Role of User Benefit Awareness in Health Coverage Utilization among the Poor in Cambodia

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ABSTRACT

The objective of this study was to understand the steps to health coverage benefit utilization in Cambodia toward improving access to health care and financial risk protection for the poor. We particularly examine the role of user awareness in the pathway to care seeking and benefit utilization with respect to the Health Equity Funds (HEF). Using 2016 survey data that were nationally representative of households with children under two years of age, we used a series of logistic regression models to evaluate associations between respondents’ awareness of benefits, public health care seeking behaviors, coverage benefit claims, and out-of-pocket expenditures. Beneficiaries were generally aware of their entitlements, although their awareness of specific benefits, such as transport reimbursement, was relatively lower. Awareness of free services at public health centers was associated with twice the odds of having ever visited a public provider for outpatient care, while awareness of free services at public hospitals was associated with higher odds of always seeking inpatient care in the public sector. Study findings point to the decision of where to seek care as the critical point in the pathway to HEF utilization. If the decision had already been made to go to a public provider, it was likely that HEF benefits were claimed. Interventions that prompt appropriate care seeking in the public sector may do the most to improve HEF utilization and subsequently improve access to care through sufficient financial risk protection.

Introduction

Although many low- and middle-income countries (LMICs) have adopted social health protection schemes to increase access to health care services and improve financial risk protection for vulnerable populations, their utilization rates of covered services often remain low and out-of-pocket (OOP) spending high. This gap between policy adoption and realization of desired outcomes puts countries’ progress toward achieving universal health coverage (UHC) at risk.

We examine one potential reason for the low utilization of covered benefits and the high OOP spending among beneficiaries of social health protection schemes: their limited awareness of the scheme’s benefits. Empirical evidence from high-income settings indicates that low awareness, knowledge, and understanding of health protection schemes can hinder eligible populations from enrolling and effectively using their coverage. For example, research on the 2010 U.S. health care reform indicates that fewer than half of eligible adults were aware that they could enroll in health insurance, and that those with the lowest awareness of the reform were the least likely to apply for coverage, but also those who might use coverage most heavily.1,2 Similarly, knowledge and understanding of a scheme’s benefits have been associated with increased interest in using these benefits, as well as increased satisfaction with the care received.3,4

In LMICs, uptake of insurance schemes is often high, while the use of benefits tends to be low, possibly because of low awareness of specific benefits. In Cambodia, nearly 80% of the eligible population is enrolled in the country’s Health Equity Funds (HEF), a comprehensive eligibility-based scheme offering free health services at public facilities for the poor. However, many low-income households continue to use private sector facilities for services that are covered by the scheme.5–10

While over 95% of Cambodian household members who reported an illness or injury in the past 30 days sought care, only 22% sought care in the public sector and 67% sought care from private providers in 2014.11
Background on the Health Equity Funds in Cambodia

HEF, established in the early 2000s, remains Cambodia’s foremost health financing effort aimed at providing financial risk protection for the poor.\textsuperscript{5,6} HEF is a funding pool financed by the Cambodian government and development partners that subsidizes user fee exemptions, hospitalization costs, transport costs, and other expenditures related to health and care seeking. Implicit in the user fee reimbursement to health providers, HEF provides coverage for a standard package of health care services that includes diagnosis, treatment, prevention, health promotion, and rehabilitation at public sector health centers and referral hospitals.\textsuperscript{5} Public sector health facilities are directly reimbursed by HEF on a case-based output payment system with payments made directly to facilities at the end of each month based on electronically documented utilization by HEF beneficiaries.\textsuperscript{12}

Beneficiaries are either pre-identified at home (prior to seeking care) by the IDPoor survey, a household survey implemented nationally on a regular basis, or by a post-identification process carried out at health facilities.\textsuperscript{13} Upon identification, individuals receive a card indicating their entitlement to HEF benefits as well as a unique national health identification number. Either the card or number associated with their health records can be used to access their benefits. HEF covered 75–80\% of its target population in 2013 and is operated at the district level with administrative support at the national level.\textsuperscript{5–7} In 2012, the total cost of HEF implementation was 9.5 million USD with an average cost of 8.40 USD per visit to health facilities.\textsuperscript{5} Average medical costs were 29.32 USD per inpatient case and 1.94 USD per outpatient case.

Impact evaluations suggest that HEF improved access to health services for the poor, reduced households’ OOP health spending by 29\% and household-related debt by 25\%, and increased public health facility utilization.\textsuperscript{5,6,14–18} Despite these successes, only between 16\% and 25\% of HEF beneficiaries visiting public health facilities claimed HEF benefits.\textsuperscript{12} A substantial proportion of HEF beneficiaries still seek care from private providers, incurring considerable OOP expenses as a result.\textsuperscript{6,8–10}

Limited awareness of HEF entitlements and benefits may be a non-financial factor affecting uptake of maternal and child health services at public facilities.\textsuperscript{13} Evidence from Colombia suggests an "awareness effect" of insurance coverage, in which having explicitly defined benefits and a physical membership card encourages greater utilization of formal health services.\textsuperscript{19,20} Indeed, having a HEF scheme card increased the likelihood of an eligible household seeking care at a public facility by 34\%.\textsuperscript{5} Thus, greater awareness of specific benefits could increase the use of health protection schemes among the eligible population, and in this way contribute to effective coverage.

Health insurance coverage is often conceptualized as an enabling factor in health care utilization, and knowledge of coverage is viewed as contributing to changes in care seeking behavior to increase the likelihood of service use and/or decrease delays in care seeking.\textsuperscript{21} In the case of HEF, awareness may mediate beneficiary decisions at a number of points at which beneficiaries must make decisions along the pathway to using health care and HEF utilization. Awareness of HEF benefits may influence the initial decision to seek care, choice of provider (i.e., public or private), and whether to claim HEF benefits at the health facility. Understanding whether use of the HEF card translates to sufficient financial risk protection by eliminating OOP expenditures remains another step toward realizing effective coverage. However, the relationships surrounding user awareness of HEF benefits and their utilization in Cambodia remain unclear.

Study Objective and Contributions

The objective of this study was to understand the steps to health coverage benefit utilization in the Cambodian setting as a first step to identifying viable next steps to improving access to health care and financial risk protection for the poor in the country. We first propose an analytical framework describing the steps to HEF utilization that user awareness may influence. We then describe the state of user awareness surrounding HEF benefits in Cambodia and empirically examine associations between awareness of health coverage benefits and outcomes with respect to the framework (e.g., care seeking behaviors, benefit claims, and OOP expenditures) with a series of logistic regressions. “Awareness” in this study was defined as knowledge of specific benefits provided under the HEF scheme.

This study makes three main contributions. First, we provide a comprehensive profile of beneficiaries of a large-scale health protection scheme in an LMIC setting using nationally representative data. Second, we examine awareness of specific components of coverage to characterize the role of awareness of each step along the pathway to benefit utilization. Third, we highlight potential policy interventions to consider as next steps toward improving beneficiaries’ effective use of health coverage.
Due to the various pathways by which individuals may become aware of HEF benefits, we were not able to establish causal relationships in this study. However, analyses reveal key relationships suggestive of potential directions for more effective HEF policy. Our findings indicate that HEF beneficiary households are generally aware of their entitlements to receive free services under the scheme, yet many continue to seek care from private providers for outpatient services and, as a result, do not claim HEF benefits. Awareness of additional benefits reimbursing expenses for transportation and caregivers is more variable. Awareness of financial coverage for hospital services is related to reduced utilization of outpatient care and is consistent with patient bypassing of lower level services. Increases in awareness of entitlements may lead to more claims under HEF, though may not be as effective as other interventions focused on encouraging health services utilization in the public sector. Therefore, interventions targeting HEF beneficiaries before they decide where to seek care may be most effective in increasing utilization of public facilities and subsequently utilization of HEF.

**Materials and Methods**

**Data Sources**

This study used nationally representative data collected in 2016 as part of the impact evaluation of the Health Equity and Quality Improvement Project (H-EQIP) in Cambodia. The primary objective of H-EQIP was to improve the quality of health care services and financial protection for vulnerable groups. However, the project’s intervention was unrelated to the questions posed by this analysis. Evaluation activities included a household survey capturing information on household composition, sociodemographic characteristics, health status, health care utilization and expenditures, social health protection status and utilization, and health outcomes. The evaluation implemented a multistage stratified sampling design based on randomization at the district level. This analysis used the baseline data collected for the evaluation.

Selection into the study was randomized within provinces and strata. Strata were defined by the average score of district facilities, determined by a quality assessment. Facilities within districts were randomly selected within strata based on quality scores and villages were randomly selected, stratified by distance to the facility. Households within villages were randomly selected, stratified by HEF status. HEF status is awarded at the household level.

Seventy of the country’s 100 operational districts (ODs), which included 2,506 households (HEF and non-HEF) and 12,344 individuals across 140 villages, were surveyed. The sample was comprised of approximately 20 households per facility catchment area, with a target of ten HEF households and ten non-HEF households. This study only analyzed data collected from HEF households.

Households were eligible for the survey if at least one household member was a woman between 15 and 49 years of age that had had at least one pregnancy event in the 24 months prior to the survey. Note that this describes only the eligibility of a household to be included in the survey and does not restrict the illness and injuries reported in the survey to those related to maternal and child health. The household survey collected information on all those living in a household, not only mothers and children. Thus, this analysis was conducted at the individual level. A detailed description of the sampling strategy has been previously published.

Survey questions on awareness of HEF benefits were asked to the heads of HEF beneficiary households. Since health decisions and the HEF card is typically managed by a single head of household, answers were assumed to be relevant to all individuals in a single household (see Appendix). Questions inquired into respondents’ awareness of financial coverage for services at public health centers and hospitals, maternal delivery and medicines at public facilities, transport costs for delivery and hospitalization, money for caregiver meals, and the possibility to use the HEF card outside of their district of residency.

**Outcomes of Interest**

Based on our analytical framework and the data available, we assessed the relationship between user benefit awareness and four outcomes: (1) choice to seek care, (2) public sector health care utilization, (3) patients’ claims or utilization of HEF benefits, and (4) whether OOP payments were made for health services. Care seeking behavior was defined as respondents having reported going to any health facility, health personnel, or traditional healer upon illness or injury. Formal health care utilization in the public sector was specified as respondents’ reporting having sought treatment from a public health care provider (e.g., national hospital, provincial hospital, referral hospital, health center, or health post) for an illness or injury in the past 12 months. Private providers included private pharmacies, drug sellers, traditional healers, religious leaders, and traditional birth attendants.
Utilization of benefits was determined by respondents’ having reported “ever” or “always” using a card to receive free health care services. The distinction between “ever” and “always” claiming HEF benefits was maintained in analyses since always claiming benefits could point to differences in behavior, habits, or decision making and allow us to possibly discern more information about these types of users.

Respondents were asked whether they had paid OOP expenditures for an illness or injury in the past two weeks. Due to limited reporting of precise amounts paid, OOP expenditures were considered as a dichotomous outcome, i.e., whether an individual had paid any amount out-of-pocket. OOP expenditures could include official provider fees, laboratory and x-ray fees, unofficial fees, transportation, medicine, and other reported expenditures.

**Steps to HEF Benefit Utilization**

Our analytical framework outlined a cascade of decision points at which individuals or households would make choices in their care seeking behavior. Upon the onset of illness or an injury, these steps included: (i) whether to seek formal care, (ii) whether to do so from a public provider, and (iii) if from a public provider, whether to claim entitlements under their HEF coverage (Figure 1). Awareness may mediate beneficiaries’ decisions at each of these points.

**Analytical Approach to Understanding User Awareness of HEF Benefits**

We generated descriptive statistics exploring respondents’ awareness of HEF benefits, their care seeking behaviors, and utilization patterns to understanding the nature of these features. Income quintiles were computed within the analytic sample. The average income by quintile in our sample was lower than that of the 2017 Cambodian Socio-Economic Survey (CSES).

We then conducted correlation analysis of awareness indicators to detect the degree to which awareness of specific features of HEF benefits were related to each other. Correlation analysis can identify sets of benefits that beneficiaries know or tend to understand together. Understanding this can inform efforts to improve awareness of types of benefits that remain less prominent in users’ awareness.

For each outcome of interest, we specified regression models to characterize their relationship with beneficiaries’ awareness of HEF benefits. We used multiple logistic regression models with covariates including age, sex, education, ethnicity, and income quintile. Each relevant question was included as separate binary variables. The sample was restricted to those reporting illness or injury in the 12 months prior to the survey.

We specified fixed effects at the district level to account for environmental factors that may contribute to health care utilization, such as community-based influences, quality of care at facilities, and other district-

![Figure 1](image-url) Proportions of the sample population observed at each point of decision making. Note: Percentages indicate proportion of all HEF beneficiaries (N = 5,473) and are not conditional on earlier steps in the tree.
level unmeasured variables. Separate regression models were specified for outpatient and inpatient care sought. In this paper, “outpatient” and “inpatient” care refer to type of services sought rather than the place of care (i.e., health center vs. hospital). Clustered robust standard errors were computed to account for the clustered household survey design. Observations with missing data were excluded from analysis. All analyses were conducted in R (version 3.6.1).

**Ethical Clearance**

Ethical approval for this study was received from the Institutional Review Board at the Harvard T.H. Chan School of Public Health (IRB19-0190). Ethical approval for the impact evaluation of H-EQIP was received from the National Ethics Committee for Health Research in Cambodia. Participation in the study was voluntary and informed consent obtained from all participants.

**Results**

**Profile of HEF Beneficiaries**

A total of 5,473 respondents surveyed were identified as HEF beneficiaries. Among those, 3,617 respondents (66%) reported having an illness or injury in the past 12 months, 3,533 individuals (65%) reported seeking formal care for that illness or injury, and 1,230 people (22%) reported ever seeking care in the public sector (Table 1). Most of the sample was made up of children and younger respondents under 20 years of age and, as would be expected, HEF beneficiaries tended to be poorer than the overall household sample.

**Awareness of HEF Benefits**

About 22% of HEF beneficiaries reported awareness of all entitlements under HEF and nearly 38% reported awareness of seven out of eight of the entitlements. Over 75% of beneficiaries reported being aware of free services at public health centers and hospitals, while 67% reported awareness of such free services in addition to coverage for maternal delivery and medicines. Nearly 52% of respondents covered by HEF were aware of reimbursement for transportation for both delivery and hospitalization.

Respondents were often aware of sets of benefits. Those aware of free services at public health centers were often also aware of free services at public hospitals (ρ = 0.73) as well as coverage of maternal delivery (ρ = 0.53) and medications (ρ = 0.52). Similarly, those aware of reimbursement for transportation for delivery were also aware of such reimbursements for hospitalization (ρ = 0.78) and often knew about funds available for meals for caregivers staying with patients at the hospital (ρ = 0.53). Considerably fewer respondents were aware of being able to use their card for services outside of their district of residence. On the contrary, those aware of free services at their local public health center were slightly less likely to respond affirmatively to the ability to use their HEF card outside of their district (ρ = −0.07). However, about 36% of responses for the question on whether respondents were aware that the HEF card could be used outside of a respondent’s district were unanswered and should be interpreted with caution.

**Patterns of Care Seeking and Utilization Behavior**

Only 25% of HEF beneficiaries ill or injured in the past 12 months claimed their HEF entitlements, while 43% paid some amount of health expenditure out-of-pocket (Figure 1). Of those who sought care from a public provider, a majority claimed HEF entitlements. Among those seeking outpatient care, the majority of respondents (66%) sought care from a private provider. About 36% of those who sought outpatient care sought it from a public provider at least once, while almost 20% always sought care in the public sector in the past 12 months. Nearly 26% of respondents indicated that they sought care more often from public compared to private providers.

Almost all (98%) respondents sought care upon onset of illness or injury with most seeking outpatient care (Figure 1). Among those having at least some primary schooling, the odds of seeking care were over 1.5 times greater than among those who had never attended school (Table 2). In general, women were more likely to have sought outpatient care from public providers (Table 3). Individuals in the second income quintile had greater odds of having sought outpatient care from a public provider compared to the poorest in the sample. Awareness of free services at public health centers was associated with increased odds of ever having visited a public provider (OR = 2.088). However, awareness of free services at public hospitals was associated with reduced odds of seeking outpatient care at a public facility in the past 12 months (OR = 0.341). Awareness of financial coverage for medicines was associated with greater odds of always seeking outpatient care at public facilities (OR = 3.46).

The sample sizes available to analyze inpatient care were smaller than those available for outpatient care, which may contribute to less reliable estimates. No sociodemographic characteristics were associated with outcomes of interest. Awareness of free hospital services was associated with greater odds of always seeking inpatient care at a public facility (Table 4).
HEF Utilization and Health Expenditure

About 30% of those seeking outpatient care claimed their entitlements under HEF coverage, while approximately 49% of those seeking inpatient care did so. Among those who claimed their HEF benefits for inpatient or outpatient care, a large proportion always used their HEF card. Nearly 80% of those seeking outpatient care at a public facility always used their HEF card and almost 88% had ever used their HEF card. Among those seeking inpatient care, over 75% always claimed HEF benefits for their care, while more than 81% claimed inpatient entitlements at least once for their illness or injury.

Among those who reported paying some amount of OOP health expenditure in the past two weeks, there was considerable variation in how much was paid, from just over 2 USD to approximately 13.60 USD. On average, the majority of OOP spending was for medicines (89%), while official provider fees made up 5% of OOP payments. Laboratory fees, transportation, and other payments to providers comprised an average of 1%, 4%, and 1% of OOP spending, respectively.

Regression results showed that no variables included in the model were associated with having ever used the HEF card (Tables 3 and 4). Awareness of funds for caregiver meals reduced the odds of always claiming...
Table 2. Odds ratios for associations with care seeking and out-of-pocket expenditure.

| Dependent variable: | Sought health care in past 12 months | Paid out-of-pocket in past 2 weeks |
|---------------------|--------------------------------------|-----------------------------------|
| **Age**             | 1.000                                | 1.008                             |
|                     | (0.992, 1.008)                       | (0.987, 1.030)                    |
| **Sex**             |                                      |                                   |
| Male                | Reference                            | Reference                         |
| Female              | 0.978                                | 1.649                             |
|                     | (0.714, 1.340)                       | (0.918, 2.962)                    |
| **Education**       |                                      |                                   |
| Never attended      | Reference                            | Reference                         |
| Primary school      | 1.559*                               | 1.416                             |
|                     | (1.108, 2.194)                       | (0.551, 3.639)                    |
| Secondary school    | 0.974                                | 0.626                             |
|                     | (0.582, 1.631)                       | (0.223, 1.758)                    |
| **Ethnicity**       |                                      |                                   |
| Khmer               | Reference                            | Reference                         |
| Non-Khmer           | 0.652                                | 0.652                             |
|                     | (0.237, 1.795)                       | (0.237, 1.795)                    |
| **Income quintile** |                                      |                                   |
| Poorest             | Reference                            | Reference                         |
| Poorer              | 1.292                                | 0.834                             |
|                     | (0.676, 2.469)                       | (0.285, 2.442)                    |
| Middle              | 1.424                                | 0.701                             |
|                     | (0.761, 2.665)                       | (0.228, 2.155)                    |
| Wealthier           | 1.355                                | 0.797                             |
|                     | (0.568, 3.232)                       | (0.229, 2.775)                    |
| Wealthiest          | 1.938                                | 1.058                             |
|                     | (0.788, 4.765)                       | (0.225, 4.974)                    |
| **Awareness**       |                                      |                                   |
| Health center services | 0.287                               | 0.784                             |
|                     | (0.027, 3.107)                       | (0.071, 8.629)                    |
| Hospital services   | 1.452                                | 17.755                            |
|                     | (0.150, 14.089)                      | (0.202, 1577.488)                 |
| Delivery            | 1.219                                | 0.265                             |
|                     | (0.359, 4.135)                       | (0.008, 8.720)                    |
| Medicines           | 0.327                                | 0.467                             |
|                     | (0.087, 1.235)                       | (0.058, 3.777)                    |
| Transport for       | 1.687                                | 1.112                             |
| delivery            | (0.669, 4.254)                       | (0.314, 3.932)                    |
| Transport for       | 0.923                                | 0.834                             |
| hospitalization     | (0.333, 2.560)                       | (0.171, 4.063)                    |
| Caregiver meals     | 1.476                                | 0.700                             |
|                     | (0.711, 3.067)                       | (0.261, 1.880)                    |
| **Constant**        | 60.577***                            | 0.199                             |
|                     | (17.854, 205.533)                    | (0.011, 3.749)                    |
| Observations        | 1.877                                | 293                               |
| Log Likelihood      | −496.308                             | −145.854                          |
| Akaikes Inf. Crit.  | 1,164.615                            | 443.707                           |
| Prediction Accuracy | 0.9032                               | 0.5404                            |

Note: *p < 0.05; **p < 0.01; ***p < 0.001. Includes district-level fixed effects. Multicollinearity evaluated by variance inflation factor was negligible across awareness variables.

Discussion

Summary of Key Findings

We described the state of beneficiaries’ awareness of HEF entitlements and how this relates to decision points along the pathway to HEF utilization using survey data of households with pregnant mothers or children under two years. Most HEF households were aware of their entitlements, especially entitlements related to free services at public health centers and hospitals. Awareness of HEF entitlements did not vary across the study sample by sociodemographic characteristics. Nearly all respondents reporting illness or injury in the past 12 months sought care. Most respondents sought care from a private provider. However, being aware of free services at public health centers was associated with twice the odds of ever having visited a public provider for outpatient care compared to those unaware of this HEF entitlement.

Awareness of hospital services was associated with decreased odds of having visited a provider for outpatient care. This may indicate individuals going straight to hospitals, bypassing outpatient care, when they are aware that hospital services are covered. Those aware of receiving financial coverage for medicines were also more likely to have always sought outpatient care from public facilities. Analyses of inpatient outcomes also revealed a strong relationship between awareness of free services at public hospitals and having always visited a public provider.

Despite generally high awareness of HEF entitlements, less than half of respondents reported claiming their benefits. This suggests that there are other factors at play along the decision cascade toward HEF utilization. If the decision had already been made to go to a public provider, however, it was likely that HEF benefits were claimed. Thus, such other factors influencing beneficiaries’ decisions may include provider trust, perceptions of quality, or physical barriers to accessing facilities. Findings also suggest that those who did use their HEF card did so consistently. This points to the role of knowledge or previous experience using the card to claim these benefits as key features of the pathway to HEF utilization.

User Awareness of Coverage and Improving Access to Health Care

Existing literature generally agrees that health coverage improves access, utilization, and financial risk protection for health care in LMICs. It is worth noting, however, that realizing increases in HEF utilization
Table 3. Odds ratios for associations with public provision and HEF claims for outpatient care.

|                        | Ever visited public provider (1) | Always visited public provider (2) | Ever used HEF card (3) | Always used HEF card (4) |
|------------------------|---------------------------------|-----------------------------------|------------------------|-------------------------|
| **Age**                | 0.999                           | 0.989*                            | 1.016                  | 0.982*                  |
|                        | (0.993, 1.006)                  | (0.980, 0.998)                    | (0.991, 1.041)         | (0.966, 0.997)          |
| **Sex**                |                                 |                                   |                        |                         |
| Female                 | 1.498***                        | 1.648***                          | 1.400                  | 1.594                   |
|                        | (1.255, 1.790)                  | (1.262, 2.152)                    | (0.679, 2.887)         | (0.986, 2.579)          |
| **Education**          |                                 |                                   |                        |                         |
| Never attended         | 0.852                           | 0.776                             | 1.311                  | 1.236                   |
|                        | (0.622, 1.169)                  | (0.538, 1.118)                    | (0.542, 3.168)         | (0.532, 2.867)          |
| Primary school         | 0.788                           | 0.870                             | 0.550                  | 1.064                   |
|                        | (0.485, 1.279)                  | (0.486, 1.557)                    | (0.166, 1.825)         | (0.340, 3.224)          |
| Secondary school       |                                 |                                   |                        |                         |
| **Ethnicity**          |                                 |                                   |                        |                         |
| Khmer                  | 0.272***                        | 0.157**                           | 0.465                  | 0.188                   |
|                        | (0.128, 0.577)                  | (0.042, 0.582)                    | (0.020, 10.908)        | (0.026, 13.36)          |
| **Income quintile**    |                                 |                                   |                        |                         |
| Poorest                | 2.036**                         | 2.004*                            | 1.923                  | 1.834                   |
|                        | (1.277, 3.248)                  | (1.102, 3.645)                    | (0.381, 9.700)         | (0.641, 5.249)          |
| Middle                 | 1.631                           | 2.541**                           | 1.798                  | 2.802                   |
|                        | (0.927, 2.872)                  | (1.359, 4.753)                    | (0.208, 15.525)        | (0.734, 10.701)         |
| Wealthier              | 1.400                           | 1.020                             | 5.686                  | 3.295                   |
|                        | (0.819, 2.396)                  | (0.465, 2.239)                    | (0.432, 74.788)        | (0.826, 13.150)         |
| Wealthiest             | 1.115                           | 1.285                             | 7.062                  | 1.601                   |
|                        | (0.604, 2.055)                  | (0.607, 2.720)                    | (0.961, 51.873)        | (0.491, 5.219)          |
| **Awareness**          |                                 |                                   |                        |                         |
| Health center services | 2.088*                          | 1.814                             | 0.173                  | 1.022                   |
|                        | (1.806, 4.014)                  | (0.769, 4.283)                    | (0.00001, 3.073)353     | (0.040, 25.975)         |
| Hospital services      | 0.341*                          | 0.319*                            | 0.219                  | 0.098                   |
|                        | (0.148, 0.788)                  | (0.130, 0.783)                    | (0.00002, 2.508)104     | (0.002, 4.433)          |
| Delivery               | 0.540                           | 0.705                             | 0.717                  | 1.343                   |
|                        | (0.212, 1.376)                  | (0.274, 1.812)                    | (0.027, 18.753)        | (0.119, 34.270)         |
| Medicines              | 2.780                           | 3.458*                            | 0.1059                 | 2.550                   |
|                        | (0.852, 9.077)                  | (1.095, 10.917)                   | (0.190, 34.270)        | (0.040, 25.975)         |
| Transport for delivery | 1.460                           | 1.262                             | 0.592                  | 1.534                   |
|                        | (0.670, 3.182)                  | (0.624, 2.550)                    | (0.114, 3.070)         | (0.423, 4.337)          |
| Transport for hospitalization | 0.689 | 0.814 | 4.052 | 1.695 |
| Caregiver meals        | 1.305                           | 1.031                             | 0.375                  | 0.332*                  |
|                        | (0.744, 2.291)                  | (0.566, 1.877)                    | (0.123, 1.146)         | (0.137, 0.805)          |
| Observations           | 1.555                           | 1.535                             | 588                    | 609                     |
| Log Likelihood         | −863.512                        | −649.248                          | −106.496               | −205.815                |
| Akaike Inf. Crit.      | 1.897,023                       | 1.468,997                         | 370.992                | 571.630                 |
| Prediction Accuracy    | 0.6711                          | 0.7938                            | 0.8793                 | 0.7882                  |

Note: *p < 0.05; **p < 0.01; ***p < 0.001. Certain awareness predictors omitted due to missingness. Includes district-level fixed effects. Multicollinearity evaluated by variance inflation factor was negligible across awareness variables.

may not translate into improved health outcomes, particularly in health care contexts characterized by poor quality. The quality of care assessment conducted as part of H-EQIP highlighted wide variation in scores across health centers and less variation in scores for referral hospitals; facilities selected by the Ministry of Health as Special Operating Agencies (SOAs) consistently scored better on quality of care measures. Restricting the scope of our insights to beneficiary awareness and HEF utilization, focusing efforts on ensuring that beneficiaries have physical cards and are informed of entitlements upon enrollment in the scheme may be an approach to improve public sector health care utilization and access to care. However, it remains unclear whether user awareness and/or understanding of benefits or experience with public health services and HEF drives health care utilization and HEF claims. Further exploration of an awareness effect of this nature would require understanding how beneficiaries learn about, receive, and use their HEF card within a household or community.

Efforts focused on encouraging care seeking in the public sector may prove most fruitful, as this is the point at which patients tend to drop off along the pathway
toward HEF utilization. Such interventions may include publicized efforts to improve the physical appearance of health facilities, patient experiences, or outreach services that promote trust in the public health care system. While studies in other LMICs have found that beneficiaries tend to have low levels of awareness of their benefits under insurance schemes, this study showed that this is not the case in Cambodia.27,28 Most beneficiaries reported knowing about entitlements under HEF. The concentrated awareness on free services at public health centers and hospitals aligns with evidence of consumers’ knowledge of health insurance in the United States that suggests that the majority of families understand only one or two simple benefits of their coverage.29

Despite generally high levels of awareness, most patients covered by HEF continue to seek care from private providers. This finding was consistent with past studies of the general population, which have reported utilization of private providers as high as 85% in rural areas and 77% of OOP spending.5 Regardless of the promise of greater financial risk protection through HEF coverage, it seemed that households were either more willing to pay for health services from private providers or possibly faced other barriers to accessing care, such as distance to public facilities, poor perceptions of public health services, or stigma associated with utilization of health coverage. Indeed, even if user awareness was high for all HEF benefits, these issues

### Table 4. Odds ratios for associations with public provision and HEF claims for inpatient care.

|                   | Ever visited public provider | Always visited public provider | Ever used HEF card | Always used HEF card |
|-------------------|-----------------------------|--------------------------------|-------------------|---------------------|
| **Age**           |                             |                                |                   |                     |
| Age               | 1.018                       | 1.004                          | 1.005             | 1.005               |
|                   | (0.986, 1.051)              | (0.976, 1.032)                 | (0.962, 1.030)    | (0.973, 1.038)      |
| **Sex**           |                             |                                |                   |                     |
| Male              |                             |                                |                   |                     |
| Female            | 0.658                       | 1.123                          | 0.456             | 0.409               |
|                   | (0.214, 2.030)              | (0.319, 3.950)                 | (0.148, 1.407)    | (0.110, 1.521)      |
| **Education**     |                             |                                |                   |                     |
| Never attended    |                             |                                |                   |                     |
| Primary school    | 0.309                       | 0.315                          |                   | 0.595               |
|                   | (0.085, 1.119)              | (0.084, 1.185)                 |                   | (0.166, 2.140)      |
| Secondary school  | 1.307                       | 1.027                          |                   | 15.146              |
|                   | (0.140, 12.251)             | (0.092, 11.451)                |                   | (0.009, 26,850.970) |
| **Income quintile**|                            |                                |                   |                     |
| Poorest           | 2.826                       | 3.852                          |                   | 2.602               |
|                   | (0.465, 17.177)             | (0.490, 30.305)                |                   | (0.414, 16.341)     |
| Poorer            | 3.016                       | 3.401                          |                   | 1.421               |
|                   | (0.721, 12.614)             | (0.556, 20.815)                |                   | (0.306, 6.598)      |
| Middle            | 0.507                       | 0.967                          |                   | 0.896               |
|                   | (0.089, 2.893)              | (0.125, 7.514)                 |                   | (0.139, 5.756)      |
| Wealthier         | 0.425                       | 2.233                          |                   | 2.557               |
|                   | (0.027, 6.579)              | (0.193, 25.831)                |                   | (0.161, 40.616)     |
| Wealthiest        | 8.023                       | 38.071**                       |                   | 5.432               |
|                   | (0.343, 187.813)            | (3.571, 405.913)               |                   | (0.037, 8.049)      |
| **Awareness**     |                             |                                |                   |                     |
| Health center services | 1.424                 | 0.323                          | 0.932             | 0.543               |
|                   | (0.114, 17.715)             | (0.056, 1.859)                 | (0.133, 6.510)    | (0.037, 8.049)      |
| Hospital services | 8.023                       | 38.071**                       |                   | 5.432               |
|                   | (0.343, 187.813)            | (3.571, 405.913)               |                   | (0.037, 8.049)      |
| Delivery          | 2.243                       | 6.834                          | 35.312            | 6.935               |
|                   | (0.119, 42.322)             | (0.091, 514.574)               | (0.074, 16,959.370)| (0.102, 472.070)   |
| Medicines         | 0.165                       | 0.056                          | 0.038             | 0.029               |
|                   | (0.012, 2.289)              | (0.001, 3.214)                 | (0.001, 2.805)    | (0.001, 9.12)       |
| Transport for delivery | 1.779                  | 0.726                          | 1.021             | 0.058               |
|                   | (0.071, 5.045)              | (0.065, 8.129)                 | (0.259, 4.034)    | (0.003, 1.194)      |
| Transport for hospitalization | 0.598            | 1.110                          |                   | 66.333              |
|                   | (0.071, 5.045)              | (0.106, 11.675)                |                   | (0.760, 5,792.215)  |
| Caregiver meals   | 4.858                       | 5.494                          | 0.670             | 0.244               |
|                   | (0.907, 26.012)             | (0.752, 40.140)                | (0.192, 2.333)    | (0.054, 1.105)      |
| Observations      | 248                         | 248                            | 256               | 186                 |
| Log Likelihood    | −80.875                     | −70.656                        | −77.277           | −59.454             |
| Akaika Inf. Crit. | 323.750                     | 303.312                        | 290.554           | 258.909             |
| Prediction Accuracy | 0.6412                | 0.7118                         | 0.6829            | 0.6129              |

Note: *p < 0.05; **p < 0.01; ***p < 0.001. Certain awareness predictors omitted due to missingness. Includes district-level fixed effects. Multicollinearity evaluated by variance inflation factor was negligible across awareness variables.
may remain obstacles to realizing effective coverage under HEF. If those covered by HEF prefer to seek care from private providers and are willing to pay for their services, doing so risks catastrophic health expenditure and can perpetuate poverty and poor health outcomes. Identifying and addressing these driving forces may help advance initiatives to improve financial risk protection for health in Cambodia.

**Limitations of This Study**

This study has several limitations. First, there was missing data across the variables of interest. Nearly 23% of HEF beneficiaries who reported illness or injury in the past 12 months were missing information on highest education completed and dropped from analyses. Nevertheless, only about 3% of this sample was missing information on the seven awareness indicators included in regression analyses. Missing data contributed to reductions in the sample sizes available for model fitting for some outcomes of interest (see Appendix, Table A1). While we present complete case analysis as a conservative approach, multiple imputation of missing data was implemented to understand how this might affect study findings (see Appendix, Tables A2-A4). Using multiply imputed datasets reduced the number of relationships detected with respect to outpatient care seeking, highlighting only awareness of reimbursement for medicines and caregiver meals, but emphasized awareness of free hospital services and coverage for caregiver meals for inpatient care seeking. Models also lack information about the conditions for which care was sought and their severity, limiting conclusions about specific disease areas.

Second, survey questions asked about respondents’ knowledge of HEF benefits in a uniform way and only about true HEF entitlements (see Appendix). Levels of awareness of HEF entitlements may not have been accurately representative of true knowledge or may have been artificially inflated due to this survey strategy. Additionally, the number of HEF beneficiaries who sought care at public providers was small and reported limited variation in awareness. Whether consistencies in awareness levels are due to previous knowledge of benefits or previous experience with public sector health care remains unclear.

Given the data available, this study was not able to establish causal relationships. Because HEF operates by various processes, there are multiple possibilities for when a beneficiary becomes aware of HEF and, consequently, how awareness of coverage benefits plays a role in health care utilization. One analytical challenge is that HEF eligibility can be determined in the community by the IDPoor survey (i.e., pre-identification) or upon seeking care at a public health facility (i.e., post-identification). The survey did not collect information on at what point in the HEF enrollment or health care seeking process an individual or household learns of HEF benefits. As a result, it remains impossible to temporally identify when and how this key step occurs in the sequence of events leading to care seeking and, ultimately, claiming HEF benefits.

Acquiring knowledge of HEF benefits may also happen prior to or upon care seeking. It is generally accepted that women of reproductive age typically have greater knowledge and contact with the health care system. Therefore, rather than awareness of HEF entitlements driving care seeking behaviors, awareness levels may be otherwise explained by respondents’ past contacts with the public providers of the health system. Other confounding factors that could not be accounted for in regression analyses include the bypassing of outpatient for inpatient care. Distance to facilities may be a physical barrier to access, but was not captured in the survey data.

Parents may make care seeking decisions for their children differently than they would for themselves. Our analysis does not differentiate between these types of decisions. Nevertheless, a parent’s age alongside consideration of the child’s age and severity of illness may influence care seeking and HEF utilization.

The data used in this study may be subject to recall bias among respondents. For example, recall of illness or injury episodes in the past 12 months may be better among those who sought care.

We assumed that responses on HEF awareness given by individual respondents of the survey were representative of the entire household. However, other household members may have varying awareness of HEF benefits.

Finally, this study did not consider the mechanisms or processes by which HEF benefits are claimed. Beneficiaries may face additional barriers to using the card if it is managed by a head of household or community, if there are technical problems using the card at a health facility, or if there is stigma associated with the IDPoor designation and claiming of benefits. Reasons for never having claimed HEF benefits reported by respondents have been included in the appendix (Table A5).

**Implications for Policy and Research**

Beneficiary entitlements under HEF coverage are simple, covering the standard package of services available in the public sector of Cambodia’s health system as well
as selected costs incurred. The generally high levels of awareness of HEF entitlements among beneficiaries may hint at the advantages of simplicity in benefit design for health insurance or other social health protection schemes.

The baseline awareness of reimbursement for transportation and funds for caregiver meals was considerably lower compared to awareness of other benefits, such as free services at public health centers and hospitals. It is possible that the most effective interventions to increase awareness should focus on the less well-known benefits in the hopes of promoting greater increases in care seeking at public facilities and subsequent HEF utilization. It is also possible that transportation reimbursement and funds for caregiver meals help reduce key barriers to accessing care among the poorest and, therefore, lead to the greatest increases in appropriate care seeking and HEF utilization in that population group.

Study findings point to the decision of where to seek care as the critical point in the pathway to HEF utilization. It is possible that, when aware that hospital services are covered, users bypass lower-level outpatient services for higher levels and seek care at hospitals.\textsuperscript{30} Interventions that prompt appropriate care seeking in the public sector may do the most to improve HEF utilization and subsequently improve access to care through sufficient financial risk protection. This emphasizes the relevance of policies and interventions that go beyond public facilities to reach individuals as they are making the decision to seek health care.

Future research should aim to identify factors that influence the decision to seek private over public health services in Cambodia. Identifying these factors could help inform how to design appropriate policies to promote appropriate HEF utilization. Our findings suggest that information interventions to increase awareness of HEF benefits may have generally limited impact. Other possible interventions that could be considered for research and evaluation include improving the distribution of physical HEF cards, quality of care, public perceptions of quality of care, and appropriate allocation of human resources to public facilities.

Interventions targeting HEF beneficiaries before individuals have decided where to seek care may be most effective in increasing utilization in the public sector and subsequent utilization of the national social protection scheme. Future research should focus on the causal and process factors influencing coverage utilization beyond affordability concerns.

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Contributions Statement

IF and SB conceived of the research question and methodology. SN and SB supported the data collection and oversaw the work. IF conducted analyses and drafted the manuscript. SN and SB reviewed several versions of the manuscript and approved the final manuscript.

Ethical Approval

Ethical approval for this study was received from the Institutional Review Board at the Harvard T.H. Chan School of Public Health (IRB19-0190). Ethical approval for the impact evaluation of H-EQIP was received from the National Ethics Committee for Health Research in Cambodia.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.
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Appendix

A. Survey questions on awareness of HEF benefits
   1. Does the closest public health center in your area provide free services for you with your HEF card?
   2. Does the closest public hospital provide free services for you with your HEF card?
   3. Can you get free delivery at government health facilities with your HEF card?
   4. Can you get free medicines at government health facilities with your HEF card?
   5. Can you get transportation costs reimbursed for delivery at government health facilities with your HEF card?
   6. Can you get transportation costs reimbursed for hospitalization at government health facilities with your HEF card?
   7. Can you get money for meals for a caregiver with a hospitalized patient at government health facilities with your HEF card?
   8. Can you use your ID poor card or post ID card at public health facilities outside of your district?

B. Definitions of outcomes of interest
   A series of questions were asked to obtain detailed information that was triangulated for each outcome of interest. Analyses of these questions to define each outcome are outlined below.
   • **Sought health care:** Respondents were identified to have sought care in cases in which question 1 below was greater than zero and non-equivalent to question 2.
     1. How many times have you been ill/injured in the last 12 months?
     2. How many of these illnesses/injuries did you NOT seek treatment for?
   • **Ever visited public provider:** Respondents were identified to have visited a public provider at least once if they reported having sought treatment for greater than zero illnesses or injuries and reported seeking treatment from a private provider fewer times than that value.
     1. How many of these illnesses/injuries did you seek outpatient/inpatient treatment for?
     2. How many of these outpatient/inpatient treatments were from a private provider?
   • **Always visited public provider:** Respondents were identified to have visited a public provider for all illness/injuries if they reported having sought treatment for greater than zero illnesses or injuries and reported never seeking treatment from a private provider.
     1. How many of these illnesses/injuries did you seek outpatient/inpatient treatment for?
     2. How many of these outpatient/inpatient treatments were from a private provider?
   • **Ever used HEF card:** Respondents were identified to have used their HEF card at least once if they reported having sought treatment for greater than zero illnesses or injuries and reported using a card for free health care at least once.
     1. How many of these illnesses/injuries did you seek outpatient/inpatient treatment for?
     2. How many of these outpatient/inpatient treatments did they use a card for free health care?
   • **Always used HEF card:** Respondents were identified to have used their HEF card for all care seeking episodes if they reported having sought treatment for greater than zero illnesses or injuries and reported using a card for free health care for all the times they sought treatment.
     1. How many of these illnesses/injuries did you seek outpatient/inpatient treatment for?
     2. How many of these outpatient/inpatient treatments did they use a card for free health care?

C. Summary of missingness

D. Model results using multiple imputation to address missing data

E. Reasons for never having claimed HEF benefits
### Table A1. Missingness by variable for sample reporting illness or injury in the past 12 months.

| Variable                                  | Missing or “don’t know” responses |
|-------------------------------------------|-----------------------------------|
| **Education**                             |                                    |
| **Awareness**                             |                                    |
| Transport for hospitalization             | 18%                                |
| Caregiver meals                           | 18%                                |
| Transport for delivery                    | 17%                                |
| Delivery                                  | 12%                                |
| Hospital services                         | 11%                                |
| Medicines                                 | 9%                                 |
| Health center services                    | 7%                                 |
| **Income quintile**                       |                                    |
| **Operational District (OD)**             |                                    |
| **Age**                                   | 0%                                 |
| **Sex**                                   | 0%                                 |
| **Ethnicity**                             | 0%                                 |

Note: Includes district-level fixed effects. Data was assumed to be at least missing at random (MAR). Used Rubin's rules to combine results from ten multiply imputed datasets, reflecting the average result with standard errors that average uncertainty across models and account for disagreement in estimated values across models.

### Table A2. Odds ratios for associations with care seeking and out-of-pocket expenditure based on multiply imputed sample.

| Dependent variable | Sought health care in past 12 months | Paid out-of-pocket in past 2 weeks |
|--------------------|--------------------------------------|-----------------------------------|
| **Age**            | 0.995 (0.992, 0.998)                 | 1.001 (0.995, 1.006)              |
| **Sex**            |                                      |                                   |
| Male               | Reference                            | Reference                         |
| Female             | 1.055 (0.927, 1.200)                 | 1.179 (0.918, 2.962)              |
| **Education**      |                                      |                                   |
| Never attended     | Reference                            | Reference                         |
| Primary school     | 1.032 (0.875, 1.218)                 | 0.818 (0.571, 1.172)              |
| Secondary school   | 0.748 (0.660, 0.849)                 | 0.876 (0.703, 0.909)              |
| **Ethnicity**      |                                      |                                   |
| Khmer              | Reference                            | Reference                         |
| Non-Khmer          | 1.148 (0.884, 1.491)                 | 0.229 (0.080, 0.660)              |
| **Income quintile**|                                      |                                   |
| Poorest            | Reference                            | Reference                         |
| Poorer             | 1.323 (1.112, 1.573)                 | 0.838 (0.615, 1.141)              |
| Middle             | 1.319 (1.067, 1.632)                 | 0.825 (0.568, 1.199)              |
| Wealthier          | 1.081 (0.874, 1.337)                 | 0.891 (0.633, 1.255)              |
| Wealthiest         | 1.442 (1.114, 1.868)                 | 1.582 (0.994, 2.519)              |
| **Awareness**      |                                      |                                   |
| Health center services | 0.428 (0.272, 0.674) | 0.421 (0.223, 0.794) |
| Hospital services  | 1.429 (0.150, 14.089)                | 3.727* (1.784, 7.783)             |
| Delivery           | 0.986 (0.722, 1.345)                 | 0.973 (0.443, 2.135)              |
| Medicines          | 0.875 (0.615, 1.245)                 | 0.620 (0.306, 1.256)              |
| Transport for delivery | 1.384 (0.615, 1.245) | 1.087 (0.734, 1.565) |
| Transport for hospitalization | 1.078 (0.852, 1.364) | 0.647 (0.433, 1.565) |
| Caregiver meals    | 1.278 (1.057, 1.545)                 | 1.360 (0.957, 1.933)              |

Note: *p < 0.05; **p < 0.01; ***p < 0.001. Includes district-level fixed effects. Data was assumed to be at least missing at random (MAR). Used Rubin's rules to combine results from ten multiply imputed datasets, reflecting the average result with standard errors that average uncertainty across models and account for disagreement in estimated values across models.
Table A3. Odds ratios for associations with public provision and HEF claims for outpatient care based on multiply imputed sample.

|                        | Ever visited public provider (1) | Always visited public provider (2) | Ever used HEF card (3) | Always used HEF card (4) |
|------------------------|----------------------------------|------------------------------------|------------------------|-------------------------|
| Age                    | 0.991 (0.989, 0.993)             | 0.988 (0.985, 0.991)               | 0.997 (0.990, 1.003)   | 0.994 (0.989, 0.999)    |
| Sex                    |                                  |                                    |                        |                         |
| Male                   |                                  |                                    |                        |                         |
| Female                 | 1.326*** (1.213, 1.450)          | 1.379* (1.242, 1.530)              | 1.420 (1.115, 1.809)   | 1.358* (1.134, 1.625)   |
| Education              |                                  |                                    |                        |                         |
| Never attended         | 0.742 (0.654, 0.841)             | 0.816 (0.700, 0.951)               | 0.762 (0.510, 1.115)   | 0.863 (0.834, 1.244)    |
| Primary school         | 0.742 (0.654, 0.841)             | 0.816 (0.700, 0.951)               | 0.762 (0.510, 1.115)   | 0.863 (0.834, 1.244)    |
| Secondary school       | 0.742 (0.654, 0.841)             | 0.816 (0.700, 0.951)               | 0.762 (0.510, 1.115)   | 0.863 (0.834, 1.244)    |
| Ethnicity              |                                  |                                    |                        |                         |
| Khmer                  | 0.515 (0.423, 0.628)             | 0.533 (0.418, 0.680)               | 1.061 (0.623, 1.808)   | 0.491 (0.314, 0.766)    |
| Non-Khmer              | 0.515 (0.423, 0.628)             | 0.533 (0.418, 0.680)               | 1.061 (0.623, 1.808)   | 0.491 (0.314, 0.766)    |
| Income quintile        |                                  |                                    |                        |                         |
| Poorest                | 1.456** (1.284, 1.650)           | 1.559* (1.340, 1.814)              | 1.008 (0.713, 1.425)   | 0.947 (0.724, 1.239)    |
| Middle                 | 1.110 (0.966, 1.275)             | 1.693*** (1.443, 1.988)            | 1.177 (0.770, 1.800)   | 1.380 (1.008, 1.887)    |
| Wealthier              | 1.318 (1.140, 1.523)             | 1.298 (0.082, 1.557)               | 1.448 (0.942, 2.226)   | 1.218 (0.887, 1.678)    |
| Wealthiest             | 0.655 (0.551, 0.780)             | 0.854 (0.692, 1.054)               | 0.845 (0.465, 1.534)   | 0.824 (0.546, 1.243)    |
| Awareness              |                                  |                                    |                        |                         |
| Health center services | 1.305 (0.997, 1.710)             | 1.567 (1.141, 2.152)               | 1.711 (0.484, 6.045)   | 2.104 (0.794, 5.575)    |
| Hospital services      | 0.857 (0.584, 1.257)             | 0.707 (0.461, 1.085)               | 0.431 (0.059, 3.168)   | 0.310 (0.072, 1.338)    |
| Delivery               | 0.800 (0.621, 1.029)             | 0.794 (0.461, 1.085)               | 0.283 (0.069, 1.161)   | 0.559 (0.263, 1.183)    |
| Medicines              | 1.269 (0.970, 1.661)             | 1.738* (1.261, 2.397)              | 3.593 (1.288, 10.027)  | 2.381 (1.154, 4.912)    |
| Transport for delivery | 0.997 (0.821, 1.212)             | 1.073 (0.876, 1.315)               | 1.297 (0.805, 2.088)   | 1.454 (1.029, 2.056)    |
| Transport for hospitalization | 0.893 (0.684, 1.167) | 0.923 (0.701, 1.216) | 1.291 (0.775, 2.499) | 1.225 (0.835, 1.797) |
| Caregiver meals        | 1.350* (1.135, 1.606)            | 0.962 (0.784, 1.181)               | 0.764 (0.480, 1.214)   | 0.612 (0.461, 0.813)    |

Note: *p < 0.05; **p < 0.01; ***p < 0.001. Includes district-level fixed effects. Data was assumed to be at least missing at random (MAR). Used Rubin’s rules to combine results from ten multiply imputed datasets, reflecting the average result with standard errors that average uncertainty across models and account for disagreement in estimated values across models.
Table A4. Odds ratios for associations with public provision and HEF claims for inpatient care based on multiply imputed sample.

|                          | Ever visited public provider | Always visited public provider | Ever used HEF card | Always used HEF card |
|--------------------------|------------------------------|---------------------------------|------------------|---------------------|
| **Age**                  |                              |                                 |                  |                     |
| 0.999                    | 1.001                        | 1.003                           | 1.008            |                     |
| (0.993, 1.005)           | (0.995, 1.007)               | (0.993, 1.012)                  | (1.000, 1.017)   |                     |
| **Sex**                  |                              |                                 |                  |                     |
| Male                     |                             | Reference                       |                  |                     |
| Female                   | 0.891                        | 0.902                           | 0.655            | 0.671               |
| (0.687, 1.157)           | (0.693, 1.173)               | (0.429, 0.999)                  | (0.472, 0.952)   |                     |
| **Education**            |                              |                                 |                  |                     |
| Never attended           | 1.050                        | 0.959                           | 0.973            | 0.974               |
| Primary school           |                              | Reference                       |                  |                     |
| (0.680, 1.622)           | (0.631, 1.458)               | (0.529, 1.792)                  | (0.548, 1.730)   |                     |
| Secondary school         | 1.075                        | 1.055                           | 1.313            | 1.136               |
|                         | (0.769, 1.502)               | (0.763, 1.459)                  | (0.803, 2.144)   | (0.778, 1.657)      |
| **Ethnicity**            |                              |                                 |                  |                     |
| Khmer                    | 0.735                        | 0.744                           | 0.995            | 0.779               |
|                         | (0.440, 1.227)               | (0.452, 1.224)                  | (0.499, 1.984)   | (0.409, 1.482)      |
| Non-Khmer                | 0.338                        | 0.524                           | 1.179            | 0.808               |
|                         | (0.190, 0.602)               | (0.286, 0.963)                  | (0.375, 3.709)   | (0.267, 2.432)      |
| **Income quintile**      |                              |                                 |                  |                     |
| Poorest                  | 1.775                        | 2.016                           | 2.701            | 1.291               |
| (1.144, 2.754)           | (1.292, 3.145)               | (1.414, 5.159)                  | (0.758, 2.199)   |                     |
| Poorer                   | 0.838                        | 1.115                           | 2.749            | 1.963               |
| (0.570, 1.234)           | (0.752, 1.653)               | (1.359, 5.558)                  | (1.125, 3.424)   |                     |
| Middle                   | 0.674                        | 0.833                           | 0.547            | 0.483               |
| (0.449, 1.012)           | (0.550, 1.261)               | (0.263, 1.135)                  | (0.271, 0.859)   |                     |
| Wealthier                | 0.338                        | 0.524                           | 1.179            | 0.808               |
| (0.190, 0.602)           | (0.286, 0.963)               | (0.375, 3.709)                  | (0.267, 2.432)   |                     |
| Wealthiest               | 0.190                        | 0.602                           | 0.951            | 0.405               |
| (0.186, 1.260)           | (0.286, 0.963)               | (0.375, 3.709)                  | (0.267, 2.432)   |                     |
| **Awareness**            |                              |                                 |                  |                     |
| Health center services   | 0.916                        | 0.722                           | 0.951            | 0.405               |
| (0.445, 1.884)           | (0.353, 1.479)               | (0.269, 3.412)                  | (0.136, 1.208)   |                     |
| Hospital services        | 3.343*                       | 3.758*                          | 6.604*           | 8.625*              |
| (1.658, 6.739)           | (1.834, 7.703)               | (2.135, 20.423)                 | (2.555, 29.117)  |                     |
| Delivery                 | 1.082                        | 1.351                           | 3.061            | 2.705               |
| (0.513, 2.284)           | (0.581, 3.143)               | (0.742, 12.620)                 | (0.790, 9.265)   |                     |
| Medicines                | 0.399                        | 0.378                           | 0.276            | 0.428               |
| (0.183, 0.868)           | (0.160, 3.143)               | (0.069, 1.100)                  | (0.128, 1.432)   |                     |
| Transport for delivery   | 1.708                        | 1.433                           | 0.373            | 0.439               |
| (0.868, 3.363)           | (0.750, 2.738)               | (0.156, 0.893)                  | (0.206, 0.935)   |                     |
| Transport for hospitalization | 0.389                      | 0.442                           | 3.157            | 2.081               |
| (0.205, 0.736)           | (0.244, 0.803)               | (1.180, 8.451)                  | (0.930, 4.656)   |                     |
| Caregiver meals          | 3.308**                      | 2.947**                         | 1.552            | 1.187               |
| (2.045, 5.350)           | (1.865, 4.657)               | (0.818, 2.945)                  | (0.702, 2.008)   |                     |

Note: *p < 0.05; **p < 0.01; ***p < 0.001. Includes district-level fixed effects. Data was assumed to be at least missing at random (MAR). Used Rubin’s rules to combine results from ten multiply imputed datasets, reflecting the average result with standard errors that average uncertainty across models and account for disagreement in estimated values across models.
Table A5. Reported reasons for never having claimed HEF benefits among respondents seeking care from public providers.

| Reason to never have claimed HEF benefits                                      | n  = 2,124 | %  |
|---------------------------------------------------------------------------------|------------|----|
| Not seriously ill                                                               | 840        | 39.5 |
| Prefer private doctor/home visits                                              | 349        | 16.4 |
| Just deemed eligible/not yet received the card                                  | 273        | 12.9 |
| No transport                                                                    | 235        | 11.1 |
| Poor quality of medicine/treatment                                             | 216        | 10.2 |
| Long waiting times                                                              | 165        | 7.8  |
| Too busy                                                                        | 154        | 7.3  |
| Facility too far                                                                | 131        | 6.2  |
| Medical workers discriminate against members                                    | 92         | 4.3  |
| Too sick to travel                                                              | 89         | 4.2  |
| Medical worker takes money/Still pay for services                               | 80         | 3.8  |
| No medicine/treatment/equipment available                                       | 72         | 3.4  |
| Forgot card                                                                     | 35         | 1.6  |
| Fear or belief that medical workers provide poor treatment/services             | 32         | 1.5  |
| Nobody to take care of house/family                                             | 32         | 1.5  |
| Facility always closed                                                           | 20         | 0.9  |
| Inconvenient hours                                                              | 21         | 1.0  |
| Don’t know how to use card                                                      | 19         | 0.9  |
| Expired card                                                                    | 17         | 0.8  |
| Don’t know card’s benefits                                                      | 16         | 0.8  |
| Staff usually absent                                                            | 15         | 0.7  |
| Free treatment provided at Kanthabopa Hospital/unnecessary                      | 14         | 0.7  |
| No money                                                                        | 12         | 0.6  |
| Lost card                                                                       | 11         | 0.5  |
| Too sick/injured for public provider to treat                                   | 11         | 0.5  |
| Needed urgent care                                                              | 10         | 0.5  |
| Facility/medical worker does not accept card                                    | 8          | 0.4  |
| Road to facility too difficult                                                  | 7          | 0.3  |
| Poor staff knowledge                                                            | 6          | 0.3  |
| Fear                                                                            | 5          | 0.2  |
| No money for treatment                                                          | 4          | 0.2  |
| Employer paid for treatment                                                     | 3          | 0.1  |
| Village chief kept card                                                         | 3          | 0.1  |
| No money for food                                                               | 2          | 0.1  |
| Don’t know location of public facility                                          | 2          | 0.1  |
| Other                                                                           | 28         | 1.3  |