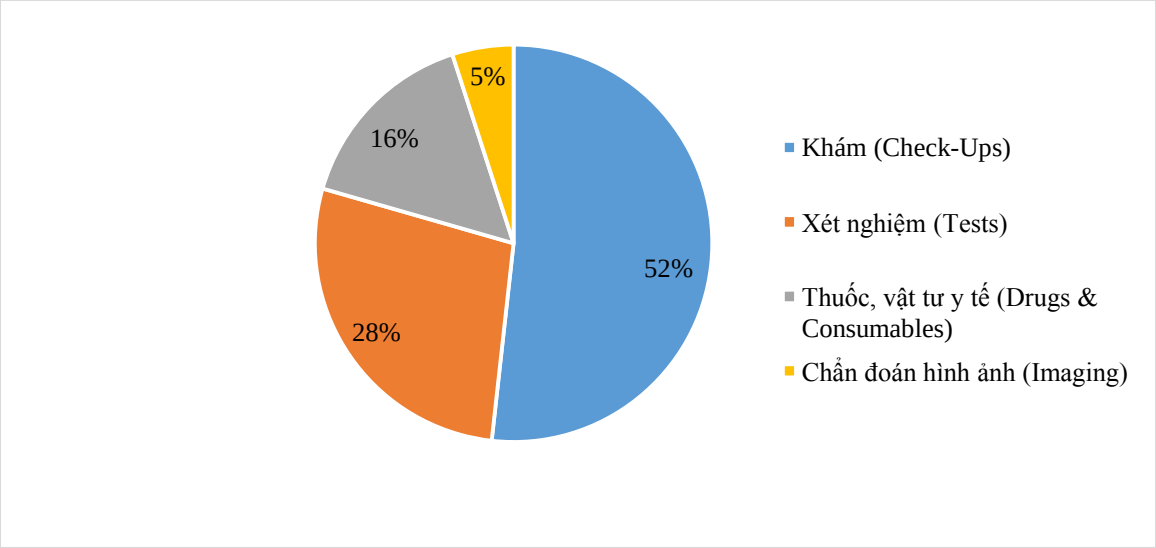
Other Services Used

We highlight below some key findings for two other single diseases for which services are more significant than drugs and consumables: N18 Chronic Kidney Disease and N20 Calculus of Kidney & Ureter. Full details of other services used for all 25 ICDs are provided in the Appendices.

N18 Chronic Kidney Disease

The graph below sets out the proportionate split of OP cost at the district level for Chronic Kidney Disease. We note that drugs and consumables represent just 16% of total cost, whereas check-ups and tests represent the vast majority of cost. As noted earlier, drugs and consumables are very significant for OP services, but there are some diseases (and health levels) where other services are more significant.

Figure 20. OP Cost by Service Grouping (District) – N18 Chronic Kidney Disease



The table below sets out the numbers prescribed and OP cost (at the district level) for check-ups for Chronic Kidney Disease.

Table 6. Top Service Units Used for Check-Ups (District Level, OP) – N18 Chronic Kidney Disease

Service	Count	Total Cost	SHI reimbursed	Cumulative prop of total cost
General Physical Examination	102	918,000	909,450	37%
Examination	57	563,000	563,000	59%
General Clinical Examination-Specialist	37	333,000	332,550	73%
Examination weekdays	30	300,000	300,000	85%
General Examination	19	190,000	190,000	93%
Public Examination	13	117,000	116,100	97%
Specialist	4	36,000	36,000	99%
Medical Examination	3	24,000	24,000	100%
Medical Examination (NQ 39)	1	9,000	9,000	100%

N20 Calculus of Kidney and Ureter

The table below sets out the numbers prescribed and OP cost (at the district level) for tests for Calculus of Kidney & Ureter. Note that in this dataset, there were 108 possible tests performed, and that 14 particular tests represent 70% of the cost for tests.

Table 7.Top Service Units Used for Tests (District Level, OP) – N20 Calculus of Kidney & Ureter

N20-Calculus of kidney and ureter-District OP						
Service Unit	Count	Total Cost	SHI reimbursed (bhyttra)	Average SHI reimbured	SHI share of cost	Cumm prop-bhyttra
10 urine parameters (machine) (PL7-804)	241	8,435,000	7,351,750	30,505	87%	12%
General analysis of peripheral blood cells	234	7,020,000	5,971,500	25,519	85%	23%
General analysis of peripheral blood cells	107	4,280,000	3,862,000	36,093	90%	29%
HBsAg (fast) (insurance payment) (PL7-	82	4,100,000	3,442,500	41,982	84%	35%
Urine 10 Parameters By Machine	106	3,710,000	3,360,000	31,698	91%	41%
Creatine	115	2,760,000	2,497,200	21,715	90%	45%
Ure	115	2,760,000	2,497,200	21,715	90%	49%
Glucose	103	2,472,000	2,242,800	21,775	91%	53%
GPT	120	2,386,000	2,168,000	18,067	91%	57%
GOT	119	2,366,000	2,149,000	18,059	91%	60%
Tryglyceride	76	1,868,000	1,690,900	22,249	91%	63%
Quantification of glucose (44-PL2-268)	97	1,843,000	1,559,900	16,081	85%	66%
Cholesterol	68	1,700,000	1,551,250	22,813	91%	68%
GOT tests (44-PL2-270)	89	1,602,000	1,339,200	15,047	84%	71%
sub-total	1,672	47,302,000	41,683,200	24,930	88%	71%
All Else	979	19,883,000	17,225,300	17,595	87%	29%
Total All	**2,651**	**67,185,000**	**58,908,500**	**22,221**	**88%**	**100%**

Drugs and consumables are a minority of the cost for one category only: N00-N99 Genitourinary System. For this category, check-ups and tests are significant service groupings, usually at the district level only.

- The services used at the province versus district level are broadly comparable except for C00-D49 Neoplasms and N00-N99 Genitourinary System. For the other ICD categories, there is generally lower use/cost for drugs at the district level and greater use of other (non-drug) services.

- When considering outpatient costs, drugs and consumables are a critical cost element; however, we should also consider tests, check-ups, and imaging. Once we factor in the illness (or ICD), then we see a more complete picture of the cost elements and they can be related directly to the type of illness and level of care.

- The consequence of this for BHSP is that if we focus only on drugs, then we might miss a more complete picture of the various cost elements of services and treatments.

Inpatient Services

In this section we set out the analysis on the inpatient services used to treat the top 25 ICD codes in terms of cost and any implications for the development of the BHSP.

Health Facility Usage

IP Admission Count

The graphs below show the IP admission count split by level of health facility — for all excluding neoplasms, and for neoplasms only.

Figure 21. IP Admission Count by Health Facility Level (Excluding Neoplasms)

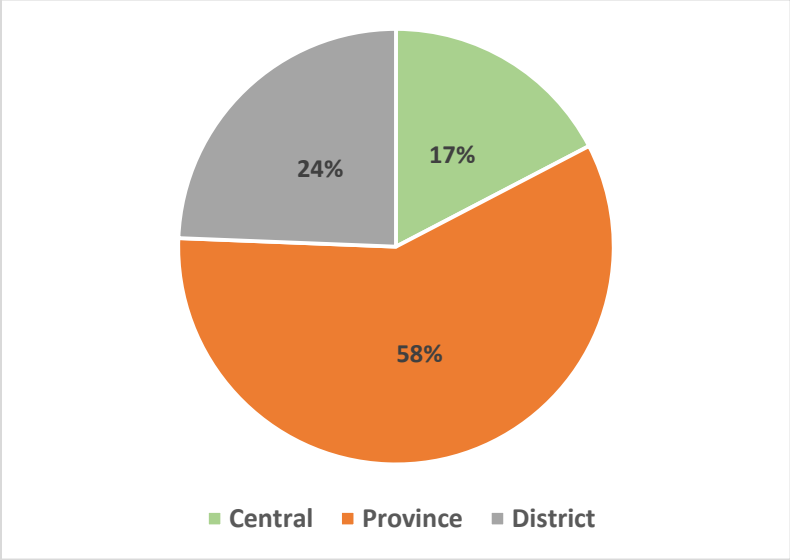
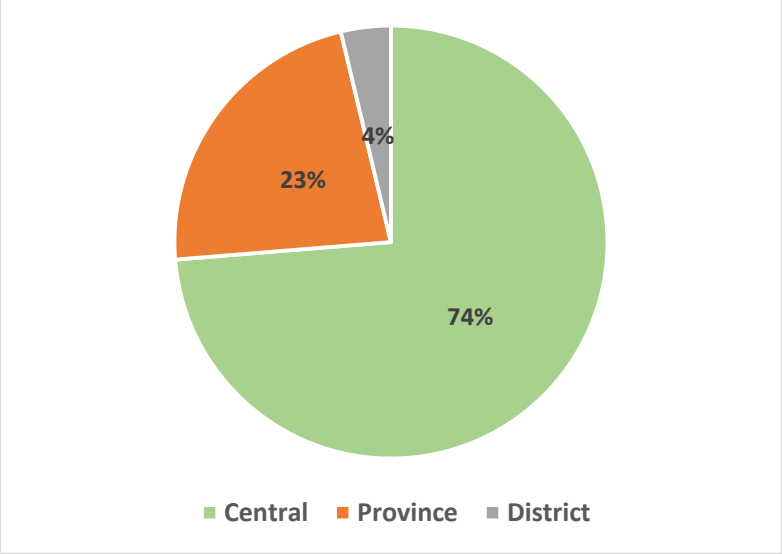


Figure 22. IP Admission Count by Health Facility Level (Neoplasms Only)



IP Cost

The graphs below show the IP cost split by level of health facility — for all excluding neoplasms, and for neoplasms only.

Figure 23. Split of IP Cost by Health Facility Level (Excluding Neoplasms)

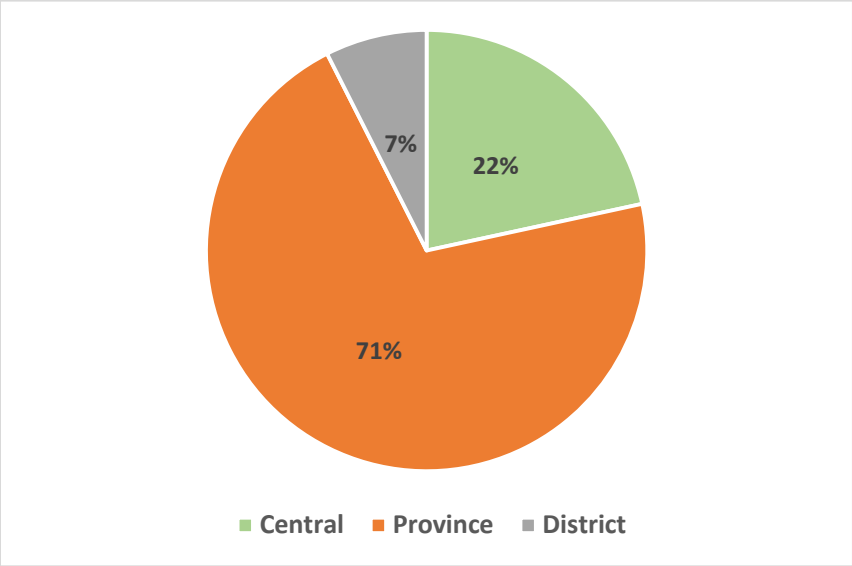
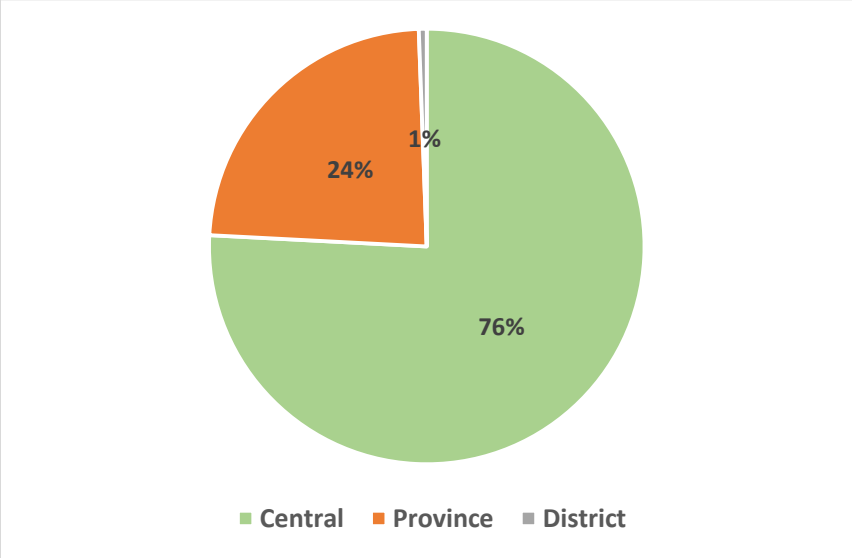


Figure 24. IP Cost by Health Facility Level (Neoplasms Only)



The vast majority of IP admissions and cost are at the province level (71% of cost), except for neoplasms (which are predominately at the central level; 76% of cost). The two levels central and province combined represent 95% of total IP cost.

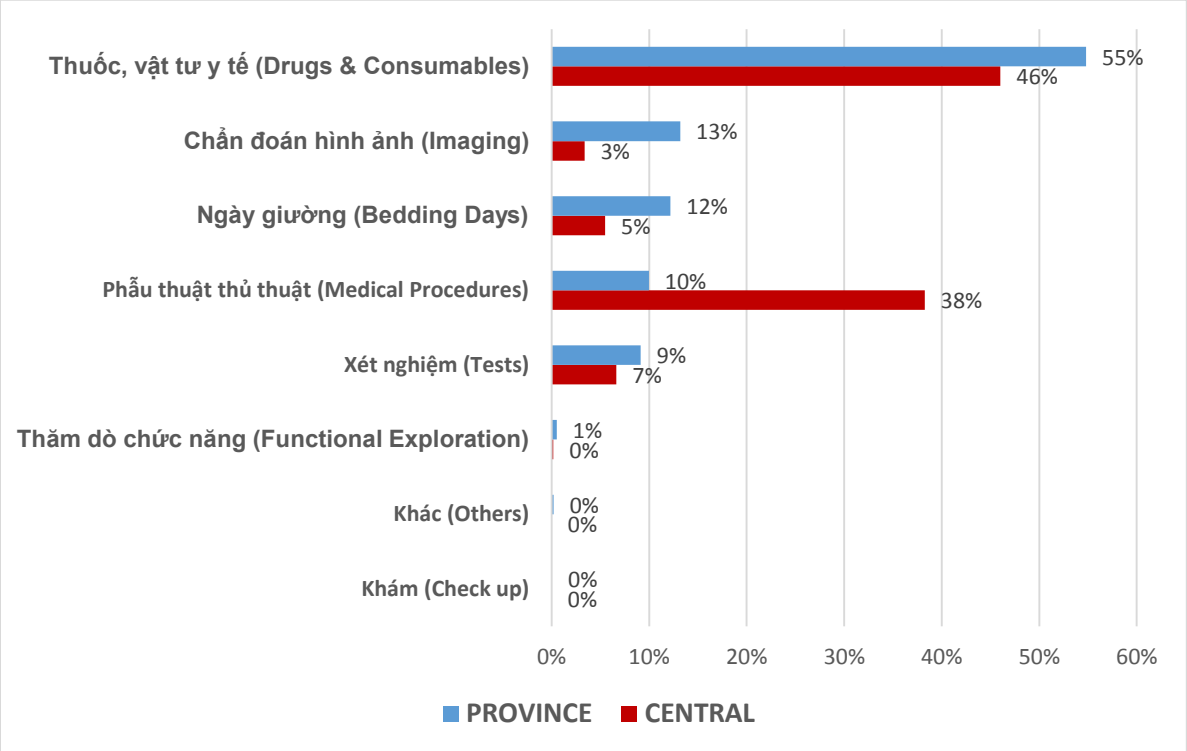
- The vast majority of IP admissions and IP cost are either at the central or province level — these two levels combined represent 95% of total IP cost.

- When neoplasms are excluded, the cost split is 71% at the province level and 22% at the central level. Neoplasms are the reverse, with 76% at the central and 24% at the province level.
- This indicates that services at the district level are not a significant part of the overall cost burden for IP services. The consequence for developing a BHSP is that any policy focusing on the cost of IP services will be most effective at the central or province level, given the current cost structure. However, any policy for neoplasms will need to focus largely on services at the central level, as this has the largest cost burden (while the costs of other services are primarily at the province level).

Key Service Groupings

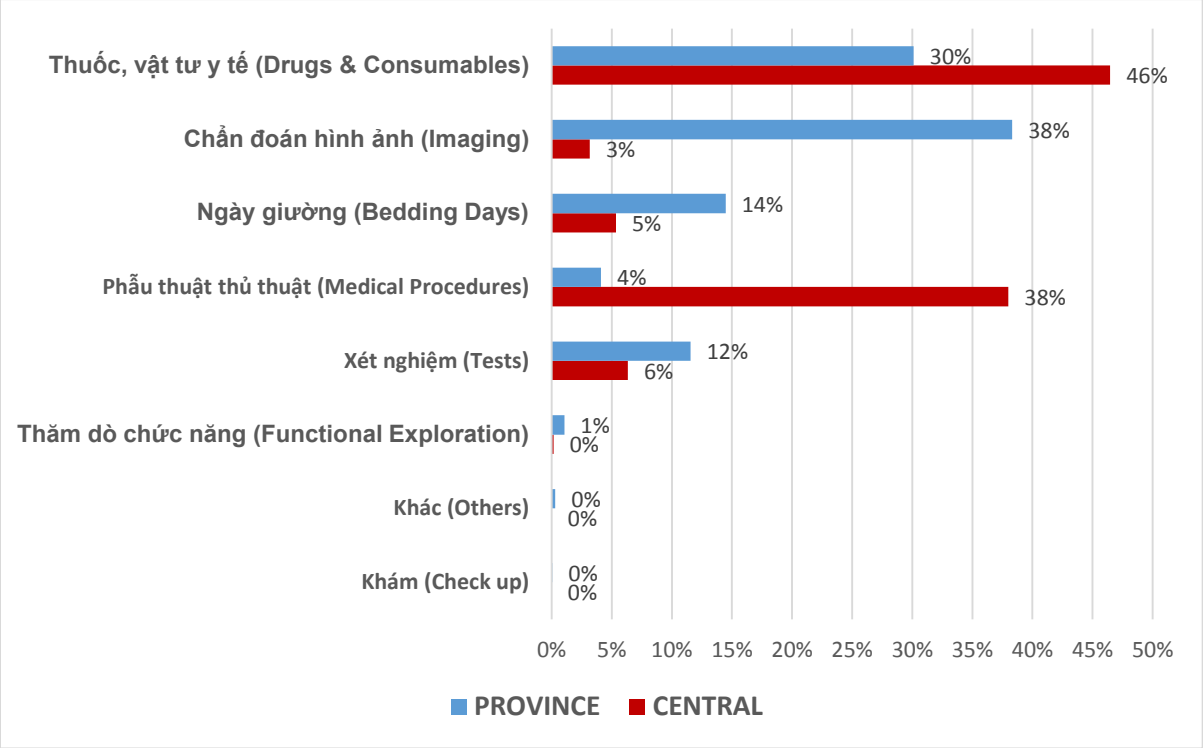
The graph below shows the proportionate split of IP cost according to the service groupings. It compares the proportionate split at the central and province levels, for all five ICD categories combined.

Figure 25. IP Cost by Service Grouping by Health Facility Level – Top Five ICD Categories



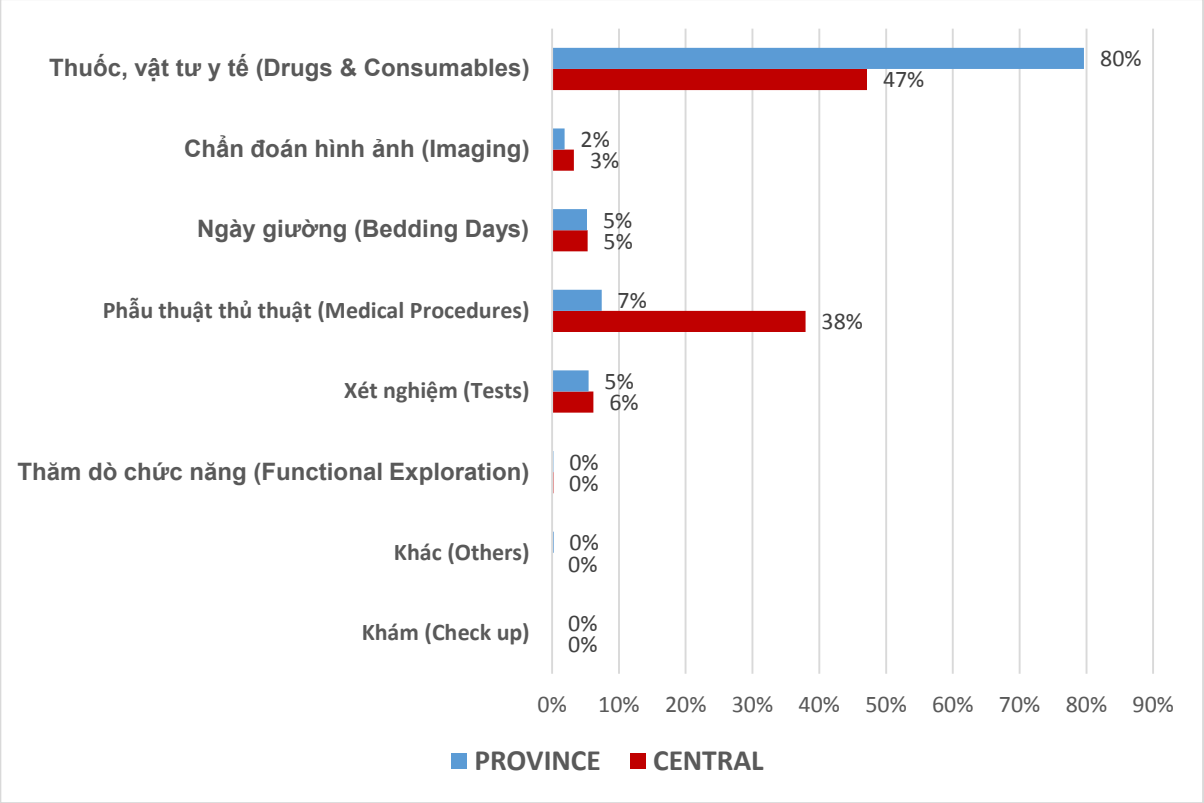
The graph below shows the proportionate split of IP cost according to the service groupings (consistent with the previous graph) for the ICD category with the ***lowest*** proportion of drugs and consumables at the province level — that is, I00-I99 Circulatory System.

Figure 26. IP Cost by Service Grouping by Health Facility Level – I00-I99 Circulatory System



The graph below shows the proportionate split of IP cost according to the service groupings (consistent with the previous graph) for the ICD category with the ***highest*** proportion of drugs and consumables at the province level — that is, N00-N99 Genitourinary System.

Figure 27. IP Cost by Service Grouping by Health Facility Level – N00-N99 Genitourinary System



Drugs and consumables are significant at both levels of health facility, at approximately half of total cost. For the other service costs at the central level, medical procedures are the most significant; at the province level, the other costs are more evenly spread across the other service groupings.

- At the central level (Cho-Ray hospital sample), there are two main service groupings — Medical Procedures and Drugs & Consumables — that represent the vast majority (95%) of IP cost. There are just two exceptions (J20 Acute Bronchitis and N39 Disorders of the Urinary System), but all other ICDs have approximately the same split of cost between these two service groupings.

- At the province level, drugs and consumables are almost half of the cost, but the other costs are more evenly split across the other service groupings. Looking at the different ICD categories gives a different picture, with some significant differences in the split of cost by the various service groupings (e.g., I00-I99 Circulatory System vs. N00-N99 Genitourinary System).

- A different picture is seen when comparing the province level with the central, in aggregate, for the same ICD category. This could indicate differences in treatment

practices and/or servicing at the two levels, differences in the nature of diseases presenting at the two levels, and/or differences in data quality especially at the central level.

- The consequence of this in developing a BHSP is that any policy focusing on cost of IP services at the central level will be most effective if focused on drugs and consumables and on medical procedures, as they represent the vast majority of cost. However, at the province level, the simplest approach would be to focus solely on drugs and consumables, as they account for half the cost (or more) across the different ICD categories.

Key Medicines Used

We highlight below some key findings on the key medicines (Drugs & Consumables) for two single diseases. Full details of medicines used for all 25 ICDs are provided in the Appendices.

C50 Breast Cancer

The table below sets out the numbers prescribed and IP cost (at the province level) for the top 10 drugs for Breast Cancer. (Note that the top 10 drugs represent approximately 70% of the cost.) This is to illustrate the relative significance of certain drugs. In the table, we highlight examples of two drugs that are low in frequency but high in average cost (peg-grafeel, chemodox) and two drugs that are high in frequency but low in average cost (glutaone, farmorubicina).

Table 8. Top Drugs Used (Province Level, IP) – C50 Breast Cancer

C50-Breast Cancer						
Service Unit	**Count**	**Total Cost**	**SHI reimbursed (bhyttra)**	**Average SHI reimbured**	**SHI share of cost**	**Cumm prop-bhyttra**
anzatax	181	514,710,000	443,079,000	2,447,950	86%	12%
navelbine	186	322,884,314	306,084,446	1,645,615	95%	21%
peg-grafeel	57	311,220,000	275,184,000	4,827,789	88%	28%
chemodox 2mg/ml,10ml(doxorubicin)	57	285,000,000	263,250,000	4,618,421	92%	36%
canpaxel	211	285,264,000	254,404,500	1,205,709	89%	43%
glutaone	5,496	272,836,200	236,834,614	43,092	87%	49%
farmorubicina	618	281,452,800	236,207,850	382,213	84%	56%
xorunwell-l	69	248,818,500	218,565,112	3,167,610	88%	62%
bestdocel	90	206,640,000	173,577,600	1,928,640	84%	66%
zoletalis	61	156,922,500	137,114,250	2,247,775	87%	70%
sub-total	**[illegible]7,026**	**[illegible]2,885,748,314**	**[illegible]2,544,301,372**	**[illegible]362,127**	**88%**	**70%**
All Else	**[illegible]**289,745	**[illegible]**1,223,208,409	**[illegible]**1,076,755,712	**[illegible]**3,716	88%	30%
Total All	**[illegible]296,771**	**[illegible]4,108,956,723**	**[illegible]3,621,057,084**	**[illegible]12,202**	**88%**	**100%**

N18 Chronic Kidney Disease

The table below sets out the numbers prescribed and IP cost (at the province level) for the top 10 drugs for Chronic Kidney Disease. (Note that the top 10 drugs represent approximately 81% of the cost.) This is to illustrate the relative significance of certain drugs. In the table, we highlight examples of one drug that is high in frequency and high in average cost (thận nhân tạo chu kỳ) and two drugs that are high in frequency but low in average cost (adalat la, uruso).

Table 9. Top Drugs Used (Province Level, IP) – N18 Chronic Kidney Disease

N18-Chronic Kidney Disease						
Service Unit	**Count**	**Total Cost**	**SHI reimbursed (bhyttra)**	**Average SHI reimbured**	**SHI share of cost**	**Cumm prop-bhyttra**
Artificial kidney cycles 1 cord blood filter	46,725	20,925,658,000	19,358,637,800	414,310	93%	61%
heberitro	[illegible]6,937	[illegible]1,266,078,807	[illegible]1,159,036,096	[illegible]67,080	92%	65%
tobaject	[illegible]7,657	[illegible]1,183,465,920	[illegible]1,080,536,688	[illegible]41,117	91%	68%
nanokine 2000ui	[illegible]7,510	[illegible]1,568,285,928	[illegible]1,460,642,574	[illegible]94,493	93%	73%
adalat la	[illegible]70,366	[illegible]865,230,650	[illegible]607,653,955	[illegible]8,636	91%	75%
eriprove 2000i.u. (erythropoietin)	[illegible]3,537	[illegible]614,610,342	[illegible]549,031,054	[illegible]55,225	89%	77%
uruso	[illegible]59,601	[illegible]578,774,300	[illegible]533,724,965	[illegible]8,955	92%	78%
mirafo 4000ui	[illegible]1,099	[illegible]347,376,856	[illegible]313,734,134	[illegible]285,472	90%	79%
kidmin 200ml (acid amin hướng thận)	[illegible]2,861	[illegible]336,217,000	[illegible]303,088,750	[illegible]105,938	90%	80%
epocassa 2000iu/ml (erythropoietin)	[illegible]1,896	[illegible]326,112,000	[illegible]293,088,000	[illegible]154,582	90%	81%
sub-total	**[illegible]208,189**	**27,811,809,803**	**25,659,174,016**	**[illegible]123,249**	**92%**	**81%**
All Else	18,986,775	[illegible]6,889,047,120	[illegible]5,958,575,741	[illegible]314	86%	19%
Total All	**19,194,964**	**34,700,856,923**	**31,617,749,756**	**[illegible]1,647**	**91%**	**100%**

There are some specific single diseases for which the vast majority of IP cost (more than 75%) is for drugs and consumables, namely neoplasms and diseases of the genitourinary system. For these, typically a small number of drugs represent the majority of the cost (for drugs and consumables), either high-cost drugs or very high volume drugs.

- For C50 Breast Cancer, drugs and consumables are 72% of IP cost at the province level. Ten types of drugs (out of 528) account for 70% of the cost — these are relatively high-cost drugs, except for two that are high-volume drugs.

- N18 Chronic Kidney Disease (CKD) is almost 70% of IP cost for Genitourinary System (N00-N99). For CKD, drugs and consumables are more than 90% of the total cost. One single drug type with high average cost accounts for more than 60% of the cost; eight other drugs account for another 20% of cost — so nine drugs represent 80% of the total cost.

- The consequence of this in developing a BHSP is that any policy focusing on cost of drugs and consumables could target a small number of specific drugs that are high-cost or high-volume, and this could have a significant impact on total cost.

- Another consequence is that one could also possibly simplify the list of allowable drugs (for reimbursement), depending on clinical efficacy, with limited impact on cost. Such a

process could simplify the recording and administration, when working off a shorter, simpler list of drugs reimbursable under SHI.

Other Services Used

We highlight below some key findings on the other types of services (besides drugs and consumables) for two single diseases: K35 Acute Appendicitis and I20 Angina. Full details of other services used for all 25 ICDs are provided in the Appendices.

K35 Acute Appendicitis

The table below sets out the numbers prescribed and IP cost (at the province level) for the top 10 medical procedures for Acute Appendicitis. This is to illustrate the relative significance of certain medical procedures. For K35, 61% of IP cost is for medical procedures — primarily appendectomies, with an average cost of approximately VND 1.9mn.

Table 10. Top Service Units Used for Medical Procedures (Province Level, IP) – K35 Acute Appendicitis

K35-Acute Appendicitus						
Service Unit	**Count**	**Total Cost**	**SHI reimbursed (bhyttra)**	**Average SHI reimbured**	**SHI share of cost**	**Cumm prop-bhyttra**
Laparoscopic appendectomy through socialization (i)	1,532	4,620,000,000	2,426,100,000	1,583,616	53%	33%
laparoscopic appendectomy	1,221	3,044,063,500	2,538,881,450	2,080,198	83%	67%
Laparoscopic surgery appendectomy inflammation	815	2,291,780,000	1,981,194,600	2,430,914	86%	94%
laparoscopic appendectomy (i)	44	132,000,000	86,400,000	1,963,636	65%	95%
appendectomy in normal position	29	52,200,000	29,610,000	1,021,034	57%	96%
Surgical treatment of intestinal obstruction due to adhesions (i)	10	32,000,000	19,040,000	1,904,000	60%	96%
surgical appendectomy peritonitis	16	28,800,000	19,620,000	1,226,250	68%	96%
(Cu) laparoscopic appendectomy socialization (i)	16	27,200,000	11,560,000	722,500	43%	96%
peritonitis surgical appendectomy	14	20,057,000	17,835,000	1,273,929	89%	97%
mechanical ventilation (01 days of treatment)	36	14,560,000	13,811,000	383,639	95%	97%
sub-total	**3,733**	**10,262,660,500**	**7,144,052,050**	**1,914,013**	**70%**	**97%**
All Else	2,247	286,729,465	226,687,143	100,880	79%	3%
Total All	**5,980**	**10,549,389,965**	**7,370,739,193**	**1,232,648**	**70%**	**100%**

I20 Angina

The table below sets out the numbers prescribed and IP cost (at the province level) for the top 10 imaging services for Angina. For I20, imaging represents 87% of IP cost — primarily for one critical intervention ("chụp và can thiệp tim mạch"), which represents 75% of imaging costs, with an average cost of VND 44mn.

Table 11. Top Service Units Used for Imaging (Province Level, IP) – I20 Angina

I20-Angina						
Service Unit	**Count**	**Total Cost**	**SHI reimbursed (bhyttra)**	**Average SHI reimbured**	**SHI share of cost**	**Cumm prop-bhyttra**
capture and interventional cardiology (heart valves, congenital heart diseases, coronary artery	211	12,409,517,000	9,308,417,500	44,115,723	75%	96%
coronary angiography by dsa	[illegible]70	[illegible]280,000,000	[illegible]236,400,000	[illegible]8,377,143	84%	98%
(Cu) capture and interventional cardiology heart valves, congenital heart arteries v	[illegible]1	[illegible]107,600,000	[illegible]46,000,000	46,000,000	43%	99%
color doppler ultrasound cardiac / vascular	[illegible]394	[illegible]2,796,000	[illegible]1,647,200	[illegible]105,704	79%	99%
sub-total	**[illegible]676**	**12,849,913,000**	**[illegible]9,632,464,700**	**14,249,208**	**75%**	**99%**
All Else	[illegible]1,981	[illegible]237,157,700	[illegible]96,688,850	[illegible]48,808	41%	1%
Total All	**[illegible]2,657**	**13,087,070,700**	**[illegible]9,729,153,550**	**[illegible]8,661,706**	**74%**	**100%**

For certain specific diseases, a service grouping other than Drugs & Consumables is the most significant cost. When significant, the service is usually a high-cost activity, such as surgery or the use of expensive technology (e.g., appendectomy for Acute Appendicitis, imaging for Angina).

- For Acute Appendicitis (K35) 61% of IP cost is for medical procedures. These are primarily appendectomies, with an average cost of VND 2mn.
- For Angina (I20), imaging represents 87% of cost. This is primarily one intervention ("chụp và can thiệp tim mạch").
- The consequence of this in developing a BHSP is that any focus purely on drugs and consumables, though impactful in aggregate, will miss some of the major costly service items for specific illnesses. For certain conditions, it is not drugs that are the most significant but another type of service. One could possibly target some of the high-cost services (besides drugs), taking into account the illness each relates to. This would then have the most cost-effective impact.

Risks and Limitations

There are some key risks and limitations associated with the above analysis.

Data Related

- The data collection was intended to be as representative as possible for one significant province per region, for a single year (i.e., 2014). However, there could be significant differences across other provinces within the regions and also at the different levels of health facility. The possible impact of this is that actual outcomes and costs across the region/country could possibly be significantly different from those in the six sample provinces.

Methodology Related

- The methodology focused primarily on SHI cost burden at different levels of the health system. This is one picture of the burden of disease, and there are other factors to consider in disease burden such as impact on quality of life and capacity to work. This analysis is based solely on the SHI cost burden, and so it relates to the SHI insured population and not the full population of Vietnam.

Policy Environment

- This analysis is based on 2014 data, and so incorporates the policy environment in place at that time. As such, in developing future policy and estimating cost impacts of future policy decisions, one should take into account any major changes to policy made since 2014 and any planned in the immediate short term.

Behavioral Aspects

- One critical driver of costs in health systems is the behavioural aspect of different stakeholders, such as insured members, clinicians and treatment staff, and health facility management. When developing policy and in costing the impact of policy change, one should always consider how these behaviours might change. The analysis in this report is based on behaviours ***implicit*** in the dataset in 2014.

Annexes

Annex 1. Technical Appendices

Listed below are the Technical Appendices supporting this analysis.

A. Data
B. Methodology
C. Summary Statistics
    1. Top Five ICD Categories
    2. Top 25 Single ICD Codes
    3. Inpatient Statistics
    4. Outpatient Statistics
D. Service Usage (I00-I99 Category)
    1. I10 Essential Hypertension
    2. I20 Angina Pectoris
    3. I21 Acute Myocardial Infarction
    4. I50 Heart Failure
    5. I63 Cerebral Infarction
E. Service Usage (C00-D49 Category)
    1. C16 Stomach Cancer
    2. C18 Colon Cancer
    3. C20 Rectum Cancer
    4. C34 Bronchus & Lung Cancer
    5. C50 Breast Cancer
F. Service Usage (J00-J99 Category)
    1. J15 Bacterial Pneumonia
    2. J18 Pneumonia Unspecified
    3. J20 Acute Bronchitis
    4. J44 Other Chronic Obstructive Pulmonary Disease
    5. J96 Respiratory Failure
G. Service Usage (K00-K95 Category)

1. K29 Gastritis and Duodenitis
2. K35 Acute Appendicitis
3. K74 Fibrosis and Cirrhosis of Liver
4. K80 Cholelithiasis
5. K92 Other Diseases of Digestive System

H. Service Usage (N00-N99 Category)

1. N04 Nephrotic Syndrome
2. N18 Chronic Kidney Disease
3. N20 Calculus of Kidney and Ureter
4. N39 Other Disorders of Urinary System
5. N40 Enlarged Prostate