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Targeting Subsidized Inpatient Services to the Poor in a Setting with Limited State Capacity: Proxy Means Testing in Myanmar's Hospital Equity Fund Scheme

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Abstract

Objectives: Many low- and middle-income countries (LMICs) provide subsidized access to health services for the poor. Proxy means tests (PMT) for income are typically employed to identify eligible beneficiaries for subsidized services but often result in significant mistargeting of benefits. We assessed the PMT approach used in Myanmar's Hospital Equity Fund (HEF).

Methods: We analyzed inclusion/exclusion errors by comparing household eligibility under the PMT used for HEF with household consumption (the gold standard proxy for income in LMICs). We assessed receipt of benefits post-hospitalization against HEF eligibility rules and household income. Focus groups/interviews were conducted to understand administrative factors that influence targeting. We modeled (linear regression) predictors of household consumption to improve PMT accuracy.

Results: We found large targeting errors (86% of households in the bottom consumption quartile would be excluded and 15% of households in the top consumption quartile deemed eligible). HEF scores for PMT held little explanatory power for household income: 93% of individuals meeting the HEF eligibility criteria did not receive benefits post-hospitalization, while 23% of ineligible individuals received program support. Re-weighting PMT indicators on electricity access, land ownership, and livestock ownership, and assigning weights to home ownership, households with elderly/disabled members, and household-head education levels could significantly improve targeting accuracy. Poor program awareness and uneven adherence to official eligibility-determination procedures among staff likely affected targeting.

Conclusions: Re-weighting PMT indicators and increasing training and communication about qualification procedures could improve allocation of limited funds, though accurate targeting may continue to be challenging in contexts of low state capacity.

Keywords: targeting, LMICs, universal health coverage, Myanmar, equity, user fees

INTRODUCTION

There is presently a significant push towards expanding population health insurance coverage in low- and middle-income countries (LMICs) to increase access to health services. Whereas previously only high-income countries had achieved universal health coverage (UHC), many middle-income countries (e.g. Mexico and Thailand) have now significantly extended coverage, with rapid progression occurring elsewhere (1–5).

Subsidized participation is a key ingredient in expanded health insurance coverage to overcome financial barriers for low-income groups (6,7). However, given limited resource bases, many LMICs have to make choices about who to cover (8). Targeting the poor is a common policy intervention for narrowing inequalities in access to services and directing scarce resources (9,10).

Strategies for targeting benefits to the poor include indirect targeting (e.g. using demographic, sociocultural or geographic characteristics), direct targeting (using proxy means), self-targeting, and community-based targeting (community members select beneficiaries)(11). Each of these methods involves trade-offs in accuracy and costs (12). Proxy means targeting (PMT) – deemed the most accurate but also costly to execute – is a commonly used method in LMICs (13,14). In PMT, observable characteristics (e.g. demographic characteristics, human capital, housing, durable goods, productive assets) are used as proxies to estimate a household's income (consumption) in the absence of reliable income data. Those below a threshold PMT score are eligible for subsidized benefits. However, PMT can result in large inclusion and exclusion errors, with varying levels of accuracy observed in LMICs (15). In a recent review of 8 Asian countries, 6 used PMT and in half of the schemes, only about 50% coverage was achieved in the intended target groups (14). Despite these limitations, PMT remains popular. How PMT approaches can be strengthened thus remains an important policy question.

We examine the effectiveness of the PMT targeting approach used for Myanmar's recently piloted hospital equity fund (HEF), a demand-side financing mechanism to increase hospital services coverage among the poor. We assess the potential magnitude of exclusion/inclusion errors related to HEF beneficiary identification; ways to improve Myanmar's PMT scoring algorithm; and administrative factors affecting targeting. Myanmar is of particular interest given its extremely low health spending as a share of GDP and the highest out-of-pocket share of health spending in the world, yet ambitious goal to achieve UHC by 2030 (16). This study is also informative for policy decisions around UHC in Myanmar and highlighting challenges for similarly-placed countries considering PMT implementation in contexts of weak governance.

Background: Myanmar's Health System and Hospital Equity Fund

Myanmar has poor health outcomes (life expectancy: 66.7 years; infant mortality ratio: 40 per 1000). Public-sector health financing has been limited until recently: 1% of government spending (2003-2011), or less than US $1 per person (2011-2012) and biased towards tertiary care (17–19). Health insurance coverage prior to HEF was negligible, available only to government and international organization employees (20). Out-of-pocket spending accounts for over 80% of all health spending, creating a significant

financial burden (16).

Health system strengthening has become a recent priority with the government increasing health spending to about 3% of government expenditure and initiating a program to address low skilled-birth attendance and immunization coverage. The program, with external support from the Vaccine Alliance (GAVI), included better equipping of front-line health workers, training for auxiliary midwives and community health workers, and a hospital equity fund (HEF) to fund hospital services for the poor (19). Under HEF, GAVI transferred a fixed amount of between 10 to 100 million kyats (approx. US $10,000-$100,000) to each township to establish a fund. The fund reimbursed eligible poor individuals (up to 100,000 kyats (approximately US $100) for cost of medicines, food, transportation and other associated costs of accessing inpatient services, related to maternal and child health and other acute conditions. Benefits under HEF were available only to patients using public services which are already free of charge. The fund is managed under the authority of the Township Health Committee which consists of a finance sub-committee (from the Township Auditor's office), the township medical officer (TMO), other medical professionals, and other local representatives (see Annex 2 for committee composition).

According to policy, eligible beneficiaries were determined using a proxy means test (PMT) to identify poor households. Households above a threshold score were deemed eligible and entitled to a beneficiary card (known as a health equity card). Government policy allowed for pre-identification of beneficiaries (through community-level processes) and for post-identification at the time of hospitalization. Beneficiaries were reimbursed at the hospital upon presentation of a patient referral form, a health equity card, and expense receipts. By 2015, the HEF scheme covered 120-GAVI supported townships (out of a total of 330 townships in the country).

METHODS

Measuring household income

We conducted a survey to measure household consumption expenditure (the gold standard proxy for household income in LMICs where income is hard to measure)(21). Calculation of consumption per adult equivalent was based on methods used by the World Bank and Myanmar's Ministry of Planning and Finance (22,23). Using a survey questionnaire and 30-day recall, household heads (or the most knowledgeable person if household head not available) were queried about cash and in-kind expenditures (food, non-food items, health care utilization and expenditures), household assets, debts, and housing living conditions, including water and sanitation access, and multiple socio-economic and demographic variables. Because program awareness is often a key intermediary step in ensuring access (15,24,25), the survey included a question on HEF programme awareness, plus HEF enrolment and reimbursement status. Robustness checks were performed by repeating our analysis for alternative indicators of economic status, namely household consumption expenditure per capita; and an indicator of household assets, based on principal components analysis (23).

In September-December 2014, an administrative list of public hospitals for townships where HEF had been implemented in phase 1 of the HEF program was drawn up and stratified into two groups based on hospital bed capacity. One hospital was randomly selected from each stratum, and the two townships corresponding to the sample hospitals were included in the study. An average township represents 40,000-50,000 households. In these two townships, we gathered survey data from a (stratified) random sample of 204 households (980 individuals, ~75% rural). While the sample size is small and limiting in many respects, this is one of very few studies to be granted access to assess a government program in Myanmar. With poverty rates in Myanmar around 32% nationally, and program exclusion errors of about 50% observed in LMICs for PMT-based methods, a sample size of 850 individuals should yield confidence intervals within 2 percentage points of the proportion PMT-based eligible population with 95% probability.

HEF proxy means test simulation

Under the HEF policy, individuals in households with a PMT score above 50 points were eligible to receive reimbursements for inpatient-related costs (Annex 1). At the time of the study, the government was solely assessing HEF eligibility at the point of hospital admission, though the official policy allowed for pre-identification of beneficiaries. We therefore assessed the PMT algorithm to determine its potential accuracy in identifying poor households. Using the government's PMT tool (algorithm presented in Annex 1), we constructed PMT scores using data from the household survey we carried out. To evaluate the targeting accuracy of the HEF's PMT, we assessed the likelihood of exclusion errors (households defined as poor based on their expenditures lying below the national poverty line of adult equivalent expenditure of 1303 Kyats per day (23) being deemed ineligible under the HEF PMT criterion) and inclusion errors (proportion of non-poor households deemed eligible under the HEF PMT criterion). We plotted PMT scores against household consumption spending (per adult equivalent). The scatterplot also shows the likelihood of inclusion and exclusion errors when household spending moves further away from the poverty line. Among sampled households that had experienced a hospital stay in the last year, we assessed targeting accuracy by measuring their consumption per adult equivalent and survey-based PMT scores and whether they received HEF benefit.

Factors associated with targeting effectiveness

We performed multivariate regression analysis to explore the socio-economic correlates of targeting effectiveness. Our choice of explanatory variables was informed by the existing literature whereby household characteristics related to education, location and demographic composition among others, have been associated with inclusion and exclusion errors (26,27).

We also examined whether changing the weights assigned in the Government PMT scoring algorithm (Annex 1) or adding other indicators to the PMT scoring algorithm from available survey data could better explain inter-household variation in consumption expenditure. Using multivariate regression

analysis, we assessed separately the associations between household consumption expenditure per adult equivalent and (a) the estimated PMT score using HEF methodology (Annex 1); (b) the indicator in (a) and other indicators of standards of living in the official PMT list, but given zero weight (Annex 1); and (c) the indicators in (b) plus others that variables in the survey that also capture standard of living. Data were analysed in Stata.

Administrative factors associated with targeting accuracy

In the two surveyed townships, all members of the Township Health Committee, the group responsible for the management of the HEF, were invited for interviews (see Annex 2 for committee composition). We also held focus group discussions (FGDs) with local health facility staff and village leaders to understand their involvement in defining poor households and assisting them to access benefits. Health staff from the nearest health facility (or village health worker in villages with no health facility) and a random sample of village leaders were invited to participate in focus groups (sampling methods are described in Annex 2). Including perspectives across administrators, health professionals, and local leaders helped triangulate information about implementation gaps. We used semi-structured question guides with open-ended questions that inquired about beneficiary enrolment and reimbursement, fund transfers related to the HEF scheme, HEF linkages with community-level leadership, and implementation challenges. A wide range of stakeholders was interviewed for ensuring consistency and triangulation. Given the potential risks to HEF administrators commenting adversely on a program, we included HEF administrators from two neighbouring townships that also implemented the HEF to reduce the likelihood of interviewee responses being linked to specific individuals. Although these neighbouring HEF administrators do not represent the townships where the household survey took place, we hypothesized that their implementing contexts would be similar and therefore provide instructive perspectives on HEF implementation while supporting anonymity for more open responses. Written consent was obtained from all participants. The lead researcher (a Myanmar national) led the discussions. Interview and FGD transcripts were prepared in MS Word and imported into Nvivo for thematic analysis. Analysis was led by the lead author (SH) and co-author (TL) reviewed the data and themes for consistency.

Ethical clearance was granted by the Monash University Health Research Ethics Committee (MUHREC) in Australia and by the Ministry of Health (MoH) in Myanmar.

RESULTS

Township Characteristics

Table 1 reports summary statistics for selected socioeconomic and demographic variables in the two townships from our sample and comparable information from the Myanmar census for the same townships which was conducted in the same year as our survey (2014)(28,29). In addition, national averages based on the Mynamar census (30), and poverty estimates from World Bank are also presented (23). These data

suggest that the two sample townships lie on the opposite sides of the national average for Myanmar, with one more rural and poorer than Myanmar as a whole, and the other more urban and wealthier. Moreover, our sample estimates are not too different from the census averages for the same two townships for several key data. Estimates of the poverty ratios in the two townships suggest though that our sample is slightly richer than the average for Myanmar as a whole.

Identifying the HEF-Eligible Poor

In our simulation exercise, 30 households (14.9% of the sample) would have been deemed eligible for benefits using the official HEF threshold and scoring algorithm. Figure 1 plots household expenditure per adult equivalent per day against PMT scores based on the HEF method. It suggests poor concordance between eligibility based on the HEF PMT and household expenditure per adult equivalent, particularly at the lower end of the expenditure scale where households living below the national poverty line are likely to be classified as ineligible for HEF benefits (eligibility requires that the PMT score equal or exceed 50). In other words, households identified as poor by the national poverty line do not match well with households defined as poor under Myanmar's PMT criterion. On the other hand, Figure 1 suggests that households above the poverty line have a much greater likelihood of being correctly classified as ineligible. Overall this plot points to high exclusion errors and relatively low inclusion errors. Using per capita household expenditure and house assets index as indicators did not change these findings (results available from authors).

Hospital Stays and Receipt of HEF benefits

Forty hospitalizations were experienced among sampled households (39 admissions for women/children <5), 10 of whom received HEF-funded reimbursements. We found significant exclusion errors: 93% of HEF-eligible households who had experienced hospitalizations did not receive benefits while 23% of households with ineligible PMT scores did (Table 2). Exclusion and inclusion errors would have remained roughly the same even if consumption expenditure-based poverty line were used as an eligibility criterion, at 95% and 24%, respectively. If the eligibility for HEF benefits was relaxed to include the poorest 25% of households (in terms of consumption per adult equivalent), the exclusion errors would fall to 86%, with inclusion errors remaining at around 24%, suggesting that at least some of the HEF program benefits are going to the marginally ineligible. Although the sample sizes on which these conclusions are based are small, they suggest that administrators may be using determinants other than the HEF PMT for determining eligibility.

Improving Targeting Effectiveness: Predicting household consumption

Table 3 presents the multivariate regression results on the association between household consumption expenditures per adult equivalent and components of PMT scores. Column 2 shows that the HEF PMT score provides little explanatory power for the observed variation in household expenditures. Most variables in

the HEF PMT scoring algorithm are not weighted, receiving a score of zero. Results for column 3 demonstrate that, if weighted appropriately, information on household access to electricity and land and cow ownership could significantly improve the ability of the HEF-score to predict consumption expenditure. Finally, variables related to home-ownership, presence of a disabled/elderly member, and household-head education-level were statistically associated with household consumption expenditure, and if included in a revised HEF algorithm, could potentially improve targeting accuracy.

Stakeholder perspectives on HEF program implementation

Key informant interviews with 24 HEF town and hospital administrators and 8 focus groups involving 32 community stakeholders (primary health centre staff, volunteer health workers, NGO representatives, community leaders) were conducted to elicit perspectives on HEF implementation. 75% (24/32) of community representatives were from rural areas, with only 12 (38%) having a direct role in HEF. Moreover, only half (4/8) of the primary health staff interviewed were involved with HEF, suggesting a lack of program engagement with primary health centres, local leadership and NGOs on the ground.

Lack of program awareness stood out as the most cited program challenge, noted by 88% (21/24) of administrators and in the FGDs:

- Township representative: “I don’t know the program, but I have the experience of transferring patients to hospitals. However, I am not sure whether the patient was under HEF or not.”
- Health worker: “Even our health staff don’t know the HEF program in sufficient detail. We need a proper advocacy for the HEF procedures. As I don’t know the HEF program in detail I dare not refer patients to it.”
- Local NGO representative: “I’ve heard of this, but I am not sure how to get the benefits and cannot recommend the community about the program. If we know more details, we can help them.”

The need for greater communication and mobilization around the program was voiced across stakeholder groups. Lack of outreach to hard-to-reach populations, lack of program familiarity among hospital patients, and confusion among patients about why they had received funds were presented as indications of low beneficiary awareness.

Most administrators (79%; 19/24) perceived that the HEF identification process is poor and/or subject to fraud, with considerable uncertainty regarding appropriate identification of beneficiaries voiced in focus groups. Stakeholder experiences suggest that HEF eligibility determination may have been only partially based on program-defined scoring criteria. A range of perspectives regarding beneficiary identification are presented below:

- “I am sure that we really paid HEF benefits to poor patients. It is obvious that they are poor, just by observation and the type of utensils they possess. They are a very pitiable sight…There is no fraud under this program.” (Hospital Staff)
- “As the patients are really honest and pure, it is very easy to decide if they are poor or not. If we

are in doubt, we usually contact the midwife from the patient's jurisdiction to confirm their status. We can also clearly see that the poor patient was admitted to the hospital with nothing." (Hospital Staff)

- "For some people, you cannot tell clearly that they are poor and as a result they did not get the money. Some rich people knew more about the programme and pretended to be poor and got the benefits." (Local NGO member)

Most administrators (79%; 19/24) perceived that the transfer of funds worked well, but nearly all (96%; 23/24) raised issues of sustainability – a challenge echoed by community representatives.

DISCUSSION

Targeting the poor remains a major challenge for public sector programs in LMICs. This study provides an assessment of Myanmar's first attempt to implement PMT for targeting hospital-based care to the poor. While many case studies on PMT are drawn from middle-income countries such as Thailand, Vietnam, and Mongolia, with stronger state capacity and greater historical investments in primary health care, our study from Myanmar demonstrates the challenges of implementing PMT in contexts where rural and primary health care investments have been marginal until recently and state administrative capacity is low. Our Myanmar analyses show that implementing effective PMT requires considerable technical capacity and administrative capacity. Myanmar was not able to carry out household means testing in the community, and instead relied on beneficiary identification at the hospital. Myanmar's challenges and the need to focus on institutional structures around program implementation may be pertinent for other low capacity countries considering PMT to target health benefits to the poor.

In light of budgetary constraints, identifying methods to improve the validity of PMT methods will continue to be important for LMICs. Modelling from our study shows that simple modifications to the PMT tool can help reduce inclusion and exclusion errors for public programs, suggesting that it is possible for countries to improve PMT accuracy considerably without overhauling them and adding complexity. Literature reviews find that PMT regressions often explain less than half of the variation in consumption between households (31). A four-country study of social protection programs produced exclusion and inclusion errors between 44%-55% when the poorest 20% were covered and between 57%-71% when only the poorest 10% were covered (15). Our results indicate exclusion and inclusion errors in HEF beneficiary identification of nearly 85% and 23% respectively, resulting in significant mistargeting of resources.

We find that poverty as measured by official HEF PMT scores was not well correlated with indicators (consumption expenditure per adult equivalent/asset indices) known to be good proxies for household economic status. Taking the existing rates of exclusion errors in Myanmar's official PMT formula, a simple back-of-the-envelope calculation suggests that the per-township HEF budget would have to be three times its current allocation to reach the same number of people in the bottom expenditure quartile relative to a situation where benefits were perfectly targeted to the poorest quartile. Instead, if additional indicators related to electricity access, land and cow ownership and weighing them according to the

coefficient estimates reported in Table 3 in a modified PMT score (5 points each, roughly reflecting their relative coefficient sizes in Table 3), the resulting exclusion errors would be reduced by almost 25%, leading to substantial savings. Adding indicators related to home-ownership, disabled/elderly members, and household-head educational status would further improve targeting. Disability, education, household size, age of household-head, location, and telecommunication access have been found to be powerful predictors of household income in related literature(26)(32). Modifying proxies and equivalence scales, weighting of variables, can help make PMT results more accurate (15). Beyond static indicators, further research is needed to understand what indicators may predict household resilience to poverty (33). In the meantime, indicators related to disability and educational attainment are plausibly good proxies for resilience and should be considered.

Beyond the PMT methodology, administrative and implementation issues can impede targeting effectiveness. Administrative capacity, including clear procedures for enrolment, and program awareness among beneficiaries are associated with improved targeting (14,15,31,34,35). Wangmo et al. (2017) also found uptake of HEF to be positively associated with public awareness. We suspect that reliance on post-identification of beneficiaries following hospital admission may have limited awareness about the HEF scheme. As a result, the very poorest who are already the least likely to access services (36), may not have been able to benefit from the HEF, thus exacerbating errors. Key informants similarly hypothesized that limited outreach had affected uptake by the poor. Expansive information campaigns and staff training on eligibility procedures also appear necessary and will help limit idiosyncratic appraisals of client eligibility. Another option is to free health staff from eligibility assessments by contracting an independent third party payer such as an NGO, as trialled in Cambodia, to manage client eligibility (36). Administrative costs, enumerator capacity, corruption, and negative effects of targeting on community cohesion are other known factors affecting PMT targeting and must be accounted for when choosing PMT methods over other community-based targeting methods. Failing these, universal programs (e.g., child support, pension plans) that are more likely to receive the support of the middle class may be more politically viable over the longer-term (Kidd & Wylde, 2011).

In theory, PMT targeting allows countries to allocate resources more equitably, given budget constraints, but is challenging to implement (37). All targeting methods face important trade-offs regarding administrative costs, perverse incentive effects, political viability, and significant inclusion and exclusion errors (11). India is considering assessing eligibility at the point-of-care following challenges in pre-identifying beneficiaries. Thailand moved to universal coverage rather than grapple with high mistargeting (38). Mexico has stuck with the PMT method and has experienced improvements over time: from 2008-2012, the percentage of the poor not otherwise covered by health insurance grew from 42%-73% under Seguro Popular while eliminating the coverage gap between indigenous and non-indigenous peoples (39). Finally, a sustainable budget is essential to any targeting approach (36). In the absence of ongoing external funding, we have learned that the HEF program in Myanmar has recently been terminated.

While our study is limited by a small sample from only two townships it is one of few to assess a government initiative in Myanmar and to investigate PMT implementation in a context of low state capacity. We were, nonetheless, able to test the likely accuracy of Myanmar's official HEF proxy means criteria, identify household types not likely to be well-served by the official scoring criteria, assess whether HEF funds had been accurately applied to poor households based on hospital admissions, and provide suggestions for actionable changes to improve the validity of Myanmar's PMT tool. The data in Table 1 suggest that we may have under-sampled the poor, to the extent that poorer households under-report illness and also face barriers to seeking care when ill. Our calculation of targeting exclusion based on reported healthcare use may have been underestimated in Table 2. But this does not affect our broader comparison of the PMT scores and household consumption (per adult equivalent) which did not consider health service use. While we applied the gold standard consumption expenditure approach, we were not able to perform sensitivity checks on household recall, test PMT model applicability in different regions, or quantify the impact of factors exogenous to PMT weighting (e.g. poor adherence to official procedures, stigmatization of beneficiaries) on targeting errors. Research is needed to better understand the impact of narrowly-focused demand-side financing on health service utilization and supply-side constraints.

CONCLUSION

The Sustainable Development Goals are building momentum for UHC in LMICs. However, countries with low coverage, limited financing, and weak health systems will likely not be in a position to rapidly achieve this goal. Recognizing the challenges faced by LMICs in increasing coverage, targeting represents an important tool for resource-constrained countries. More effort is needed to understand what targeting methods are the most suitable – both in terms of accuracy and implementability – for countries with low administrative capacity.

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Table 1: Summary Statistics for Sample Townships in Myanmar: Comparison of Township and National Data, 2014

Indicator	Township 1 (S)	Township 2 (S)	Township 1 (C)	Township 2 (C)	National
Population living in rural areas (%)	62.0	93.7	59.5	92.8	70.0
Population density (per square km)	202	210	201	191	76
Female headed households (%)	25.0	20.4	20.1	20.3	23.7
25+ Population Completed Primary School (%)	72.8	39.6	72.3	49.2	69.0
Share of Population 65+ (%)	8.5	4.8	4.9	5.3	5.8
Share with Population (0-14) (%)	28.6	27.3	31.6	29.4	28.6
Household Size	5.3	4.4	5.0	3.9	4.4
Population with access to drinking water from improved sources (%)	n. a.	n. a.	84.9	41.4	69.5
Households with access to mobile phone (%)	48.1	56.3	39.8	30.1	32.9
Households with Concrete/Brick Home Walls (%)	35.1	9.2	20.9	5.1	15.9
Electricity for lighting at home (%)	72.0	24.2	65.5	24.3	41.7
Population living below National Poverty Line (%)	20.7	16.7	n. a.	n. a.	32.1

Sources: (Columns 2 and 3) authors' (weighted) estimates based on sample survey undertaken in November-December 2014; (Columns 3 and 4) census data from (Government of Myanmar, 2017b, 2017a); (Column 5), census data from government of Myanmar (2015) and poverty estimates from a

report of the World Bank and the Ministry of Planning and Finance (World Bank, 2017a). *Note*: poverty ratios are based on the poverty line of 1303 Kyats per adult equivalent per day measure estimated in World Bank (World Bank, 2017b) and excludes health spending from total household expenditures when estimating the share of population living in poverty (see p.43 of World Bank 2017b).

Table 2: Receipt of HEF Hospital Admission Benefits by HEF-eligibility Indicator and Consumption Per Adult Equivalent (n=40)

Households with hospital admissions	Proportion receiving HEF benefits (in percent)	95% CI
Households with ineligible HEF proxy means test score (PMT < 50)	23.2	22.6-23.9
Households with eligible HEF proxy means test score (PMT >=50)	6.8	5.5-8.2
Households with consumption expenditure per adult equivalent in top 3 quartiles	23.5	22.8-24.2
Households with consumption expenditure per adult equivalent in bottom quartile	13.8	12.5-15.1
Non-poor Households based on poverty line consumption expenditure per adult equivalent (>1303 Kyats)	24.0	23.3-24.7
Poor households based on poverty line consumption expenditure per adult equivalent (≤ 1303 Kyats)	5.0	4.0-6.0

Note: Estimates based on household survey data for 40 inpatient stays, using household sampling weights. Exact confidence intervals were computed using binomial distributions. Consumption expenditure quartiles were constructed using data on the sample of 204 households, using household sampling weights.

Table 3: Improving Targeting: Predicting Household Monthly Expenditure Per Adult Equivalent

	Predictors of monthly consumption expenditure per adult equivalent (000s, Kyats)		
Explanatory variables	**Official HEF eligibility score**	**Official HEF eligibility score + other indicators in HEF instrument in Annex 1**	**Official HEF eligibility score + other indicators in HEF instrument in Annex 1 + selected other indicators**
PMT eligible for HEF (1 if eligible, 0 otherwise)	7.03 (7.49)	6.28 (7.13)	7.97 (7.04)
Whether brick house (1 if brick, 0 otherwise)		11.82 (9.47)	15.46* (9.34)
Whether wood house (1 if wood, 0 otherwise)		-7.54 (5.81)	-6.34 (5.63)
Whether house has electricity (1 if yes, 0 otherwise)		11.48** (5.37)	13.36** (5.53)
Whether own less than 3 acres land (1 if yes, 0 otherwise)		-10.69* (6.18)	-12.85** (6.08)
Whether own 1 cow or less (1 if yes, 0 otherwise)		-18.89** (4.81)	-17.38** (4.87)
Whether own tractor (1 if yes, 0 otherwise)		10.42 (11.13)	5.78 (10.76)
Whether own motorcycle (1 if yes, 0 otherwise)		3.68 (5.29)	0.77 (5.16)
Whether own boat (1 if yes, 0 otherwise)		1.99 (10.51)	5.68 (10.19)
Whether own phone (1 if yes, 0 otherwise)		-2.96 (5.29)	-2.06 (5.29)
Whether home owner			13.48*

(1 if yes, 0 otherwise)			(8.26)
Whether disabled or 65+ household member (1 if yes, 0 otherwise)			-15.69** (4.66)
Whether household-head completed primary school (1 if yes, 0 otherwise)			11.73** (4.81)
Whether rural resident (1 if yes, 0 otherwise)			5.71 (6.64)
Constant	66.31** (2.46)	98.86** (16.85)	74.93** (20.33)
F-statistic	0.88	4.02	4.64
Sample size	204	204	204

Note: The coefficients are sample-weighted estimates using household survey data for Myanmar. Standard errors are reported in parentheses below each estimate. **Significant at the 5% level; *Significant at the 10% level.

Figure 1: Correlating Proxy Means Test (PMT) scores and Household Expenditure (per adult equivalent per day) in Two Myanmar Townships, 2014